QUALITY CONTROL
AND INDEPENDENT TECHNICAL REVIEW PLAN

Cameron Run / Holmes Run Watershed

City of Alexandria and Fairfax County, Virginia

General Investigation – Feasibility Study

April 2007

QUALITY CONTROL AND INDEPENDENT TECHNICAL REVIEW PLAN

1.0 PURPOSE

This plan presents the process that assures quality products for the Cameron Run / Holmes Run Watershed Study, a General Investigation (GI) feasibility study. This quality control (QC) and independent technical review (ITR) plan, herein referenced as the "review plan," defines the responsibilities and roles of each member assigned to the study and the technical review team.

The product to be reviewed by the technical review team is the integrated feasibility report, meaning that all required National Environmental Policy Act (NEPA) documentation is included. Under the provisions of the U.S. Army Corps of Engineers (USACE) policy regarding peer review as detailed in Engineering Circular (EC) 1105-2-408 dated May 31, 2005, the ITR will be conducted by specialists from organizations outside of the Baltimore District, which is currently responsible for the study. Independent technical review will be conducted on all decision documents and will be separate from the technical production of the project. This plan is an addendum to and is, by reference, a part of the project management plan which scopes the effort for this feasibility study.

2.0 APPLICABILITY

This document provides the quality control review plan for the feasibility study. It identifies the 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

EC 1105-2-407 "Planning Models Improvement Program: Model Certification" (May 31, 2005)
EC 1105-2-408 "Peer Review of Decision Documents" (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 study is being conducted under the Potomac River and Tributaries authority - resolution of the U.S. Senate Committee on Environment and Public Works (dated 26 January 1956); resolution of the U.S. Senate Committee on Environment and Public Works (dated 6 July 1959) and resolution of the U.S. Senate Committee on Environment and Public Works (dated 23 May 2001). This authority states:

> *"That the Secretary of the Army is requested to review the Report of the Chief of Engineers on the Potomac River and Tributaries in Maryland, Virginia, and*

Pennsylvania published in House Document 343, 91st Congress, Second Session, and other pertinent reports, with a view to conducting a study, in cooperation with the States of Maryland and West Virginia, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia, their political subdivisions and agencies and instrumentalities thereof, other Federal agencies and entities, for improvements in the interest of the ecosystem restoration and protection, flood plain management, and other allied purposes for the middle Potomac River watershed."

Under this authority, the first action by the Corps was to complete a reconnaissance study for the Middle Potomac study area. The Middle Potomac Watershed 905(b) (WRDA 86) Analysis report, dated January 2004, recommended that the Corps of Engineers conduct multiple feasibility studies in the study area, including one in the Cameron Run/Holmes Run watershed. These studies were to take a watershed approach, covering multiple purposes (e.g. ecosystem restoration, flood control, water quality improvements). USACE Headquarters certified the reconnaissance phase and the 905(b) report on 16 May 2004 and gave permission to initiate negotiations with non-federal sponsors in the Cameron Run/Holmes Run watershed, as outlined in the 905(b) report.

The legislative authority for this feasibility study allows for a comprehensive watershed approach to restoring Cameron Run and Holmes Run. It will look broadly at the watershed level, identifying priority sub-watersheds and making recommendations for these priority sub-watersheds for further design and implementation. The benefits of restoring the Cameron Run watershed will not only be the restoration of an individual watershed, but also the restoration of a small but significant component of the Potomac River sub-basin and the Chesapeake Bay drainage basin.

The study area is defined as the Cameron Run watershed which is located in Northern Virginia. The total drainage area of the watershed is approximately 42 square miles, and is located in three jurisdictions: 75% lies in Fairfax County, 22% in the City of Alexandria and 3% in the City of Falls Church.

The project team is comprised of representatives from USACE's Baltimore District as well as the project's two non-federal sponsors -- the City of Alexandria and Fairfax County. The Baltimore District project team includes representatives from Planning, Engineering, Real Estate, Construction, Contracting, and Programs and Project Management Divisions, as well as the Office of Counsel and the Resource Management Office. The non-federal sponsor is comprised of local jurisdiction representatives from the Alexandria Department of Recreation, Parks and Cultural Activities, Alexandria Department of Transportation and Environmental Services, Alexandria Department of Planning and Zoning, and the Fairfax County Department of Public Works and Environmental Services.

5.0 REVIEW REQUIREMENTS

Initial quality control (QC) review will be handled within the Corps section or branch office performing the work or by staff in the corresponding sponsor jurisdiction when the work

involves in-kind services. Additional QC will be performed by the project team during the course of completing the integrated 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 2c(2), any models used in the preparation of decision documents covered by that 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 the [1105-2-408] circular. The uses and applications of models in individual studies that lead to the preparation of decision documents will be reviewed in accordance with its requirements by the related discipline(s) as part of this technical review.

Pursuant to EC 1105-2-408, because this study leads to a decision document requiring authorization by Congress, as well as recent guidance, an ITR team will be assigned by the Planning Center of Expertise (PCX) for Environmental Restoration (National Ecosystem Planning) Projects. Dr. Dave Vigh (CEMVD-RB-T) of the appointed PCX will assign this team. It is recommended that an ITR, handled entirely within USACE, will satisfy the peer review requirements, as the risk and magnitude of the proposed project do not warrant an additional external peer review (EPR) based upon the initial risk screening process conducted by the project study manager, as 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 will it 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 project authority and NEPA requirements,
- Completeness of preliminary design and support documents, and
- Assessment of interdisciplinary coordination.

Following initiation of the study in 2004, Baltimore District began discussions with the New England District regarding their involvement as the ITR for this project. Final approval of the assigned ITR will come from the PCX now that recent guidance dictates this as their responsibility.

6.0 REVIEW PROCESS

It is anticipated that the ITR team review process will begin after the ITR team has been assigned, and will initially review the project management plan and the models to be used in the preliminary analysis. As alternative plans are formulated, the review process will focus on data, assumptions, and the engineering, scientific, economic, social and environmental analyses.

The major milestones of the review process are listed below, with all North Atlantic Division (NAD) required meetings indicated by a “P”:

- Approval of review plan by NAD
- ITR team assigned by PCX
- P-6 read-ahead materials (RAM) to ITR
- P-6 feasibility scoping meeting
- P-7 RAM (formulation analysis notebook) to ITR
- P-7 plan formulation meeting
- P-8 RAM for alternative formulation briefing
- Alternative formulation briefing
- Draft report review
- Final report review

7.0 REVIEW COST

The cost of the ITR will be negotiated between the Baltimore District and the PCX. It is assumed that documents to be reviewed will be transmitted electronically to the assigned ITR members. Comments will be recorded using DrChecks software if technical in nature, otherwise another suitable format will be coordinated with the ITR member. All comments will be provided electronically to the Baltimore District study manager. It is also assumed that the ITR team will be working virtually. Only under extreme circumstances should the ITR team, or a representative of that team, be required to physically attend team or milestone meetings. The ITR team should participate in all P milestone meetings via conference call or video teleconference.

8.0 REVIEW SCHEDULE

Development of a preliminary schedule for this environmental restoration study was accomplished during the reconnaissance phase. The preliminary milestone schedule reflected in the 2004 project management plan assumed that appropriate funding for the study was provided in subsequent fiscal years to effectively accomplish the study.

Note that since the September 2004 commencement of this study preceded the requirement for PCX involvement and development of this Review Plan, the review schedule below differs from the major review process milestone list in section 6 above.

TASK	START DATE	FINISH DATE
Develop review plan and post to website, PCX	20 Mar 2007	30 Apr 2007
Identify regional ITR resources and recommend ITR plan to PCX	22 Apr 2007	30 Apr 2007
PCX assigns/approves ITR team	1 May 2007	7 May 2007
Review of models	TBD	
ITR team review of feasibility scoping meeting documents	Waived (since study beyond this point)	
Feasibility scoping meeting	Waived (since study beyond this point)	
ITR review of P-7 RAM (formulation analysis)	14 May 2007	31 May 2007
P-7 meeting	June 2007	

Preparation for alt. Formulation Briefing (AFB)	TBD	
Alternative formulation briefing	TBD	
Review of draft feasibility report	February 2009	March 2009
Submit DE's public notice of study completion	September 2009	

9.0 PROJECT RISK

An initial project risk assessment was conducted by Baltimore District's study manager. Ultimately, the assessment of risk will be defined in coordination with the entire project team and the PCX. For this exercise, an assessment was made of the risk associated with this project based upon five factors and the project was rated quantitatively among five levels of project risk, ranging from low to high (risk score class). All five factors were weighted equally and are described further below. The rater considered previous District project experiences when making this analysis. No attempt was made to tie this risk to a national scale of rating; however, it is assumed that the PCX will bring this perspective to their assessment of the rating.

- Risk inherent in project complexity deals with the potential that the project will fail after it is ultimately constructed.
- Customer expectations risk is a measure of the level of expectations of the sponsor and the risk that we may not be able to meet them.
- The project schedule and cost were assessed a low degree of risk if they both remained flexible, and a high degree of risk if the project schedule and cost were to become fixed.
- Staff technical experience was assessed as a low degree of risk if the staff had a high level of ecosystem restoration experience, and a high degree of risk if the staff had minimal experience.
- The impact of project failure and the subsequent consequences is determined based on preliminary future, without project scenarios in conjunction with sponsor and technical team member input.

The score for the risk items were summed and the average value of the risk assessment scores was used to determine overall project risk level (Table 9.1). Based upon this analysis by the Corps study manager, the project is projected to carry low-to-medium level of risk with a score of 2.8. The results of the evaluation are tabulated as follows:

Table 9.1 Quality Control/Review Plan Score Guide

Project Risk Item	**Risk Assessment Score (Low Degree to High Degree)**					**Score**
	Low		**Medium**		**High**	
Project Complexity	1	2	3	4	5	**2**
Customer Expectations	1	2	3	4	5	**4**
Product Schedule/Cost	1	2	3	4	5	**3**

Staff Technical Experience	1	2	3	4	5	**3**
Failure Impact and Consequences	1	2	3	4	5	**2**
Average Project Risk Assessment Score					➔	**2.8** **Low-to Medium Risk**

10.0 REVIEW PLAN

The components of the review plan were developed pursuant to the requirements of EC 1105-2-408.

10.1 Team Information

The decision document that will be the ultimate focus of the peer review process is the integrated feasibility report, which will include an environmental assessment. The purpose of the decision document will be to begin the approval process leading to project authorization and project implementation.

The current project team is listed below. This list provides the points of contact of Baltimore District (NAB) team members that are available to answer specific technical questions as part of the review process. The list also provides the names and organizations of the non-federal sponsors and participating outside entities.

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District Project Team Members:

CENAB-PP-C
Project Manager

CENAB-EN-GH
Hydraulic Engineer

Deleted: Claire O'Neill,

Deleted: Dennis Seibel,

CENAB-PL
Study Team Leader

CENAB-EN-WW
Hydraulic Engineers

Deleted: Stacey Blersch,

Deleted: Ben Soleimani/Carey Nagoda

CENAB-EN-WC
Design Team Leader

CENAB-EN-C
Cost Estimator

Deleted: Sean Dawson,

Deleted: Luan Ngo,

CENAE-EP-VC
Regional Economist

CENAB-PL
Cultural Resource Specialist

Deleted: Karen Umbrell,

Deleted: Kenneth Baumgardt,

CENAB-PL
Environmental Specialist

CENAB-RE-C
Real Estate Specialist

Deleted: Erika Mark,

Deleted: Pete Emens,

CENAB-EN-WE
Civil Engineer

Deleted: Ben Fedor,

Sponsor Team Members

Claudia Hamblin-Katnik, Ph.D.
Watershed Program Administrator
Division of Water Quality
City of Alexandria, Virginia
(703) 519-3400 x219

Bill Hicks
Northern Virginia Regional Commission
Senior Water Resource Planner
(703) 643-4628

Aimee Vosper, R.L.A.
Alexandria Department of Recreation, Parks and Cultural Activities
City of Alexandria, Virginia
(703) 838-5041 x440

Fred Rose
Fairfax County Watershed Planning
Assessment Branch
(703) 324-5823

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Independent Technical Review (ITR) Team

Based on early project coordination with New England District (NAE), it is recommended to the PCX that NAE be the approved ITR selection. When the official ITR team is determined, the name, organization, and discipline for the team members will be provided below:

Hydraulic Engineering
Civil Engineering
Real Estate
Ecology
Planning
Economics
Cost Estimating

10.2 Scientific Information

Based upon the self-evaluation by the project team, it is unlikely that the feasibility report will contain influential scientific information. The environmental restoration measures that were identified within the 905(b) analysis will be evaluated using standard engineering, environmental, and economic processes, with pertinent engineering and economic models that have been developed and approved by Corps of Engineers for use in planning studies. These models include: HEC-HMS and HEC-RAS (completed in early 2007 and cover entire watershed).

Though not a model, extensive GIS analysis of the watershed was used as an assessment tool to optimize the selection of sites for restoration. Stream assessment surveys and geospatial data were incorporated with individual maps of six different criteria. Details of the formulation strategy will be presented in conjunction with the P-7 milestone meeting. The project team will determine with the ITR team whether or not this process is considered novel and requires certification.

10.3 Timing

The ITR process is envisioned to begin in summer 2007 with an assessment of the engineering (hydrologic/hydraulic) models, virtual participation in the P-7 meeting, and the engineering

methods to be used in the evaluation and comparison of alternative plans in this feasibility study. It is anticipated that work would start within one week of assigning the ITR team. The estimated schedule is noted in section 8 of this review plan.

10.4 External Peer Review Process

No external peer review (EPR) is deemed necessary at this time, though this assumption will be confirmed with the PCX. According to requirements set forth in EC 1105-2-408, the feasibility study will not present novel methods or models, present complex interpretations, have conclusions that change prevailing practices, impact public safety or affect significant policy decisions. This assessment is supported by the evaluation of the project team in April 2007 in section 5 and tabulated as shown in section 9 of this review plan.

10.5 Public Comment

Public involvement has continued throughout the feasibility study since its inception in 2004 for a variety of audiences, such as the Fairfax County Watershed Advisory Committee, the Holmes Run Committee, the Alexandria Environmental Policy Commission, the Fairfax County Environmental Quality Advisory Council, and the public at large. Public involvement activities conducted to date include: a Fairfax County Watershed Advisory Committee meeting on the Cameron Run watershed (January 2005); a public forum (Dec 2006) for the Fairfax County's Cameron Run Watershed draft final plan; development of an Internet website for watershed activities; publication of two e-newsletter (January and April 2007); and a public information exchange (February 2007) sponsored by the Alexandria Environmental Policy Commission. Future public meeting dates have not been scheduled at this time but are anticipated after major milestones are met.

10.6 ITR Reviewers

It is anticipated that five to six reviewers should be available in the following disciplines: hydraulic engineering, civil engineering, real estate, ecology, economics, cost estimating, and planning. Section 10.1 of this review plan will be update to reflect specific reviewer contact information once the ITR team is assigned by the PCX.

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

1) Hydraulic Engineering – The reviewer(s) should have extensive knowledge of principles of fluid geomorphology and natural stream channel design. The reviewer(s) should also have a solid understanding of flood hydrology, hydraulic modeling, erosion, sediment transport and bank protection measures.

2) Civil Engineering – The reviewer should have knowledge of surface water hydrology, TR-20 and TR-55 models produced by the Natural Resource Conservation Service, as well as AutoCAD Land Development desktop and Arc GIS (version 9.1) mapping software.

3) Real Estate – The reviewer should have knowledge of land acquisition process, permit review and land appraisal.

4) Ecology – The reviewer should have a solid background in the restoration of freshwater wetlands and upland habitats, and understand the factors that influence the reestablishment of native species of plants and animals.

5) Economics – The reviewer should have a solid understanding of economic models including cost effective incremental cost analysis (e.g. IWR Plan Suite) and their application to ecological restoration and public perception of risk.

6) Cost Estimating – The reviewer should have recent experience in concept-level estimates for stream restoration and storm water retrofit projects. It is anticipated that the M-CACES cost estimate will be reviewed by the center of expertise in Walla Walla District.

7) Planning – The reviewer should have recent experience in reviewing plan formulation processes for multi-objective studies and be able to draw on "lessons learned" in advising the project team of best practices.

10.7 External Peer Review Selection

There is no external peer review (EPR) selection because EPR is not anticipated for this study. Should it be determined that EPR is required, and selection process will be crafted and presented in an update to this document.