

**DELAWARE RIVER BASIN COMPREHENSIVE  
NEW YORK, NEW JERSEY, PENNSYLVANIA, MARYLAND AND DELAWARE:  
INTERIM FEASIBILITY STUDY FOR THE DELAWARE RIVER WATERSHED  
FLOOD MANAGEMENT PLAN**

**QUALITY CONTROL (QC) AND  
INDEPENDENT TECHNICAL REVIEW (ITR) PLAN**

**1.0 PURPOSE**

This Review Plan presents the process that assures quality products for the Delaware River Watershed Flood Management Plan Interim Feasibility Study, General Investigation (GI). This QC and ITR Plan define the responsibilities and roles of each member on the study and technical review team.

The product to be reviewed by the technical review team is the integrated Feasibility Report. Under the provisions of new U.S. Army Corps of Engineers (USACE) policy, the ITR will be conducted by specialists from organizations outside of the district responsible for the study. Independent Technical Review will be conducted for all decision documents and will be independent of the technical production of this project. This QC and ITR Plan is, by reference, a part of the PMP for this Feasibility Study.

**2.0 APPLICABILITY**

This document provides the Quality Control Plan for the Feasibility Study. It identifies quality control processes and independent technical review for all work to be conducted under this study authority, including in-house, sponsor and contract work.

**3.0 REFERENCES**

EC1105-2-408 “Peer Review of Decision Documents” dated May 31, 2005  
EC 1105-2-407 “Planning Models Improvement Program: Model Certification” (May 31, 2005)  
EC 1105-2-409 “Planning in a Collaborative Environment” (May 31, 2005)  
ER 1105-2-100 “Planning Guidance Notebook & Appendices”

**4.0 GENERAL PROJECT DESCRIPTION**

The Corps of Engineers has been given the authority under Section 729 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 202 of WRDA 2000, to conduct a reconnaissance study and any ensuing feasibility level investigations in the Delaware River Basin. The Delaware River Basin was listed as a priority river basin and the authority provides that:

“The Secretary may assess the water resources needs of river basins and watershed of the Unites States, including needs relating to: (1) ecosystem protection and restoration; (2)

flood damage reduction; (3) navigation and ports; (4) watershed protection; (5) water supply; and (6) drought preparedness.”

In addition, on July 20, 2005 the United States Senate Committee on Environment and Public Works requested that the Secretary of the Army review the report of the Chief of Engineers on the Delaware River and its tributaries, Pennsylvania, New Jersey, and New York, published as House Document 179, Seventy Third Congress, Second Session, with a view to determining whether any modifications of the recommendations contained therein are advisable in the interest of ecosystem restoration, flood plain management, flood control, water quality control, groundwater and subsidence management, comprehensive watershed management, recreation and other allied purposes.

This study will allow the Corps to participate in the Interstate/Interagency flood mitigation task force which is being managed by the Delaware River Basin Commission (DRBC). The study will focus primarily on flood damage reduction through the creation of a suite of software which will be used to evaluate the various operational objectives of the Delaware River Basin Reservoir system. These objectives could include navigation, flood damage reduction, fish and wildlife habitat considerations, recreation, water quality, water supply, erosion and sedimentation control, hydropower production, and sustaining hydrologic function on lakes and rivers. This study will include the creation of a flood analysis model (which will be developed by HEC and USGS) and flood inundation maps to improve the Basin’s flood warning system.

## **5.0 REVIEW REQUIREMENTS**

Initial Quality Control (QC) review will be handled within the Section or Branch performing the work or by staff in the corresponding Sponsor Department when it involves In-Kind Services. Additional QC will be performed by the PDT during the course of completing the Feasibility Study. The detailed checks of computations and methodology should be performed at the District level, and the processes for this level of review are well established.

Pursuant to EC 1105-2-408, item 2 c (2), Models used in the preparation of decision documents covered by this Circular will be reviewed in accordance with EC 1105-2-407, Planning Models Improvement Program: Model Certification, and are not subject to the requirements of this Circular. The uses and applications of models in individual studies that lead to the preparation of decision documents covered by this Circular will be reviewed in accordance with the requirements of this Circular.

Pursuant to EC 1105-2-408, due to the complex nature of this project the Feasibility Report will need an ITR team assigned by the PCX for Flood Damage Reduction Projects. Coordination is ongoing. CESPDPD-TP will assign this team. It is recommended that the ITR be handled entirely within USACE, as the scope and technical complexity do not warrant an External Peer Review (EPR), based upon the initial Risk Screening Process conducted by the Project Development Team (PDT) noted in Section 9. It is anticipated that while this study will be challenging and beneficial, it will not be novel, controversial or precedent setting, nor have significant national importance. As a result, the ITR will focus on:

- Review of the planning process and criteria applied.
- Review of the methods of preliminary analysis and design.
- Compliance with authority and NEPA requirements.
- Completeness of preliminary design and support documents.
- Spot checks for interdisciplinary coordination.

## 6.0 REVIEW PROCESS

It is anticipated that the ITR Team Review Process will begin after the ITR Team has been assigned, and will cover the feasibility study and associated products. Coordination is ongoing with the PCX Center of Expertise. The Review Process will focus on data, assumptions and the engineering, scientific and economic analysis process. Major Review Process milestones are listed below:

- Approval of Review Plan by NAD
- ITR team assigned by PCX
- Draft Report Review
- Final Report Review

## 7.0 REVIEW COST

The cost of the ITR is to be estimated. It is anticipated that documents to be reviewed will be transmitted electronically. Comments will be made and addressed in Dr. Checks, a Corps computer program applied to aggregate comments. It is also assumed that the ITR team will be working virtually. The ITR team, or a representative of that team, will be required to physically attend significant team or milestone meetings. The team should participate in all P milestone meetings; however, via conference call or video tele-conference.

## 8.0 REVIEW SCHEDULE

Note that since the commencement of this study preceded the requirement for PCX involvement and development of this Review Plan, the review schedule below does not match the major review process milestone list above.

TASK	START DATE	FINISH DATE
Develop ITR Plan & post to Web Site, PCX		Aug-07
Identify Regional ITR resources & Recommend ITR Plan to PCX		Aug 07
PCX Approves or Assigns ITR Team	TBD	
Review of Draft Feasibility Report	TBD	
Review Final Feasibility Report	TBD Based on HQ comments and Public review	

## 9.0 PROJECT RISK

The PDT members were asked to rate their assessment of the risk associated with this project based upon several factors and rate the project quantitatively among the defined levels of project risk of failure ranging from low to high. Based upon this analysis by the PDT, the project is projected to be low to medium in risk. The PDT considered previous District project experience when making this analysis. No attempt was made to tie this to a national scale of rating, so it is likely that the risk level would have been lower if the team were to have compared the risk of this project to a large flood damage reduction project.

The Project Delivery Team (PDT) scored each item in the QCP Score Guide (Table 9.1) to get an average score. The Project schedule and cost were assessed as a low degree of risk if they both remained flexible and a high degree of risk if the Project schedule and cost was fixed. Staff Technical Experience was assessed as a low degree of risk if the staff had a high level of flood damage reduction experience and a high degree of risk if the staff had a low level of flood damage reduction experience. The score for the risk items were summed and the average value of the Assessment Score was used to determine the overall level of project risk. The results of the evaluation are tabulated as follows:

**Table 9.1 Quality Control/Review Plan Score Guide**

Project Risk Item	Assessment Score (Low Degree to High Degree)					Score
	Low		Medium		High	
Potential for Failure	1	2	3	4	5	2
Uncertainties of Predictions	1	2	3	4	5	4
Long Term Cumulative Effects/Customer Expectations	1	2	3	4	5	3
Staff Technical Experience	1	2	3	4	5	2
Failure Impact and Consequences	1	2	3	4	5	2
<b>Average Project Risk Assessment Score</b>						<b>2.6</b>
<b>Project Magnitude Item</b>						
Product Schedule/Cost	1	2	3	4	5	4
Project Complexity	1	2	3	4	5	3
Project Benefits	1	2	3	4	5	4
Project Scale	1	2	3	4	5	2
<b>Average Project Magnitude Assessment Score</b>						<b>3.25</b>

## 10.0 REVIEW PLAN

The components of the Review Plan (external ITR only) were developed pursuant to the requirements of EC1105-2-408.

### 10.1 Team Information

The decision documents that will be the ultimate focus of the peer review process are the Integrated Feasibility Report, the Division Commander's Public Notice, and the Environmental Record of Decision (ROD) for the Delaware River Basin Comprehensive New York, New Jersey, Pennsylvania, Maryland and Delaware Interim Feasibility Study for the Delaware River Watershed Flood Management Plan. The purpose of the decision document will be to begin the approval process leading to the authorization to begin Plans & Specifications.

The PDT list provides the organizations of the NAP team and participating outside entities.

#### **District PDT Members:**

CENAP-PL-PB  
Project Manager

CENAP-EC-H  
Hydraulic Engineer

CENAP-PL-F  
Hydraulic Engineer

CENAP-PL-D  
Economist

#### **Non-District PDT Members:**

Delaware River Basin Commission  
USGS

HEC

#### **Independent Technical Review Team:**

Planning  
Engineering: Hydrologist  
\*\*Pending Approval by Division

Economics

### 10.2 Scientific Information

Based upon the self-evaluation by the PDT, it is unlikely that the USACE report to be disseminated will contain influential scientific information. The flood damage reduction measures that were identified within the 905 (b) analysis will be evaluated using standard hydrologic, hydraulic, geotechnical and economic processes.

Economic and planning processes will additionally consider the Collaborative Planning EC (EC 1105-2-409). This EC describes all the economic accounts that can be used to describe economic benefits. The four main economic accounts are national economic development (NED), national ecosystem restoration (NER), regional economic development (RED), and the other social effects (OSE).

### **10.3 Timing**

The ITR process is envisioned to begin First Quarter FY08 with an assessment of key models to be used in the evaluation and comparison of alternative plans in this feasibility study. It is anticipated that work would start within days of naming the external ITR team. The estimated schedule is noted in Part 8 of this Review Plan.

### **10.4 External Peer Review Process**

No External Peer Review process is envisioned at this time. This assessment is supported by the evaluation of the PDT and tabulated as shown in Section 9 of this document.

### **10.5 Public Comment**

Public involvement is anticipated throughout the Feasibility Study. The Public Involvement meeting dates have not been scheduled at this time.

It is anticipated that minutes of Public Involvement Meetings will be disseminated to the Peer Review Team following the meetings. This will allow the public response to be available to the ITR team.

### **10.6 ITR Reviewers**

It is anticipated that reviewers should be available in the following disciplines: 1) Planning, 2) Economics, and 3) Hydraulic Engineering. The reviewer contact information should be stated in Section 10.1 of this Review Plan.

The expertise that should be brought to the review team includes the following:

- 1) Planning – The reviewer should have recent experience in reviewing Plan Formulation processes for flood warning systems and reservoir system analysis.
- 2) Economics – The reviewer should have a solid understanding of Economic Models including SID and EAD.
- 3) Engineering –The reviewer should have recent experience in analyzing reservoir systems and flood warning systems.

### **10.7 External Peer Review Selection**

Because an External Peer Review is not anticipated for this study, there is no EPR selection.