

# **QUALITY CONTROL PLAN (QCP) AND INDEPENDENT TECHNICAL REVIEW (ITR) PLAN FOR HAGATNA RIVER FLOOD CONTROL TERRITORY OF GUAM**

## **1. PURPOSE**

The Quality Control Plan (QCP) for the Hagatna River Flood Control Feasibility Phase provides a technical review mechanism insuring that quality products are developed during the course of the study by the Honolulu District (POH). All processes, quality control, quality assurance, and policy review will be done to complement each other producing a review process that identifies and resolves technical and policy issues during the course of the study and not during the final study stages.

The QCP was formulated to provide for a sound technical review process that focuses on several objectives. Primarily, quality technical products will be produced through an effective and comprehensive single level technical review process throughout product development while verifying that functional, legal, safety, health and environmental requirements are satisfied. This review process will insure that a cost-effective solution, while maintaining product requirements, is developed. Technical review will also act as a mechanism to avoid startovers and redesign efforts, and will assure accountability for the technical quality of the product. Each technical review objective in the QCP will be satisfied through a review process performed by an Independent Technical Review (technical review), Pacific Ocean Division (POD) (quality assurance of technical products), and Headquarters (HQUSACE) (policy review).

## **2. APPLICABILITY**

This document provides the QCP 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. REFERENCE**

- EC 1105-2-408, "Peer Review of Decision Documents", dated May 31, 2005

#### **4. GENERAL**

The Hagatna River Flood Control Study was formerly identified as the Agana River Flood Control Study until the Government of Guam official changed the name to Hagatna in 2002. For the purpose of this report, "Hagatna" will be used with the exception of names of titles of official studies and reports that were performed before the change was made by the Government of Guam.

The project was originally studied by the U.S. Army Corps of Engineers (USACE) in 1977 and was found to be feasible. However, the Government of Guam was not in a position to implement the project at the time. Since then, conditions have changed allowing the Government of Guam to make this project a higher priority. Reinvestigation needs to first identify if there is a continued Federal interest and issues associated with the project. The project was authorized as "Agana River, Guam" in the Water Resources Development Act of 1986 (Public Law 99-662). However, in accordance with 33 U.S.C. 579a(b), if no Federal funds are expended for the 7-year period following authorization, the project is subject to deauthorization. The Agana River project was administratively deauthorized on 26 June 2003, as published in the Federal Register. The project will require a new Decision Document submitted to Congress and new authorization.

The Territory of Guam is located approximately 3,800 miles west of Honolulu. Guam is the largest island in the Western Pacific and is approximately 30 miles long; 4 to 8.5 miles wide; and 209 square miles in area. The Hagatna River drainage basin is situated on the west-central section of the island.

The Hagatna River drainage basin extends from the Hagatna Swamp to Hagatna Bay and is subject to flooding during moderate to heavy rain. The flooding is primarily attributed to the limited capacity of the Hagatna River due to the small capacity of the river and relatively flat topography, and much of the areas adjacent to the river banks are subject to flooding when the existing capacity is exceeded following moderate to heavy rain. Flooding that is a natural occurrence on the Hagatna River has become a problem because of man's activities and development of the damageable structures within the floodplain. Inadequate interior drainage within the basin contributes to flood problem in the study area.

The flood problem begins near the northern end of the Hagatna Swamp along the power line access road, a narrow, unpaved road that has altered the normal drainage pattern by cutting off the free flow of water. During high flows, flood waters exceeding the storage capacity of the swamp flow over the power line access road and fan out over the flat basin floor in a north-northwest direction toward the downtown area of Hagatna. The river flows through the undeveloped area between the power line access road and O'Brian Drive and is estimated to have a bank-full capacity of only 300 cubic feet per second (cfs).

With the urbanized area along the riverbank below Saylor Street, the estimated flow at which flooding and subsequent damages occur is approximately 900 cfs. The capacities of the bridges at Saylor Street and Marine Drive are estimated to be approximately 3,500 and 2,700 cfs, respectively.

The interior drainage within the Hagatna town area was substantially improved with construction of the Route 4 interceptor. The double box culvert (each 4 feet high and 6 feet wide) is located under Route 4 from the Townhouse Shopping Center to a point about 150 feet upstream of Marine Drive, where it empties into the Hagatna River. The capacity of the double box culverts is approximately 300 cfs.

The economic growth that started during the 1960's has extended to the present time and is expected to continue into the future. The population density in the Hagatna area increased as a result of the economic growth. Hagatna is expected to continue as the governmental, commercial, and financial center of Guam, and the Government of Guam considers the improvement and development of Hagatna to be of vital importance to the economic well being of the territory. The Government of Guam is situationally aware of Hagatna's developmental growth and realizes that effective land use controls are required in order to permit continued development without creating problems such as flooding, inadequate drainage, and pollution, without adversely affecting its natural scenic areas, open space, and flora and fauna.

Major improvements in the floodplain that are subject to damage include an extensive network of commercial and governmental buildings, shopping centers, highways, streets, and utility facilities. These improvements vary from medium cost, low-rise structures to expensive high-rise office buildings.

The scope of this study is to determine various flood protection alternatives with a positive net economic return with minimal environmental disruption. The scope of the study will further review the reduction of the flood hazard and associated flood damages; the prevention of further degradation of water quality in the basin; where possible, include provisions for enhancing recreational opportunities in the basin; the preservation and maintaining existing environmental resources, and if necessary alter the resources for human safety after careful consideration of the tradeoffs involved; and to provide efficient and wise use of the project lands consistent with the needs and desires of the study area residents and to incorporate long-range development plans for the area.

## **5. REVIEW REQUIREMENTS**

Initial Quality Control (QC) review will be handled within the Section or Branch performing the work. Additional QC will be preformed 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.

Pursuant to EC 1105-2-408, this feasibility study will also need to have a Corps ITR team assigned by the Planning Center of Expertise (PCX) for Flood Risk Management Projects. This team will be assigned by Clark Frentzen of CESPDPD-TP. It is recommended that the ITR be handled within the Corps, as the scope and technical complexity do not warrant an External Peer Review (EPR). 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 methods of preliminary analysis and design.
- Compliance with client, program and DEPA requirements.
- Completeness of preliminary design and support documents.
- Spot checks for interdisciplinary coordination.

## **6. REVIEW PROCESS**

It is anticipated that the ITR Team Review Process will begin after the ITR Team has been assigned, and will initially cover the Project Management Plan and the models to be used in the analysis. As alternative plans are formulated, the Review Process will focus on data, assumptions and engineering, scientific, economic, social and environmental analysis process.

## **7. REVIEW COST**

The cost of the ITR is estimated to be about \$20,000.

## **8. REVIEW SCHEDULE**

TASK	START	FINISH
1. Develop ITR Plan	5 Feb 07	9 Feb 07
2. Review of ITR Plan by Division	12 Feb 07	16 Feb 07
3. Finalize ITR Plan	19 Feb 07	21 Feb 07
4. Review of ITR Plan by PCX	22 Feb 07	2 Mar 07
5. Revise ITR Plan	5 Mar 07	7 Mar 07
6. PCX Approves/Assigns ITR Team	8 Mar 07	20 Apr 07
7. Feasibility Scoping Meeting	TBD	
8. Preparation for AFB	TBD	
9. Alternative Formulation Briefing	TBD	
10. Review of Draft Feasibility Report/EA	TBD	

## 9. PEER REVIEW PLAN

The components of the Peer Review Plan were developed pursuant to the requirements of EC 1105-2-408.

### A. Basic Information

The decision documents that will be the ultimate focus of the peer review process are the Feasibility Report, the Division Commander's Public Notice and the Environmental Assessment for the Hagatna River Flood Control, Territory of Guam, General Investigation Feasibility Study. The purpose of the decision document will be to begin the approval process leading to the authorization to begin the preparation of the plans and specifications.

The District's PDT point of contact (POC) is provided below:

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All comments regarding this review plan and any other comments on this project should be addressed to the District's PDT POC. A list of disciplines of the PDT members is provided below. Also, the POC for the ITR Team has not been identified. The Review Plan will be updated as soon as the name of the POC is identified.

### 1) District PDT

#### Discipline of PDT Members

Project Manager

Hydraulic Engineer

Hydrologist

Economist

Biologist

Archaeologist

Attorney

Program Analyst

Report Writer

Realty Specialist

Cost Engineer

Construction Engineer

Contracting Specialist  
Geotech Engineer

## **2) ITR TEAM**

### **Discipline of Team Members**

Hydraulic Engineer  
Hydrologist  
Economist  
Biologist  
Realty Specialist  
Planner

## **B. Scientific Information**

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

## **C. Timing**

The Peer Review process is envisioned to begin in late spring/early summer with an assessment of key models to be used in the evaluation and comparison of alternative plans in this feasibility study. The estimated schedule is noted in Part 8 of this report.

## **D. EPR Process**

No External Peer Review process is envisioned at this time. The recommended alternative plan identified in the 905 (b) analysis is a combination of earth levee, flood wall, riprap channel and concrete lined channel.

## **E. Public Comment**

Public involvement is anticipated throughout the feasibility study phase. A meeting with the members of the Guam Chamber of Commerce took place in August 2006. The Public Involvement program is expected to occur as follows:

<b><u>TASK</u></b>	<b><u>Date</u></b>
Initial Scoping Meeting	April 2007
Informational Meeting	May 2008
Public Meeting	February 2009

## **F. Dissemination of Public Comment**

It is anticipated that minutes of all 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.

## **G. Review Disciplines**

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

- i. Hydraulic Engineer/Hydrologist-The reviewer(s) should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model.
- ii. Economist-The reviewer should have a solid understanding of economic models including HEC-FDA and other models and their application to flood risk management projects.
- iii. Biologist-The reviewer should have a solid background in the restoration of brackish water habitats and impacts to wetlands.
- iv. Realty Specialist-The reviewer should have experience in reviewing Real Estate plans for feasibility studies.
- v. Planner-The reviewer should have experience in reviewing plan formulation processes for flood damage reduction project.

## **H. EPR Selection**

An External Peer Review is not anticipated for this study.

## **I. Public Peer Review**

No formal Public Peer Review will be conducted. However, all input and comments received at the public involvement meetings will be addressed and applicable comments will be incorporated into the feasibility report.