

PLANNING DECISION DOCUMENT REVIEW PLAN

December 2022

OVERVIEW

Project Name: Memphis Light Gas and Water (MLGW) Tower #1613 - SEC 14

P2 Number: 487478

Decision Document Type: Feasibility Report

Project Business Line: Section 14, Emergency Streambank and Shoreline Protection, Flood Control Act of 1946

District: Memphis

District Contact: Jason Allmon, Project Manager (901) 325-9664

Major Subordinate Command (MSC): Mississippi Valley Division (MVD), Vicksburg, MS

MSC Contact: Sarah Palmer, Program Manager (601) 634-5910

Review Management Organization (RMO): Mississippi Valley Division (MVD), Vicksburg, MS

RMO Contact: Sarah Palmer, Program Manager (601) 634-5910

Key Review Plan Dates

Date of RMO Endorsement of Review Plan:	Pending
Date of MSC Approval of Review Plan:	Pending
Date of IEPR Exclusion Approval:	N/A
Has the Review Plan changed since RMO Endorsement?	No
Date of Last Review Plan Revision:	None
Date of Review Plan Web Posting:	Pending (07-Nov-22 (S))
Date of Congressional Notifications:	N/A

Milestones and Other Key Dates*

	<u>Scheduled</u>	<u>Actual</u>	<u>Complete</u>
FCSA Execution (CW130):	18-Dec-22		No
Tentatively Selected Plan (CW190):	07-Feb-24		No
Release Draft Report to Public (CW250):	12-Feb-24		No
Receive Report Approval (CW170):	19-Apr-24		No

*03 September 2020 CECW-P (2020-07) Continuing Authorities Program, Feasibility Phase Process Changes states that CAP studies only require two planning milestones—The FID and the Tentatively Selected Plan (TSP) milestone (formerly called the MSC Decision Meeting (MDM)).

Project Fact Sheet
December 2022

Project Name: Memphis Light Gas and Water (MLGW) Tower #1613 - SEC 14

Location: The project is located in Memphis, Tennessee in Shelby County between North Highland Street to the west, Jackson Avenue to the east, and Interstate 40 to the south.

Authority: Section 14, Emergency Streambank and Shoreline Protection, Flood Control Act of 1946

The Corps of Engineers is authorized to construct bank protection works to protect endangered highways, highway bridge approaches, and other essential, important public works, such as municipal water supply systems and sewage disposal plants, churches, hospitals, schools, and non-profit public services and known cultural sites that are endangered by flood-caused bank or shoreline erosion. Privately owned property and facilities are not eligible for protection under this authority.

Sponsor: City of Memphis, Tennessee

Type of Study: Feasibility, design, and construction under CAP Section 14

SMART Planning Status: Applicable to all CAP projects, including CAP Section 14

Project Area: MLGW Tower #1613 is located in the City of Memphis, Tennessee (Figure 1) on the right descending bank of the Wolf River (Figure 2) within the Wolf River Basin. The Wolf River is a tributary to the Mississippi River with a confluence at River Mile 739. The study area is in congressional delegation TN-09.

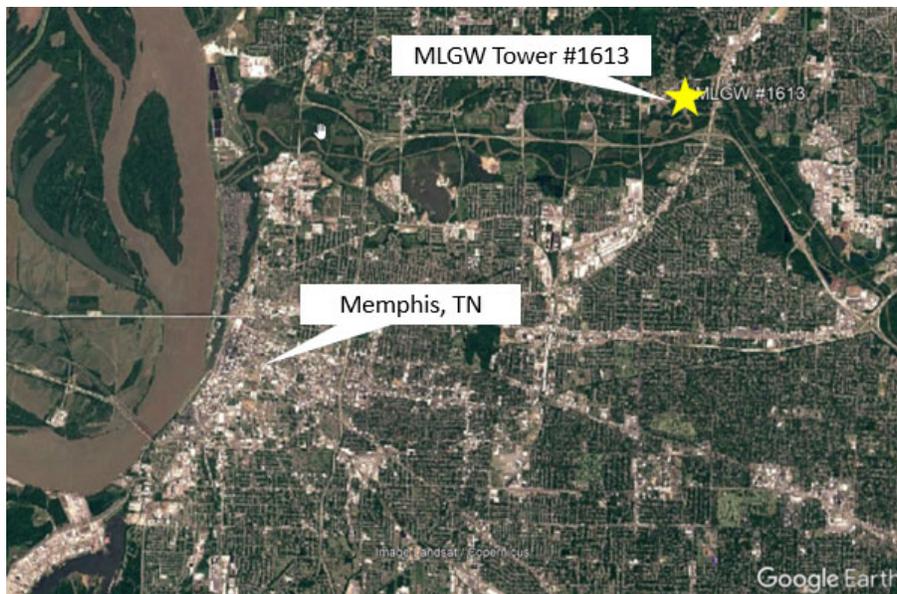


Figure 1. Study Area



Figure 2. MLGW Tower # 1613 Tower Location on the Wolf River

Problem Statement: Memphis Light Gas and Water (MLGW) is a municipal public works utilities provider in Memphis, Tennessee. MLGW has requested emergency assistance to protect electrical transmission lines connected to MLGW Tower #1613, which services a portion of the City of Memphis and northern Shelby County.

The MLGW Tower #1613's location on the right descending bank of the Wolf River along an outer bend makes it prone to natural streambank erosion. Figure 3 below shows the rapid progression of erosion towards the tower base between January 2006 and September 2021. This erosion has encroached to within approximately 99 feet of the tower's foundation, causing imminent danger of collapse into the Wolf River (Figures 4 and 5).

Failure of the tower would weaken the MLGW system, potentially impacting approximately 30,000 residents and businesses. The geographic impact area includes the northern part of downtown Memphis, which is a heavily populated residential and commercial area. The tower failure could also impact traffic on the major transportation routes of North Highland Street, and Jackson Avenue (Tennessee Highway 14). In the event of tower collapse, live power lines could fall onto the roadways.



Figure 3. Wolf River Top Bank Comparison at Tower #1613 between 31 January 2005 (blue) and 05 September 2021 (red).



Figure 4. Streambank Erosion Adjacent to Tower #1613 Closeup



Figure 5. Streambank Erosion Adjacent to Tower #1613

Federal Interest: Federal interest is warranted based upon existing data and the project delivery team's (PDT's) preliminary analysis of the problem. The District proposed a potential least-cost alternative to address the problem. The least-cost alternative prevents the need for costly facility relocation or a bank/facility failure that poses the risk for a loss of public infrastructure. The service provided by MLGW Tower #1613 is essential and meets the eligibility requirement stated in EP 1105-2-58, *Continuing Authorities Program* pamphlet dated 01 March 2019.

Goals and Objectives:

The planning goal is to reduce the risk of MLGW Tower #1613 failure by mitigating streambank erosion on the adjacent Wolf River streambank.

The planning objectives of this project are, over the 50-year period of analysis to:

- Protect essential utilities and add reliability to utilities that provide power to a portion of the City of Memphis and northern Shelby County.
- Reduce the risk of erosion and active scour on the streambank in the vicinity of the MLGW Tower #1613.

Inventory and Forecast:

Natural stream processes are eroding the Wolf River streambank adjacent to MLGW Tower #1613. There is no immediate evidence that factors other than natural streambank erosion are endangering the Tower. The majority of the soils in the area are dominated by glacial silts (loess) and are known to be highly erosive. The channel has migrated approximately 500 feet westward since the tower was first installed in 1957. A head-cut that is known to have occurred along the Mississippi River due to cut-offs constructed in the 1930's and 40's for the purpose of commercial navigation is believed to have affected, and may still be affecting, tributaries in West Tennessee, compounding the natural dynamic processes of erosion in the Wolf River. This headcut is believed to have migrated approximately 20 miles north of the project location.

Existing conditions would further exacerbate the erosion of the streambank adjacent to MLGW Tower #1613. Future without project conditions would compromise the integrity of the foundation of MLGW Tower #1613. Future with project conditions is further described in Measures and Alternatives below.

Measures and Alternatives:

A formal charrette was held on 21 September 2022 to select a final array of alternatives. The project design team (PDT) considered 14 different measures, including 8 nature-based measures per WRDA 2016 Section 1184(b). At the charrette, engineering judgment and utility right of way constraints narrowed the measures to relocating the tower and riprap armor of the bank, which correlate to Alternatives 1 and 2, described in the FID, respectively. On 28 September 2022, the PDT added Alternative 3 – Trench Revetment after further investigating the risks of future streambank migration. The alternatives in their current level of detail are described below:

- 1. Alternative 1 – No Action/Relocate the Facility** – This alternative would require the relocation of the MLGW Tower #1613 by MLGW. No action would be taken by USACE to stabilize the streambank and erosion would continue. The Tower would be relocated approximately 100 feet to the west of the current location, in-line with the adjacent towers. Expected actions include installation of four new concrete drilled pier foundations, obtaining

approximately 1 acre in real estate easements, crane rental to physically relocate the tower, and an access road that is approximately 4,000 linear feet in length.

2. **Alternative 2 – Riprap Armor of the Bank** – This alternative would require the protection of the right descending bank of the Wolf River with riprap to protect the MLGW Tower #1613, with a structure less than a 300 linear foot length. An access road in the same location and with the same length (approximately 4,000 linear feet) as Alternative 1 would also be constructed. This alternative would arrest the erosion causing imminent risk of Tower failure and maintain the existing tower location. A water quality certification from the Tennessee Department of Environment and Conservation (TDEC) may be required based on currently estimated quantities. Design optimization and further analysis of this alternative will be conducted during this feasibility study.

3. **Alternative 3—Trench Revetment** – In addition to the bank protection provided in Alternative 2, this alternative would use riprap to protect Tower #1613 from all sides to mitigate damages should the Wolf River ever jump course through Lake Epping and flank the tower. An access road in the same location and with the same length as Alternative 1 would also be constructed (approximately 4,000 linear feet).

Risk Identification: Overall Risk Assessment: Low

The study will include a full risk assessment in accordance with ER 1105-2-101 (*Risk Assessment for Flood Risk Management Studies* dated 15 July 2019) and other applicable USACE policies and regulations. The study is anticipated to be a straightforward study involving a small area of impact. Existing conditions, failure of the project, or future conditions are not expected to pose a significant threat to human life or the environment.

Potential risks identified so far included but are not limited to the following: unknown existing conditions, delays due to weather, right of way for construction, underground utilities, and potential infrastructure failure at the project site prior to completing the study. These risks are further outlined below (Table 1):

Table 1. Potential Project Risks

Risk	Action	Level	Mitigation
Cost/Schedule	Unknown existing conditions	Low	Coordination with MLGW, the NFS and Stakeholders.
Schedule	Delays due to weather	Medium	Construction may be dependent on river stages.

Real Estate	Right of Way for Construction	Low	MLGW may need to acquire additional temporary and permanent ROW for construction.
Relocations	Underground Utilities	Low	Coordinate with MLGW, NFS and City of Memphis; most likely would pertain to the access road.
Funding	CAP program funding based on MVD ranking	Medium	PM will coordinate with Programs Office and MVD to ensure funds are requested/received timely.
Schedule	Tower could collapse into the Wolf River before USACE completes study, design, and construction	High	PDT will advance the project in accordance with the established schedule, leveraging efficiencies whenever possible.
Engineering	Models based on upstream hydrology and hydraulics data may apply differently to this site. There is a low risk that the structure installed could destabilize a downstream bank	Low	PDT will evaluate alternatives using data from best models available and engineering judgement with this risk considered.
Engineering	Future channel migration is unknown. There is a risk that the river could flank the tower from the north through Lake Epping.	Medium	PDT is evaluating the historic channel migration and the likelihood of future flanking. PDT is considering an alternative to protect Tower 1613 even in the event of flanking.
Environmental	Temporary vs permanent access road crossing over low water area.	Low	The PDT has conducted surveys and will further investigate Epping Lake drainage conditions. Proper course of action (permit application) will be followed once scope is determined.

DOCUMENTATION OF RISKS AND ISSUES

1. FACTORS AFFECTING THE LEVELS AND SCOPES OF REVIEWS

Mandatory IEPR Triggers.

- Is the estimated total project cost, including mitigation, greater than \$200 million? *No*
- Has the Governor of an affected state requested a peer review by independent experts? *No*
- Has the Chief of Engineers determined the project study is controversial due to significant public dispute over the size, nature or effects of the project or the economic or environmental costs or benefits of the project (including but not limited to projects requiring an Environmental Impact Statement)? *No*

Level and Scope of Review.

- Will the study likely be challenging? While all studies have challenges, this feasibility study is not expected to be unusually difficult or present challenges that cannot be overcome through coordination and technical expertise.
- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. While the bank will be stabilized in the project area, there is a low risk of streambank destabilization downstream, depending on the measures selected for the TSP. However, the insights gained from existing hydraulic modeling of the Wolf River will help reduce this risk. No significant negative impacts to threatened or endangered species are anticipated. If the Recommended Plan is installed and fails, there would be a significant consequence due the loss of power to 30,000 residents and businesses.
- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? No, this is a standard bank stabilization and grade control project. If the completed project were to fail, there would be marginal life safety or environmental risks.
- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? Alternative 1 is MLGW relocating the transmission tower. Methods to relocate the tower do not vary from precedents. Alternative 2, Riprap Armor of the Bank, is a standard bank stabilization practice. Alternative 3, Trench Revetment, uses similar commonly used construction materials and practices as Alternative 2, and do not vary from precedents.
- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? No
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? This is unknown until a cultural resources field

survey is completed. A Phase I cultural resources survey will be conducted and coordinated with the State Historic Preservation Office.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? No
- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? None anticipated.

Assessment of the District Chief of Engineering.

The District Chief of Engineering does not anticipate any significant threats to human life associated with the study or failure of the project at this time and will continue to assess throughout the project. For more information, see ER 1165-2-217 (*Civil Works Review Policy*), Chapter 3.6.2.2.2.2.

Current guidance in ER 1165-2-217 states that “SAR is conducted on PED and construction activities for projects where potential hazards pose a significant threat to human life...” Paragraph 7.4.1.2 further directs the PDT to use the Tolerable Risk Guidelines (TRGs) found in ER 1110-2-1156 *Safety of Dams – Policy and Procedures* to “judge if there is a significant threat to human life”. The PDT assessed the project considering the following TRGs:

- a. Potential threat to human life and property:** The MLGW Tower 1613 is located within the floodplain of the Wolf River and is not associated with any federal flood risk management, or navigation feature providing protection to any identifiable populations. Failure of the Tower would be completely contained within the floodway poses no threat to human life safety.
- b. Use of innovative materials or techniques:** The bank stabilization and erosion control measures will be constructed using standard stone paving material and constructed using standard industry equipment, materials, and methods.
- c. Engineering based on novel methods:** The bank stabilization work at this site will be developed using industry standard design practices.
- d. Engineering presents complex challenges for interpretations:** The design and engineering for this project is straight forward and does not require complex analysis.
- e. Engineering contains precedent-setting methods or models:** Not present on this project.
- f. Engineering presents conclusions that are likely to change prevailing practices:** Not present on this project.

Based on the TRG factors addressed above by the PDT, the District Chief of Engineering concurs that a SAR is not required for this project. After reviewing the project features that could be

impacted by failure of this project, it is determined that there is not a significant threat to human life at this stage of analysis.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. A separate Review Plan will be developed during the implementation phase of the project to indicate the required reviews of the implementation products.

Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

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

Agency Technical Review. ATR will be performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC.

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

Model Review and Approval/Certification. As stated in the Director of Civil Works Policy Memorandum #1 (CECW-P memorandum, Subject: Continuing Authority Program Planning Process Improvements), 19 January 2011, approval of planning models is not required for CAP projects. MSC commanders remain responsible for assuring the quality of the analysis used in these projects. ATR will be used to ensure that models and analyses are compliant with Corps policy, theoretically sound, computationally accurate, transparent, described to address any limitations of the model or its use, and documented in study reports.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100 (*Planning Guidance Notebook*), Appendix H, and Director's Policy Memorandum 2019-01, both provide guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander.

Public Review. The district will post the Review Plan and approval memo on the district internet site. Public comment on the adequacy of the Review Plans will be accepted and considered. Additional public review will occur when the report and environmental compliance document(s) are released for public and agency comment.

Table 22 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections of this plan covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 2: Schedule and Costs of Reviews

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Draft Feasibility Report / EA	District Quality Control	09/25/2023	10/23/2023	\$25,000	No
Draft Feasibility Report / EA	Agency Technical Review	10/24/2023	12/23/2023	\$25,000	No
Draft Feasibility Report / EA	Policy and Legal Review	10/24/2023	12/23/2023	n/a	No

NOTE: This table may also be used to identify future review work in follow-up phases of a project. This may include products prepared during the pre-construction engineering and design phase or products prepared as part of planning for the Operations and Maintenance phase of a project.

a. DISTRICT QUALITY CONTROL

The home district will manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, Chapter 4). Table 332 identifies the required expertise for the DQC team. The DQC Team members should not be involved in the production of any of the products reviewed.

Table 3: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planner should have experience in the formulation of alternatives for Section 14 projects as well as other Continuing Authorities Program projects.
Economics	The reviewer should have significant USACE economics experience with a background in developing economic simulation models and analysis.
Environmental Resources	The reviewer of environmental resources and compliance should be an expert in the field of environmental compliance (specifically with NEPA, the Endangered Species Act, and the Clean Water Act).
Cultural Resources	The cultural resources reviewer should be an expert in the field of cultural resources compliance (specifically Section 106 of the National Historic Preservation Act).

Hydrology & Hydraulics	The Hydrology reviewer should have a thorough knowledge of open channel dynamics and computer modeling such as HEC-RAS and HEC-HMS.
Civil Engineering	The Civil Engineering reviewer should be a senior civil engineer with experience in design of bank stabilization features of civil works projects.
Geotechnical Engineering	The geotechnical engineering reviewer should be a senior geotechnical engineer with experience in soils analysis and design of bank stabilization features of civil works projects.
Cost Engineering	Team member will be experienced in design and construction of streambank protection projects. In addition, the team member will be familiar cost estimating for similar civil works projects.
Real Estate	The real estate reviewer shall have experience developing a Real Estate Plan with Section 14 or similar studies.

Documentation of DQC. DQC will be conducted on the Draft Report. Quality Control should be performed continuously. A specific certification of DQC completion is required at the Draft report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in ER 1165-2-217, on page 19 (see Figure F). Dr. Checks will be used for documentation of DQC comments.

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see ER 1165-2-217, Chapter 4).

b. AGENCY TECHNICAL REVIEW

ATR will be conducted on the Draft report. The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. The RMO will manage the ATR. The review will be conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see ER 1165-2-217, Chapter 5.5.3). Table 4 identifies the disciplines and required expertise for this ATR Team (also see Attachment 1 - the ATR Team roster).

Table 4: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead (the ATR Lead should be from outside of the home MSC)	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
Planning	The Plan Formulation reviewer should have experience in formulation of alternatives for Section 14 projects as well as other Continuing Authorities Program projects.
Economics	The reviewer should have significant USACE economics experience with a background in developing economic simulation models.
Environmental Resources	The reviewer of environmental resources and compliance should be an expert in the field of environmental compliance (specifically with NEPA, the Endangered Species Act, and the Clean Water Act).
Cultural Resources	The cultural resources reviewer should be an expert in the field of cultural resources compliance (specifically Section 106 of the National Historic Preservation Act).
Hydrology & Hydraulics	The Hydrology reviewer should have a thorough knowledge of open channel dynamics and computer modeling such as HEC-RAS and HEC-HMS.
Geotechnical Engineering	The geotechnical engineering reviewer should be a senior geotechnical engineer with experience in soils analysis and design of bank stabilization features of civil works projects.
Civil Engineering	The Civil Engineering reviewer should be a senior civil engineer with experience in design of bank stabilization features of civil works projects.
Cost Engineering	Team member will be experienced in design and construction of streambank protection projects and certified by the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX). In addition, the team member will be familiar cost estimating for similar civil works projects.
Real Estate	The real estate reviewer shall have experience developing a Real Estate Plan with Section 14 or similar studies.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses, and resolutions. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team will use the four-part comment structure (see ER 1165-2-217, Chapter 5). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the

vertical team to resolve using the issue resolution process in ER 1165-2-217, chapter 5.9. Concerns will be closed in DrChecks by noting the concern has been elevated. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, chapter 5.11 and Appendix D), for the Draft report, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Assessment of IEPR Conditions and Factors.

Section 1 of this Review Plan assesses the factors affecting the levels and scopes of reviews including Independent External Peer Review (IEPR). These factors include three mandatory conditions (cost of a project, request by the Governor of an affected state, or a determination by the Chief of Engineers) that independently require performance of IEPR. Additional discretionary factors or scenarios may also lead to the performance of IEPR. A risk-informed decision regarding the performance of IEPR is made through assessment of both the mandatory conditions and discretionary factors.

Decision on IEPR. All CAP projects are excluded from Independent External Peer Review (IEPR) except Section 205 and Section 103 or those projects that include an Environmental Impact Statement (EIS) or meet the mandatory triggers for Type I IEPR as stated in ER 1165-2-217. A Type II IEPR (or Safety Assurance Review (SAR)) is still required for those CAP projects where life safety risk is significant.

d. SAFETY ASSURANCE REVIEW

Safety Assurance Reviews (SARs) are managed outside of the USACE and are conducted on design and construction products for hurricane, storm and flood risk management projects, or other projects where existing and potential hazards pose a significant threat to human life. In some cases, significant life safety considerations may be relevant to planning decisions. These cases may warrant the development of relevant charge questions for consideration during reviews such as ATR or IEPR. In addition, if the characteristics of the recommended plan warrant a Safety Assurance Review, a panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, on a regular schedule.

Decision on Safety Assurance Review. In this circumstance, the project does not require Safety Assurance Review.

e. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 (*Assuring Quality of Planning Models* dated 31 March 2011) 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. As stated in the Director of Civil Works Policy Memorandum #1 (CECW-P memorandum, Subject: Continuing Authority Program Planning Process Improvements), 19 January 2011, however, approval of planning models is not required for CAP

projects. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC and ATR.

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

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
HEC-RAS-1 and 2D	Developed and maintained by the Hydrologic Engineering Center (HEC). Project may use 1-D Steady Flow and 1-D Unsteady Flow. HEC-RAS 1-D is commonly used for: Water surface profiles over long reaches; Depth averaged velocities; Rainfall impact; Sediment transport. HEC-RAS 2D is commonly used for 2-D flow simulation over large domains such as: Rivers, Canals, Flood Plains, Estuaries, Rainfall Catchment Areas; large scale simulations with long durations. Both models have been used extensively in the project area.	CoP Preferred
Micro-Computer Aided Cost Engineering System (MCACES) MII Version 3.0	MCACES is a cost estimation model. This model will be used to estimate costs for the feasibility study.	Certified

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

f. POLICY AND LEGAL COMPLIANCE REVIEW

Policy and legal compliance reviews for draft planning decision documents have been delegated to the MSC (see Director’s Policy Memorandum 2019-01).

(ii) Policy Review.

The policy review team will be selected through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The

team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team may be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences, or other vertical team meetings plus the milestone events.
- The input from the Policy Review team will be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR will be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations will be documented in an MFR.

(ii) Legal Review.

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

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

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