



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, US ARMY CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
BROOKLYN, NEW YORK 11252-6700

DEC 14 2012

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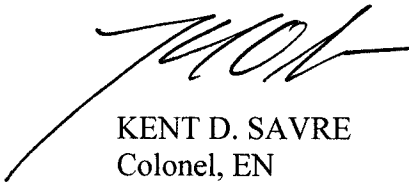
CENAD-PD-PP

MEMORANDUM FOR Commander, New York District, ATTN: CENAN-PL

SUBJECT: Review Plan Approval for Winooski River, Montpelier, Vermont, Flood Risk Management Feasibility Study

1. The attached Review Plan for the subject study has been prepared in accordance with EC 1165-2-209, Civil Works Review Policy.
2. The Review Plan has been coordinated with the Flood Risk Management Planning Center of Expertise of the South Pacific Division, which is the lead office to execute this plan. For further information, contact Mr. Eric Thaut at 415-503-6852. The Review Plan currently does not include independent external peer review and will be revised after a risk-informed decision analysis has been made.
3. I hereby approve this Review Plan, which 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 will require new written approval from this office.

Encl

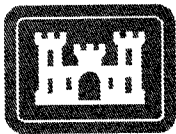

KENT D. SAVRE
Colonel, EN
Commanding

**REVIEW
PLAN**

**WINOOSKI RIVER
FLOOD RISK MANAGEMENT
FEASIBILITY STUDY
MONTPELIER, VERMONT**

**NEW YORK
DISTRICT**

DECEMBER
2012



**US Army Corps
of Engineers®
New York
District**

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1. PURPOSE AND REQUIREMENTS

This Peer Review Plan outlines the review plan for the Winooski River Flood Damage Reduction Project in Montpelier, Vermont. Engineering Circular 1165-2-209 "Civil Works Review Policy" a) establishes procedures to ensure the quality and credibility of Corps decision documents by adjusting and supplementing the review process and b) requires that documents have a review plan. The Circular applies to all feasibility studies and reports and any other reports that lead to decision documents that require authorization by Congress.

The Corps decision document for which this Peer Review Plan is intended is the Feasibility Report for the Winooski River Flood Risk Management Feasibility Study. The Project Management Plan (PMP) that was completed and approved in November 2009 includes a review plan as required by EC 1105-2-410.

(1) District Quality Control. District Quality Control (DQC) review will be performed by staff in the home district that are not involved in the study. Additional QC will be performed by the Project Delivery Team (PDT) during the course of completing the Feasibility Study. The detailed checks of computations and methodology will be performed at the District level, and the processes for this level of review are well established. A Quality Control Plan (QCP) is included in the PMP for the subject study and addresses DQC by the MSC/District.

(2) Agency Technical Review (ATR). Reviewing the technical aspects of the decision document is accomplished through an ATR level or approach. ATR is a critical examination by a qualified person or team outside of the home district that was not involved in the day-to-day technical work that supports the decision document. ATR is intended to confirm that such work was done in accordance with clearly established professional principles, practices, codes, and criteria. In addition to technical review, documents should also be reviewed for their compliance with laws, regulations and policies. The Circular also requires that DrChecks (<https://www.projnet.org/projnet/>) be used to document all ATR comments, responses, and associated resolution accomplished. To assure independence, the leader of the ATR team shall be from outside the home MSC. This Review Plan outlines the proposed approach to meeting this requirement for the Winooski River, Feasibility Study. ATR is required for this study.

(3) Independent External Peer Review (IEPR). The Circular added independent external peer review to the existing Corps review process. This approach does not replace the standard ATR process. The independent external peer review requirement applies in special cases where the magnitude and risk of the project are such that a critical examination by a qualified person

outside the Corps is necessary. IEPR can also be used where the information is based on novel methods, presents complex interpretation challenges, contains precedent-setting methods or models, or presents conclusions that are likely to change the prevailing practices. The degree of independence required for technical review increases as the project magnitude and project risk increase. In accordance with Section 2034 of the Water Resources Development Act of 2007 (P.L. 110-114), Independent External Peer Review shall be conducted for all projects with an estimated total cost of greater than \$45M dollars. The total project costs for this project will not be in excess of this amount; planning, design and engineering is estimated to cost approximately \$7M. Further, we do not anticipate that other criteria, such as innovative solutions and life safety issues will trigger the requirement for IEPR. Therefore an IEPR is not anticipated for this document. The District expects to submit a waiver to exclude the project study from IEPR.

(4) Planning Center of Expertise (PCX) Coordination. EC 1105-2-408 and EC 1105-2-410 outline PCX coordination in conjunction with preparation of the Review Plan. This Review Plan is being coordinated with the PCX for Flood Risk Management (FRM). The FRM-PCX is responsible for the accomplishment of ATR for the Winooski River, Montpelier, Vermont Feasibility Study. The DQC is the responsibility of the MSC/District and will be conducted in accordance with the District's Quality Management Plan. The FRM-PCX may conduct the review or manage the ATR.

(5) Policy and Legal Compliance Review. In addition to the technical reviews, decision documents will be reviewed throughout the study process for their compliance with law and policy. These reviews culminate in Washington-level determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the Chief of Engineers. Guidance for policy and legal compliance reviews is addressed further in Appendix H, ER 1105-2-100. Technical reviews described in EC 1105-2-410 are to augment and complement the policy review processes by addressing compliance with published Army policies pertinent to planning products, particularly policies on analytical methods and the presentation of findings in decision documents. DQC and ATR efforts are to include the necessary expertise to address compliance with published planning policy. When policy and/or legal concerns arise during DQC or ATR efforts that are not readily and mutually resolved by the PDT and the reviewers, the District will seek issue resolution support from the MSC and HQUSACE in accordance with the procedures outlined in Appendix H of ER 1105-2-100. Legal reviews will be conducted concurrent with ATR of the preliminary, draft and final feasibility report and environmental assessment.

(6) Review Plan Approval and Posting. In order to ensure the Review Plan is in compliance with the principles of EC 1105-2-410 and the MSC's QMP, the Review Plan must be approved by the applicable MSC, in this case the Commander, North Atlantic Division (NAD). Once the Review Plan is approved, the District will post it to its District public website and notify NAD and the FRM-PCX.

(7) Safety Assurance Review. In accordance with Section 2035 of WRDA 2007, EC 1105-2-410 requires that all projects addressing flooding or storm damage reduction undergo a safety assurance review during design and construction. Safety assurance factors must be considered in all reviews for those studies.

Safety assurance factors to be taken into consideration include:

- Where failure leads to significant threat to human life
- Novel methods\complexity\precedent setting models\policy changing conclusions
- Innovative materials or techniques
- Design lacks redundancy, resiliency or robustness
- Unique construction sequence or acquisition plans
- Reduced\overlapping design construction schedule

Implementation guidance for Section 2035 is under development. When guidance is issued, the study will address its requirements for addressing safety assurance factors, which at a minimum will be included in the draft report and appendices for public review. Prior to preconstruction engineering and design (PED) of the project identified for construction, a PMP will be developed that will include safety assurance review. Safety assurance review will also be accomplished during construction.

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the Flood Risk Management Planning Center of Expertise (FRM-PCX).

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The FRM-PCX will coordinate the Type 1 IEPR with the RMC to ensure that the safety assurance review will be included in the Type 1 IEPR. In addition, the FRM-PCX will coordinate with the Ecosystem Restoration PCX on the Planning models to be used for environmental impact analysis.

3. STUDY INFORMATION

A. Decision Document. The purpose of this study is to identify and evaluate Flood Risk Management (FRM) options in the Winooski River Basin, in Washington County, Vermont. The decision document, a Feasibility Report, will present planning, engineering and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the plan. The effort is a General Investigations funded study undertaken to evaluate structural and non-structural flood risk management measures, including but not limited to, floodwalls, levees, and channel modifications. The Feasibility Study is cost shared 50/50 with the project partner, the City of Montpelier, Vermont.

If the Feasibility report results in a supported recommended plan, the report will be sent to USACEHQ for approval and eventually to Congress for authorization for Planning, Engineering, Design and Construction. If total project costs fall under the limit of a Section 205 Flood Risk Management Continuing Authorities Program, there may be a recommendation to implement the

project under this authority which would not require Congressional Authorization. Continued coordination with the vertical team throughout the course of the feasibility study will ensure that this recommendation, if made, is with full support from the vertical team as well as the PDT and project stakeholders.

B. General Site Description. The study area lies along the Winooski River. The Winooski River is one of the major rivers in Vermont, with its headwaters in the Town of Cabot and its point of discharge into Lake Champlain (about ninety miles of total river length). The total drainage area for the Winooski River is approximately 1,080 square miles. The study area consists of the section of Montpelier which lies within the 500 year fluvial floodplain of the Winooski River and its tributaries. The study area limits begin at City of Montpelier/Town of Middlesex Town line and extends approximately 5.5 miles up the Winooski River to the City of Montpelier/Town of Berlin line. The study area also extends approximately .5 miles up the Dog River, .75 miles up the North Branch, and .5 miles of the Stevens Branch of the Winooski River.

C. Project Scope. Due to the considerable amount of effort that has been put into studying the Winooski River and flood conditions that affect the City, the Corps will utilize as many existing studies and as much existing data as possible. Some data from the 1994 Reconnaissance study has been determined to be relevant for use in the proposed Feasibility Study. Additionally the City and the State have put a great amount of resources and time into studying the River and proposing flood reduction measures on their own. No structural flood control measures have been constructed since the 1994 Reconnaissance Study.

Changes in existing conditions since 1994 as well as a change in the focus for the study have since occurred. Changes in existing conditions within the project area require the Study to include new data collection and inclusion of new technology for flood risk management. Further, this feasibility study will not focus on reduction of fluvial flood induced damages but will rather focus on reducing damages that occur as a result of ice jams on the Winooski River.

The scope of work for the feasibility study is laid out in the Project Management Plan which was approved in November 2009. Data collected to support the study will be done by a team made up of NAN technical offices, an approved AE, USACE's Cold Regions Research and Engineering Laboratory, the City of Montpelier Vermont (NF in-kind work will be limited to a structure inventory survey). All data collected to support the study will be subject to the same review process for technical acceptability and quality assurance.

The most challenging aspect of the study will most likely be identifying flood risk management measures that can be constructed within the constraints of the small project area as the flood plain has largely been developed.

D. Problems and Opportunities. The primary water resources problem within the Winooski River Basin is flooding to downtown Montpelier, Vermont induced by ice jams.

The study area within Montpelier has always been subject to ice jam floods due to the relatively steep river gradient upstream of the study area and float gradients downstream. Flood damages have continually increased since the City was initially settled in the 1700's because of development in and around the floodplain. Current development within the flood plain of the study area is subjected to inundation, surcharge seepage, and structural damage from ice jams and the resulting increase of the water surface of the river.

The basic objective of the plan formulation process is to identify and evaluate solution to the serious flooding problems which occur in the study area as a result of the ice jam-induced flooding, while at the same time protecting the existing resources of the stream and surrounding environment.

E. Potential Measures. The focus of the feasibility study will be to formulate and recommend alternatives that will reduce flood damage that occurs as a result of ice jam events. The Reconnaissance Study was thorough in preliminarily screening a number of measures to address ice jam induced flooding.

As a part of the development of the Project Management Plan, the City and Corps have concurred that limited resources will be spent on the measures that were determined in the 1994 Reconnaissance Study to be unfavorable. However for those measures that were determined to be favorable for ice jam induced flood risk management the Corps will formulate and make a recommendation for implementation. Additionally any new technology or possible measures for flood risk management will be considered in the feasibility study.

F. Potential Significant Impacts. The data collected and the limited alternative formulation that was done as part of the 1994 Reconnaissance Study was extensive and comprehensive. The Reconnaissance study indicated that there would likely be no negative impacts or effects on cultural, historical, tribal, fish, wildlife, and endangered species. Research and coordination was done in preparation of the PMP to ensure that the same was true at present day, which it is. Therefore the PDT anticipates no significant issues will arise relate to impacts of the project area environment.

G. Project Delivery Team. The Project Delivery Team (PDT) is comprised of those individuals directly involved in the development of the decision document. Individual contact information and disciplines are presented in Appendix B. Other agencies, USFWS, EPA, FEMA etc, will be involved as stakeholders as they are normally included in Corps studies. However, it is not anticipated that there will be significant interagency interest in the study outside of the regular coordination and updates for situational awareness.

H. Vertical Team. The Vertical Team includes District Management (Resource Providers), District Support Team (DST) and the HQUSACE Regional Integration Team (RIT) staffs as well as members of the Planning Community of Practice (PCoP). Specific points of contact for the Vertical Team can be found in Appendix B.

I. Planning Model Certification. The certified computational models to be employed in the Winooski River Basin Feasibility Study have been developed by CRREL.

A two dimensional computer simulated model (DynaRICE) will be employed by CRREL to determine the design requirements for ice control structures if this is in fact the chosen alternative for flood risk management. The Terrestrial & Cryospheric Sciences Branch of CRREL conducts research on the physics, geophysics, and geochemistry of terrain-atmosphere interaction and the dynamics of terrestrial material properties forced by weather and climate. In support of their cryospheric mission, this Branch performs research advancing the fundamental understanding of snow, ice, and frozen ground properties and processes.

Recent advances in discrete element modeling make possible the direct simulation of river ice which

is done at CRREL's laboratory in Hanover, NH. Two and three dimensional computer simulation modeling can be done although CRREL also has the ability to construct physical models at their laboratories in Hanover, NH.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

- a. Documentation of DQC. District Quality Control is documented through the use of Dr Checks and is performed by senior level staff in the appropriate technical offices. A Quality Control Report is produced, which documents the comments, evaluation and responses as well as requires a signature of each of the DQC reviewers and the Office of Counsel representative reviewing the report.
- b. Products to Undergo DQC. The products to undergo DQC include the In-progress Review Materials, the Alternative Formulation Briefing materials and the Draft and Final Feasibility Reports.
- c. Required DQC Expertise. The required DQC expertise includes senior level NEPA/environmental impact analysis review, hydrologic and hydraulic review, economic analysis review, as well as plan formulation review.

5. AGENCY TECHNICAL REVIEW PLAN

As outlined above in paragraph 1.B. (1), the District is responsible for ensuring adequate technical review of decision documents. The responsible PDT District of this decision document is New York (NAN). It is recommended that the Flood Risk Management PCX nominate individuals to serve as the review team, however, proposed Districts to undertake the review are included in Appendix B.

A. General. An ATR Manager from a district outside of NAD will be designated for the ATR process by the PCX. The ATR Manager is responsible for providing information necessary for setting up the review, communicating with the New York District's Plan Formulation Section Chief, providing a summary of critical review comments, collecting grammatical and editorial comments from the ATR team (ATRT), ensuring that the ATRT has adequate funding to perform the review, facilitating the resolution of the comments, and certifying that the ATR has been conducted and resolved in accordance with policy.

B. ATR Team (ATRT). The ATRT will be comprised of individuals that have not been involved in the development of the decision document and will be chosen based on expertise, experience, and/or skills. The members will roughly mirror the composition of the PDT. It is anticipated that the team will consist of approximately 8 reviewers. The ATRT members will be identified at the time the review is conducted and will be presented in Appendix B.

C. Communication. The communication plan for the ATR is as follows:

(1) The team will use DrChecks to document the ATR process. The NAN Plan Formulation Section Chief will facilitate the creation of a project portfolio in the system to allow access by all PDT and ATRT members. An electronic version of the document, appendices, and any significant and relevant public comments shall be posted in Word format at: <ftp://ftp.usace.army.mil/pub/> at least one business day prior to the start of the comment period.

(2) The PDT shall host an ATR kick-off meeting virtually to orient the ATRT during the first week of the comment period. If funds are not available for an on-site meeting, the PDT shall provide a presentation about the project, including photos of the site, for the team.

(3) The NAN Plan Formulation Section Chief shall inform the ATR manager when all responses have been entered into DrChecks and conduct a briefing to summarize comment responses to highlight any areas of disagreement.

(4) A revised electronic version of the report and appendices with comments incorporated shall be posted at <ftp://ftp.usace.army.mil/pub/> for use during back-checking of the comments.

(5) Team members shall contact ATRT members or leader as appropriate to seek clarification of a comment's intent or provide clarification of information in the report. Discussions shall occur outside of DrChecks, but a summary of discussions may be provided in the system.

(6) Reviewers will be encouraged to contact PDT members directly via e-mail or phone to clarify any confusion. DrChecks shall not be used to post questions needed for clarification.

D. Funding

(1) The PDT district shall provide labor funding by cross charge labor codes. Funding for travel, if needed, will be provided through a government order. The NAN Plan Formulation Section Chief and the NAN Project Manager will work with the ATR manager to ensure that adequate funding is available and is commensurate with the level of review needed. The current cost estimate for each review is \$15,000 (P7, AFB, Draft Report, Final Report). Any funding shortages will be negotiated on a case by case basis and in advance of a negative charge occurring.

- (2) The ATR Manager shall provide organization codes for each of the ATR team members and a responsible financial point of contact (CEFMS responsible employee) for creation of labor codes.
- (3) ATRT members shall monitor individual labor code balances and alert the ATRT Manager to any possible funding shortages.

E. Timing and Schedule

(1) Throughout the development of this document, the team will hold planning meetings to ensure planning quality. Senior staff and subject matter experts from the PDT District and members of the vertical team (DST, PCX, Planning CoP, and RIT, as needed) will attend the meetings and provide comments on the product (2) The ATR will begin with the without project conditions, Hydrology and Hydraulics, and Economics sections of what will ultimately become the P7 Report, or Preliminary Alternatives Report. This will include the preliminary formulation, economics, and preliminary engineering design, including the H&H model. The Alternative Formulation Briefing (AFB) review will include the plan formulation process, economics, environmental assessment, preliminary engineering design, and the recommended plan. (3) The PDT will hold a “page-turn” session to review the draft report to ensure consistency across the disciplines and resolve any issues prior to the start of ATR. Writer/editor services will be performed on the draft prior to ATR as well (4) see proposed detailed schedule below.

Proposed Study Schedule

Feasibility Cost Sharing Agreement Executed	1/1/10
NEPA Scoping Meeting/Reduced Level Public Meeting	1/16/10
Economic Flood Damage Analysis w/o project	10/8/10
Preliminary formulation & screening of alternatives	1/5/12
Interim Review of prelim. Formulation	2/1/12
Formulation Scoping Meeting	1/12/12
Alternative Formulation Briefing	1/4/12
AFB Guidance Memorandum	1/25/12
Environmental Assessment	1/11/12
Final Selected Plan	1/5/12
Interim Review of Selected Plan	1/1/12
Draft EA	1/3/13
Existing Conditions Hydrology and Hydraulics	1/16/13
District ITR	1/7/13
Draft Report Complete	1/7/13
Final EA	1/29/13
Submit Final Report and Final NEPA document to HQ for approval	1/29/13
OWRB	1/1/13
HQ Approval of FR	2/13/13

F. Review

(1) ATRT responsibilities are as follows:

(a) ATRT members shall review the draft report(s) to confirm that work was done in accordance with established professional principles, practices, codes, and criteria and for compliance with laws and policy. Comments on the report shall be submitted into DrChecks.

(b) Reviewers shall pay particular attention to one's discipline but may also comment on other aspects as appropriate. Reviewers that do not have any significant comments pertaining to their assigned discipline shall provide a comment stating as such.

(c) Grammatical and editorial comments shall not be submitted into DrChecks. Comments should be submitted to the ATR manager via electronic mail using tracked changes feature in the Word document or as a hard copy mark-up. The ATR manager shall provide these comments to the NAN Plan Formulation Section Chief.

(d) Review comments shall contain these principal elements:

- a clear statement of the concern
- the basis for the concern, such as law, policy, or guidance
- significance for the concern
- specific actions needed to resolve the comment

(e) The "Critical" comment flag in DrChecks shall not be used unless the comment is discussed with the ATR manager and the NAN Plan Formulation Section Chief first

(2) PDT Team responsibilities are as follows:

- (a) The team shall review comments provided by the ATRT members in DrChecks and provide responses to each comment using “*Concur*”, “*Non-Concur*”, or “*For Information Only*”. *Concur* responses shall state what action was taken and provide revised text from the report if applicable. *Non-Concur* responses shall state the basis for the disagreement or clarification of the concern and suggest actions to negotiate the closure of the comment.
- (b) PDT Team members shall contact the PDT and ATRT managers to discuss any “Non-Concur” responses prior to submission.

G. Resolution

- (1) Reviewers shall back check PDT responses to the review comments and either close the comment or attempt to resolve any disagreements. Conference calls shall be used to resolve any conflicting comments and responses.
- (2) Reviewers may “agree to disagree” with any comment response and close the comment with a detailed explanation. If reviewer and responder cannot resolve a comment, it should be brought to the attention of the ATR manager and, if not resolved by the ATR manager, it should be brought to the attention of the Chief, Planning Division, NAN who will need to sign the certification. ATRT members shall keep the ATR manager informed of problematic comments. The vertical team will be informed of any policy variations or other issues that may cause concern during HQ review.

H. Certification

To fully document the ATR process, a statement of technical review will be prepared. Certification by the ATR manager and the NAN Plan Formulation Section Chief will occur once issues raised by the reviewers have been addressed to the review team’s satisfaction and the final report is ready for submission for HQ review.

Indication of this concurrence will be documented by the signing of a certification statement (Appendix A). A summary report of all comments and responses will follow the statement and accompany the report throughout the report approval process. An interim certification will be provided by the ATR manager to indicate concurrence with the report to date until the final certification is performed when the report is considered final.

I. Alternative Formulation Briefing (AFB)

The AFB for this project will occur after the PDT has developed the alternatives to a sufficient level of detail that would allow for review of the plan formulation process. It is possible that the briefing will result in technical or policy comments from high level reviewers for resolution. The resolution of significant policy comments may result in major changes to the document. Therefore, the ATRT members will perform a review of the report to ensure that technical issues are resolved.

6. INDEPENDENT EXTERNAL PEER REVIEW PLAN

The Circular added independent external peer review to the existing Corps review process. This approach does not replace the standard ATR process. The independent external peer review requirement applies in special cases where the magnitude and risk of the project are such that a critical examination by a qualified person outside the Corps is necessary. IEPR can also be used where the information is based on novel methods, presents complex interpretation challenges, contains precedent-setting methods or models, or presents conclusions that are like to change the prevailing practices. The degree of independence required for technical review increases as the project magnitude and project risk increase. In accordance with Section 2034 of the Water Resources

Development Act of 2007 (P.L. 110-114), Independent External Peer Review shall be conducted for all projects with an estimated total cost of greater than \$45M dollars. The total project costs for this project will not be in excess of this amount; planning, design and engineering is estimated to cost approximately \$7M. Further, we do not anticipate that other criteria, such as innovative solutions and life safety issues will trigger the requirement for EPR. Therefore an IEPR is not anticipated for this document. The District expects to submit a waiver to exclude the project study from IEPR.

A. Project Magnitude. The magnitude of this project is determined as low, as shown in Table 4.1, below. The cost of the project will not exceed \$45 million. The project is not considered complex and involves implementation of standard concepts. It is anticipated that the report will not present influential scientific information or influential scientific assessments.

B. Project Risk. This project is considered low, low-medium risk overall. The potential for failure is low because the project involves straight forward concepts with numerous successful national applications. The potential for controversy regarding project implementation is low because the recommended plan will take into account the public concerns. A socio-economic analysis will be prepared and at least one public meeting will be held. The uncertainty of success of the project is low-medium because the methods used for evaluating the project have been practiced at CRREL and the concept of implementing proposed project features is no longer considered innovative.

Project Risk was assessed using Table 4.2 below. Other District projects were considered as a comparison and previous project experience was also considered when making this analysis.

Table 4.1: Project Magnitude Assessment

Project Magnitude Item	Assessment Score (Low Degree to High Degree)					Score
	Low		Medium		High	
Project Schedule/Cost	1	2	3	4	5	1
Project Complexity	1	2	3	4	5	2
Project Benefits	1	2	3	4	5	3
Project Scale	1	2	3	4	5	1
Avg. Project Magnitude Score						.75

Table 4.2: Project Risk Assessment

Project Risk Item	Assessment Score (Low Degree to High Degree)					Score
	Low		Medium		High	
Potential for Failure	1	2	3	4	5	3
Uncertainties of Predictions	1	2	3	4	5	3
Long Term Cumulative Effects/Customer Expectations	1	2	3	4	5	3
Staff Technical Experience	1	2	3	4	5	4

Failure Impact and Consequences	1	2	3	4	5	2
Avg. Project Risk Assessment Score						3

C. Vertical Team Consensus. This review plan will serve as the coordination document to obtain vertical team consensus. Subsequent to PCX concurrence, the plan will be provided to the NAD for approval. MSC approval of the plan will indicate vertical team consensus. The ATR and Public and Agency Review will serve as the main review approaches.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports 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. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-407 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, for the purposes of the EC, are defined as any models and analytical tools that planners use 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 the planning product. 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 (if required).

EC 1105-2-407 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever 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 (if required).

- a. **Planning Models.** The following planning models are anticipated to be used in the development of the decision document: HEC-FDA 1.2. and a Stream Impact Assessment Spreadsheet Model. See the table below for a detailed description of these Planning models.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.4 (Flood Damage Analysis)	The Hydrologic Engineering Center’s Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans along the Wild River near River City to aid in the selection of a recommended plan to manage flood risk.	Certified
Stream Impact Assessment - spreadsheet model	<p>Given the variety of alternatives formulated for this project, the urbanized nature of the Project Area and the lack of significant natural resources identified , a two phased approach will be utilized to evaluate and quantify the impacts to natural resources and the associated mitigation requirements of each impact.</p> <p>For the screening of preliminary alternatives, the following method will be used:</p> <p>Consideration of the extent of development within and surrounding the Project Area and its effect on the</p>	Not certified; will initiate approval process in 2 nd quarter FY11.

	<p>identification of suitable mitigation sites; New Jersey Flood Hazard Area Control Act Rules, which regulates activities in the riparian zone and outlines mitigation requirements; New Jersey Freshwater Wetlands Regulations; New Jersey Green Acres Regulations, which regulates open space preservation and outlines mitigation requirements when the use on subject properties is modified for purposes other than recreation/open space; Corps ETL 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams and Appurtenant Structures.</p> <p>It should be noted that this preliminary alternative screening method was approved by the ECO-PCX via email dated 13 September 2010 (Attachment 1).</p> <p>The alternative selected for further evaluation involves river channelization and the creation of a diversion culvert. Currently, there is no state specific or regional method that focuses on quantifying stream function and impacts resulting from channel modification activities that could be applied to this project. Therefore, the PDT will create a series of worksheets modeled after those developed and implemented by the Regulatory Divisions at the USACE Kansas City, Little Rock, Omaha and Rock Island Districts that quantifies the adverse impacts caused by the proposed activity and establishes the appropriate level and type of mitigation required to compensate for the impacts.</p> <p>A stream assessment and fish and macroinvertebrate studies utilizing the Environmental Protection Agency Rapid Bioassessment Protocols (EPA RBP) method were conducted as part of the Feasibility Study. The PDT will use the data obtained from the EPA RBP studies in conjunction with New Jersey State environmental regulations to assist in developing the worksheets. The worksheets will then be applied to each variation of the alternative created during the optimization process to compare the level of environmental impacts and mitigation requirements.</p>	
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- b. **Engineering Models.** The following engineering models are anticipated to be used in the development of the decision document: HEC-RAS 4.0 and HEC-HMS are the two engineering models to be used in this study.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-RAS 4.0 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions along the Wild River and its tributaries. [For a particular study the model could be used for unsteady flow analysis or both steady and unsteady flow analysis. The review plan should indicate how the model will be used for a particular study.]	HH&C CoP Preferred Model
HEC-HMS	This model will be used to define the watersheds' physical features; describe the metrological conditions; estimate parameters; analyze simulations; and obtain GIS connectivity	HH&C CoP Preferred Model

10. REVIEW SCHEDULES AND COSTS

- a. ATR Schedule and Cost. The current ATR schedule is as follows:

The estimate cost for the AFB effort is \$20K, Draft Feasibility Report effort is \$20K, and Final Feasibility Report effort is \$10K. This budget includes participation of the ATR lead at the AFB meeting, and the CWRB to address the ATR process and any significant and/or unresolved ATR concerns.

- b. Type I IEPR Schedule and Cost. N/A
- c. Model Certification/Approval Schedule and Cost. N/A

11. PUBLIC PARTICIPATION

Public review of the draft report will occur after completion of the ATR and concurrence by NAD and HQUSACE that the document is ready for public release. As such, public comments other than those provided at any public meetings held during the planning process will not be available to the review team. However, the PDT may hold an “information session” with the public to describe the recommendations and findings and to gather public opinion information. It is not anticipated that the study or proposed project will be highly controversial. The City maintains a direct line of communication with its community through its website and public/City meetings of which the topic of flooding and potential solutions is often a subject. Communication with the public and other stakeholders will continue to be an important part of the study process.

Public review of the draft report will begin approximately one (1) month after the completion of the ATR process and policy guidance memo. The period will last 30 days as required. Public review comments will be forwarded to the ATR Team Leads upon completion of the public review comment period.

A formal State and Agency review will occur concurrently with the public review. However, it is anticipated that intensive coordination with these agencies will have occurred concurrently with the planning process.

Upon completion of the review period, comments will be consolidated and addressed if needed. A comment resolution meeting will take place if needed to decide upon the best resolution of comments. A summary of the comments and resolutions will be included in the final document.

12. REVIEW PLAN APPROVALS AND UPDATES

The PDT will carry out the review plan as described. The NAN Plan Formulation Section Chief will submit the plan to the Chief, Planning and Policy Community of Practice, North Atlantic Division for approval. Coordination with the PCX will occur through the NAN Planning Chief.

13. REVIEW PLAN POINTS OF CONTACT

The appropriate PCX for this document is the National Flood Risk Management Center of Expertise located at South Pacific Division (SPD). This review plan will be submitted to the PCX Director, for approval and designation of an ATRT manager. IEPR will not be required therefore PCX coordination regarding an IEPR will not be necessary. The District expects to submit a waiver to exclude the project study from IEPR.

Name	Discipline	Phone	Email
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Thomas J. Hodson	NAN Plan Formulation Branch Chief	17-790-8602	thomas.J.Hodson@usace.army.mil
Anthony Ciorra	NAN PPMD Civil Works Branch Chief	17-790-8208	anthony.ciorra@usace.army.mil
Leonard J. Houston	NAN Environmental Analysis Branch Chief	17-790-8702	leonard.houston@usace.army.mil
Joe Forcina	NAD DST Lead	18-765-7084	joseph.Forcina@usace.army.mil
Wes Coleman	NAD RIT	02-761-5782	Wesley.E.Coleman@usace.army.mil
Eric Thaut	ARM PCX Lead	15-503-6852	eric.w.thaut@usace.army.mil
Others as necessary			

ATTACHMENT 1

TEAM ROSTERS

PROJECT DELIVERY TEAM

Name	Discipline	Phone	Email
Jenifer Thalhauser	Project Management	(917) 790-8632	Jenifer.E.Thalhauser@usace.army.mil
Jason Shea	Section Chief, Plan Formulation	x-8727	Jason.A.Shea@usace.army.mil
Carrie McCabe	Plan Formulation/Economics	x-8606	Caroline.M.Mccabe@usace.army.mil
Nancy Brighton	Section Chief, Environmental Analysis	x-8703	Nancy.J.Brighton@usace.army.mil
Kimberly Rightler	Biology/NEPA	x-8722	Kimberly.A.Rightler@usace.army.mil
Carissa Scarpa	Cultural Resources	x-8612	Carissa.A.Scarpa@usace.army.mil
Stanley Nuremberg	Real Estate	x-8436	Stanley.Nuremberg@usace.army.mil
Frank Santangelo	Chief, Engineering Civil Works Branch	x-8296	Angelo.R.Trotto@usace.army.mil
Peter Koch	Hydrologist	x-8359	Peter.M.Koch@usace.army.mil
Ray Schembri	Hydraulic Engineer	x-8265	Raymond.L.Schembri@usace.army.mil

AGENCY TECHNICAL REVIEW TEAM

Name	Discipline	Possible Review District**
TBD	ATR Manager/Plan Formulation	South Pacific Division (SPD); Alaska District
TBD	Civil Design	Alaska
TBD	Biology/NEPA	New England
TBD	Hydrology/Hydraulics	Alaska
TBD	Economics	Baltimore
TBD	Cost-Engineering*	New England
TBD	Real Estate	Philadelphia
TBD	Cultural Resources	St. Louis

* The cost engineering team member nomination will be coordinated with the NWW Cost Estimating Center of Expertise as required. NWW will determine if the cost estimate will need to be reviewed by PCX staff. **All resumes will be reviewed and approved by the PCX prior to initiating any ATR.

AGENCY TECHNICAL REVIEW TEAM DISCIPLINE DESCRIPTIONS

Discipline-Specific Guidance & Requirements. ATR Team representation is required in the disciplines listed below. In general, the ATR team members will each have a minimum of 15 years experience in their respective discipline and hold a Professional Engineer license where applicable. A statement of qualifications is required for each team member prior to acceptance as an ATR Team member and for any subsequent changes thereto.

Hydrology & Hydraulics: Team member will be an expert in the field of ice hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of ice piers for ice breakup, effects of best management practices and low impact development on hydrology, approaches that can benefit water quality, application of ice retention structures in an urban environment with space constraints, non- structural measures where applicable including non-structural solutions involving non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project.

Structural: Team member will have a thorough understanding of non-structural measures, ice retention structures and other ice breakup structures typically associated with ice jam flooding. A certified professional engineer is recommended though not required.

Mechanical: Engineering disciplines other than Mechanical may be acceptable for review of this area of work subject to meeting the experience requirement stated above.

Geotechnical: Team member will have extensive experience in ice retention structure design, post-construction evaluation, and rehabilitation. A certified professional engineer is recommended.

Economics: Team member will have extensive experience in related flood risk management projects, and have a thorough understanding of HEC-FDA.

Plan Formulation: Team member will be familiar with watershed level projects, current flood risk management planning and policy guidance, and have experience in plan formulation for multipurpose projects, specifically integrating measures for flood risk management, ecosystem restoration, recreation, a watershed approach, and planning in a collaborative environment.

Civil / Site / Utilities / Relocations: This discipline may require a dedicated team member, or may be satisfied by structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations, positive closure requirements and internal drainage for levee construction, and application of non-structural flood risk management, specifically flood proofing. A certified professional engineer is suggested.

Cost Estimating: Team member will be familiar with cost estimating for similar projects using MCACES. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. A separate process and coordination is also required through the Walla Walla District DX for cost engineering.

Other disciplines/functions involved in the project include Hazardous/Toxic Waste, Environmental/NEPA, Real Estate, Cultural Resources, and Legal. In each case, any required Independent Technical Review within these disciplines may be accomplished within District or by other independent sources. The general experience requirements and principles contained in this

document also apply to these disciplines/functional areas.

(Exception: Legal review is not under the purview of the ATR Manager but is instead responsible to the Corps of Engineers Office of Counsel chain-of-command).

ATR Manager. One member of the ATR Team will act as the ATR manager. Manager designation will be finalized based on input from the PCX. The ATR manager shall, in addition to discipline-specific review requirements, be responsible for:

Acting as a liaison between the Project Development Team and the ATR Team

In conjunction with the NAN Plan Formulation Section Chief, the ATR manager will perform active coordination of the ATR process and study findings with the Corps Flood Risk Management Center of Expertise (FRM) in South Pacific Division, and ensure compliance with an adequate level of FRM review.

Distributing information for review and coordinating efforts of the ATR Team. Ensuring that individual ATR Team members are operating IAW the guidelines established for ATR by EC 1105-2-410. The ATR team is not geographically co-located. Therefore, it is of paramount importance that the ATR Manager be capable of organizing the total ATR efforts across District and Division boundaries. A substitute ATR Manager from the ATR team will be named by the ATR Manager for periods of extended (over 60 days) absence.

VERTICAL TEAM

Name	Discipline	Phone	Email
Thomas J. Hodson	NAN Plan Formulation Branch Chief	917-790-8602	Thomas.J.Hodson@usace.army.mil
Anthony Ciorra	NAN PPMD Civil Works Branch Chief	917-790-8208	Anthony.ciorra@usace.army.mil
Leonard J. Houston	NAN Environmental Analysis Branch Chief	917-790-8702	Leonard.houston@usace.army.mil
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Peter Blum	NAD Planning CoP	718-765-7066	Peter.R.Blum@usace.army.mil
Joe Forcina	NAD DST Lead	718-765-7084	Joseph.Forcina@usace.army.mil
Wes Coleman	NAD RIT	202-761-5782	Wesley.E.Coleman@usace.army.mil
Eric Thaut	FRM PCX Lead	415-503-6852	Eric.w.thaut@usace.army.mil
Others as necessary			

ATTACHMENT 2

STATEMENT OF TECHNICAL REVIEW

**COMPLETION OF AGENCY TECHNICAL REVIEW WINOOSKI RIVER
FLOOD RISK MANAGEMENT FEASIBILITY STUDY MONTPELIER, VERMONT**

WITH ENVIRONMENTAL ASSESSMENT AND APPENDICES

The New York District has completed the project implementation report (Feasibility Report) with an Environmental Assessment and appendices for the Winooski River Flood Risk Management Feasibility Study. Notice is hereby given that an agency technical review, that is appropriate to the level of risk and complexity inherent in the project, has been conducted as defined in the Review Plan. During the agency technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level obtained; and reasonableness of the result, including whether the product meets the customer's needs consistent with law and existing Corps policy. The ATR was accomplished by an agency team composed of staff from multiple districts. All comments resulting from the ATR have been resolved.

TBD

Agency Technical Review Team Manager
New York District

TBD NAME NAME

Plan Formulation Section Chief

CERTIFICATION OF AGENCY TECHNICAL REVIEW

A summary of all comments and responses is attached. Significant concerns and the explanation of the resolution are as follows:

(Describe the major technical concerns, possible impact and resolution)

As noted above, all concerns resulting from the agency technical review of the study have been fully resolved.

NAME
Chief, Planning Division
New York District

Date

ATTACHMENT 3

REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
Jan 2010	Review Plan Approval @ NAD	
15 November 2012	Updated for 2012 request for updates & reformat	

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
		WRDA	Water Resources Development Act

MEMORANDUM FOR RECORD

SUBJECT: Winooski River Flood Damage Reduction Feasibility Study – Risk Informed Assessment of Significant Threat to Human Life

1. Project Information. The study area lies along the Winooski River. The Winooski River is one of the major rivers in Vermont, with its headwaters in the Town of Cabot and its point of discharge into Lake Champlain (about ninety miles of total river length). The total drainage area for the Winooski River is approximately 1,080 square miles. The study area consists of the section of Montpelier which lies within the 500 year floodplain of the Winooski River and its tributaries. The study area limits begin at City of Montpelier/Town of Middlesex Town line and extends approximately 5.5 miles up the Winooski River to the City of Montpelier/Town of Berlin line. The study area also extends approximately .5 miles up the Dog River, .75 miles up the North Branch, and .5 miles of the Stevens Branch of the Winooski River.

The reconnaissance study on flood damage reduction in the City of Montpelier, Vermont (the City) was authorized under Section 309(I) of the Water Resources Development Act of 1992. A reconnaissance report dated April 1994 presents the results of the investigation into the flowing problems in the flood study area, which is located in the Winooski River floodplain and its Dog River, North Branch, and Stevens Branch tributaries in Washington County, Vermont.

2. Project Description.

In 1996, the Winooski River Flood Damage Reduction Reconnaissance Study was completed approved, but did not progress into the Feasibility phase. As a result of a potentially serious freezeup ice jam event in January 2006, the City of Montpelier, VT (the City) expressed their renewed interest in carrying the study forward into the feasibility phase. The NY District has held several meetings with the City and the State of Vermont (the State) to discuss current problems, opportunities, and constraints and what differences exist between current conditions and conditions that existed at the time the 1994 Reconnaissance Study Report was completed. This Study will update the information in the 1994 Reconnaissance Phase, shift focus to ice-jam induced flood damages, remove focus on fluvial flood damages, and complete alternative analysis.

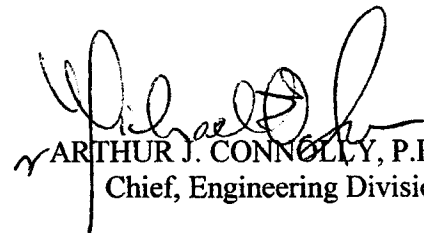
3. Risk Informed Assessment

A Safety Assurance Review (SAR) as part of a Type I IEPR is typically warranted due to the potential for risk to life safety involved in any FRM project. However, it is too early in the study process to accurately predict the level of risk involved to human life. We do not envision the use

of innovative materials or techniques in any of the alternatives nor will precedent setting methods or models be used. We expect the design of the selected alternative to be robust and resilient and include redundancy in the critical components of the system.

4. Determination

The risk informed assessment of significant threat to human life will be performed once the tentatively selected plan is identified and optimized. If a SAR is required, the Review Plan will be revised to include a SAR for the selected plan.



ARTHUR J. CONNOLLY, P.E.,
Chief, Engineering Division