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AUG 28 2017

CEPOD-PDC

MEMORANDUM FOR Commander, Alaska Engineer District (CEPOA-PM-C-PL/George Kalli), P.O. Box 6898, JBER, AK 99506-0898

SUBJECT: Review Plan Approval for the Lowell Creek Flood Diversion Feasibility Study, Seward, Alaska

1. References:

- a. Engineering Circular 1165-2-214, Civil Works Review, 15 December 2012.
- b. Review Plan for the Lowell Creek Flood Diversion Feasibility Study, Seward, Alaska District, U.S. Army Corps of Engineers (Enclosed).

2. This memorandum constitutes approval of the Review Plan for the Lowell Creek Flood Diversion Feasibility Study, Seward, Alaska District, U.S. Army Corps of Engineers.

3. The approved Review Plan is subject to change as circumstances require, consistent with project development under the Project Management Business Process. Subsequent significant revisions to this Review Plan or its execution require my written approval.

4. POC is Mr. Russell Iwamura, Senior Economist, Civil Works Integration Division, 808-835-4625 or email [Russell.K.Iwamura@usace.army.mil](mailto:Russell.K.Iwamura@usace.army.mil).

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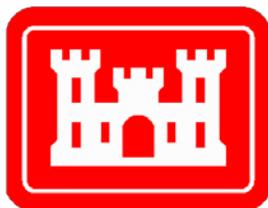
**Review Plan  
U.S. Army Corps of Engineers  
Pacific Ocean Division  
Alaska District**

**Lowell Creek Flood Diversion Feasibility  
Study, Seward, Alaska**

**MSC Approval Date:** August 28, 2017

**Last Revision Date:** none

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## **1. Purpose and Requirements**

### **a. Purpose**

This Review Plan for the Lowell Creek Flood Diversion Feasibility Study will ensure a quality engineering project is developed by the U.S. Army Corps of Engineers (Corps) in accordance with EC 1165-2-214, "Civil Works Review Policy." The Review Plan shall layout a value added process that assures the correctness of the information shown.

The District Chief of Engineering has assessed that the life safety risk of the project is significant; therefore, both a Type I Independent External Review and a Type II Independent External Review (Safety Assurance Review) will be required.

#### **(i) Guidance and Policy References**

- EC 1165-2-214, Civil Works Review Policy, 15 December 2012
- ER 1110-1-12, Quality Management, 31 March 2011
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 March 2014
- EM 1110-2-1913 Design, Construction, and Evaluation of Levees, 30 April 2000
- EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
- ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 November 2007
- ER 1105-2-101, Risk Assessment for Flood Risk Management Studies, 17 July 2017
- ECB 2016-25, Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects, 16 September 2016
- Lowell Creek Flood Diversion Project Management Plan, January 2017
- Alaska District (POA) Quality Management Plan, CEPOA-QMP-001, January 2010
- Pacific Ocean Division (POD) Quality Management Plan, November 2014
- Project Management Business Process (PMBP) Reference 8023G and ER 11-1-321, Change 1

### **b. Requirements**

This Review Plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines five general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise review (MCX), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. An additional review this study will undergo is Consistency Review (CR) as required by ER 1110-2-1156. The Review Plan identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought,

thus setting the appropriate scale and scope of review for the individual project. This Review Plan should be provided to the PDT, DQC, ATR and IEPR Teams.

### **c. Review Management Organization**

The Corps' Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. Contents of this Review Plan have been coordinated with the RMC, Flood Risk Management Planning Center of Expertise (FRM-PCX) and the Pacific Ocean Division (POD), which is the Major Subordinate Command (MSC). The RMO will also coordinate with the Civil MCX to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

In-Progress Review (IPR) team meetings with the RMC, POD, and HQUSACE will be scheduled on an "as needed" basis to discuss programmatic, policy, and technical matters. This Review Plan will be updated for each new project phase. Alaska District will assist the RMC with management of the ATR and IEPR reviews and development of the draft ATR and IEPR "charges".

## **2. Project Description and Information**

### **a. Project Description**

The Lowell Creek Flood Diversion System is in Seward, Alaska, 125 miles south of Anchorage at the head of Resurrection Bay. The project reroutes Lowell Creek through Bear Mountain and around the city of Seward to Resurrection Bay. The project was completed in 1940, and responsibility for operation and maintenance was transferred to the City of Seward in 1945. Structures consist of an upstream diversion dam, inlet structure, tunnel outlet control structure, and a spillway. The Alaska District has repaired the tunnel four times under the authority of P.L. 84-99 (Rehabilitation Assistance for Non-Federal Flood Control Projects) and one additional time under the authority of Section 510 of P.L. 106-60 (WRDA 2000).

This General Investigations (GI) Study was authorized by Section 5032 of the Water Resources Development Act (WRDA) of 2007. Section 5032 directs the Corps to assume long-term maintenance responsibilities for the tunnel until 08 November 2022 or until an alternative method of flood diversion is constructed and operational, whichever is earlier. The legislation also directs the Corps to study whether an alternative method of flood diversion at Lowell Canyon is feasible. The legislative language follows.

#### **(i) Long-Term Maintenance and Repair**

(a) Maintenance and Repair: The Secretary shall assume responsibility for the long-term maintenance and repair of the Lowell Creek Tunnel, Seward, Alaska.

(b) Duration of Responsibilities: The responsibility of the Secretary for long-term maintenance and repair of the tunnel shall continue until an alternative method of flood diversion is constructed and operational under this section or 15 years after the date of enactment of this Act, whichever is earlier.

**(ii) Study**

The Secretary shall conduct a study to determine whether an alternative method of flood diversion in Lowell Canyon is feasible.

**(iii) Construction**

(a) Alternative Methods: If the Secretary determines under the study conducted under subsection (b) that an alternative method of flood diversion in Lowell Canyon is feasible, the Secretary shall carry out the alternative method.

(b) Federal Share: The Federal share of the cost of carrying out an alternative method under paragraph (i) shall be the same as the Federal share of the cost of the construction of the Lowell Creek Tunnel.

Since the enactment of WRDA 2007, the Alaska District has assumed long-term maintenance and repair responsibility of the concrete-lined tunnel and inlet and outlet structures. Part of this responsibility includes an annual survey and visual inspection. The existing diversion dam is subject to overtopping from a probable maximum flood (PMF) event, a plugged tunnel, or a surge-release event and is unusual in that the dam provides essentially no flood water storage, functioning only to divert water into the Lowell Creek tunnel. Residential and commercial properties (to include the hospital and senior citizens home) are in the inundation area and would be subject to high velocities and water depths along with large debris should overtopping occur.

**b. Project Sponsor**

The City of Seward is the non-Federal sponsor for the project. A Feasibility Cost Sharing Agreement between the Department of the Army and the City of Seward was executed on 12 August 2016. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, MCX, and IEPR. It has not been determined whether there will be in-kind contributions for this effort.

**c. Decision Documents**

The decision document for this study will be an Integrated Feasibility Report and National Environmental Policy Act (NEPA) document. At this time, the District assumes an Environmental Assessment (EA) will be prepared with the feasibility report. If an Environmental Impact Statement (EIS) is required, the Alaska District will update this Review Plan accordingly. Approval of this report will be at HQUSACE and will result in a Director of Civil Works report.

A Hybrid Risk Assessment Report will be completed for this study and is anticipated to be included as an appendix to the Integrated Feasibility Report. This hybrid is designed to follow a Periodic Assessment (PA), typically taking 10 days for the Risk Cadre to

meet and finalize, with the additional incorporation of some elements of an Issue Evaluation Study. It is anticipated that two Potential Failure Mode Analyses (PFMAs) will be conducted as part of this effort, one for existing conditions prior to the Alternatives Milestone and one for alternatives prior to the Tentatively Selected Plan Milestone.

### **3. District Quality Control (DQC)**

#### **a. Requirements**

All SMART Planning milestone submittals and decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo a DQC. DQC will be conducted upon submittals for the following SMART Planning milestone meetings: Alternatives Milestone (AM), Tentatively Selected Plan Milestone (TSP), and Agency Decision Milestone (ADM). The decision document is a Director of Civil Works report. DQC comment/response reports will be provided to the Agency Technical Review (ATR) team prior to initiation of ATR of the Draft and Final Integrated Feasibility Reports.

All computations, drawings or sketches shall undergo a rigorous independent check as part of the standard Quality Control (QC) process. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts. Quality Checks include a review of the alternatives considered, schedules, budgets, means and methods of construction, and whether lessons learned have been considered. DQC is ensuring the math and assumptions are correct by having a checker initial each sheet of the computations. Checking is accompanied by a red check mark or similar annotation next to the item that has been checked. For drawings the checker shall place a red check mark or similar annotation on each dimension/elevation, note or reference showing concurrence with the correctness of the information shown. Additionally, the PDT is responsible to ensure consistency and effective coordination across all project disciplines during project design and construction management. See Attachment 2 for PDT and DQC members and disciplines.

#### **b. Documentation**

Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC. Review comments, evaluations (responses to comments), and response/action taken (for each comment) from the DQC of the feasibility study will be maintained in ProjNet (DrChecks) or some comparable tool.

## **4. Consistency Review**

### **a. Requirements**

The hybrid semi-quantitative risk assessment (SQRA) report prepared as part of this effort will undergo separate RMC Consistency Review (CR). The objective of CR is to ensure consistency with established risk assessment criteria, guidance, procedures, and policy. The CR will assess whether an adequate case has been built for the risk estimate, whether the risks, DSAC (urgency), and recommended actions are consistent, and if the risks are consistent with other projects. A site visit is not required for the CR Team. After CR, the draft and final hybrid SQRA shall be presented to the Dam Senior Oversight Group (DSOG).

### **b. Documentation of CR**

DrChecks review software will be used to document all CR comments, responses and associated resolutions accomplished throughout the review process. Comments will be limited to those required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

### **c. Products to Undergo CR**

CR will be performed on the both the draft and final Hybrid Risk Assessment Report.

Required Submittals for CR:

- PDF copy of the entire report (including current versions of the Executive Summary and Dam Safety Fact Sheet, as well as signed Team Concurrence and Facilitator Certification Sheet).
- DSOG presentation (for changing DSAC or maintaining DSAC)
- District out-briefing presentation
- Draft DSAC evaluation memorandum
- All H&H data used to create Chapter 4 (i.e., all raw and processed data for historical, simulated and observed flows and dam stages, HEC-SSP files, statistical smoothing parameters and justification, hypothetical events, routing files, HEC-HMS files,

balanced hydrographs, frequency precipitation values, etc.) This does not need to include the MMC HEC-RAS files since they are being preserved on an MMC server

#### **d. Required CR Team Expertise and Requirements**

The CR Panel will be comprised of senior Corps personnel identified by the RMC. In addition to expertise in risk assessment methodologies and procedures, technical discipline expertise in structural, hydraulic, and geotechnical engineering, and geology.

#### **e. Completion and Certification of the CR**

At the conclusion of each CR effort, the CR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the CR documentation and shall:

- (1) Identify the document(s) reviewed and the purpose of the review;
- (2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- (3) Include the charge to the reviewers;
- (4) Describe the nature of their review and their findings and conclusions;
- (5) Identify and summarize each unresolved issue (if any); and
- (6) Include a verbatim copy of each reviewer's comments (either with or without specific attributions) or represent the views of the group as a whole, including any disparate and dissenting views.

CR may be certified when all CR concerns are either resolved or referred to the vertical team for resolution and the CR documentation is complete. The CR lead will prepare a completion of CR and Certification of CR. It will certify that the issues raised by the CR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project.

## **5. Agency Technical Review**

### **a. Requirements**

ATR is mandatory for all decision/implementation documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct, went through robust DQC, and comply with published Corps guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and

decision makers. The PDT should obtain ATR agreement on key data such as hydraulic and geotechnical parameters early in the design process. The goal is to have early involvement of the ATR team, especially when key decisions are made. The ATR lead should be invited virtually to all PDT meetings in order to understand the design efforts and to know when to engage other ATR members for concurrence on key decisions. Value added Lessons Learned from the ATR team should be shared early on to have the best chance of being adopted by the PDT This is consistent with the requirement that the ATR members shall not be involved in the day-to-day production of the project/product. Pending sufficient funding, a site visit will be scheduled for the ATR Team.

#### **b. Documentation of ATR**

DrChecks<sup>sm</sup> review software will be used to document all ATR comments, responses, and associated resolutions accomplished throughout the review process. Comments will be limited to those required to ensure adequacy of the product. ATR comments should generally include the same four key parts as described for CR comments in Section 5.

#### **c. Comment Resolution**

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks<sup>sm</sup> includes the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the District, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks<sup>sm</sup> with a notation that the concern has been elevated to the vertical team for resolution.

#### **d. Products to Undergo ATR**

ATR will be performed on the Draft Integrated Feasibility Report and Final Integrated Feasibility Report.

#### **e. Required ATR Team Expertise and Requirements**

ATR teams will be comprised of senior Corps personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. See Attachment 2 for ATR members. The ATR team will be chosen from Corps certified ATR reviewers based on each individual's qualifications and experience with similar projects. All EC reviewers will be certified in CERCAP:

[https://team.usace.army.mil/sites/ERDC-CRREL/PDT/atr\\_certification/default.aspx](https://team.usace.army.mil/sites/ERDC-CRREL/PDT/atr_certification/default.aspx)

**ATR Lead:** The ATR team lead is a senior professional outside the home MSC with extensive experience in preparing Civil Works documents and conducting ATRs. The lead has the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline, in this case, Structural Engineering, Hydraulic Engineering, or Geotechnical Engineering.

**Geotechnical Engineer** – The geotechnical reviewer shall have experience in the field of geotechnical engineering, analysis, design, and construction of concrete dams and tunnels. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection design, and earthwork construction.

**Hydraulic Engineer** – The hydraulics engineer reviewer shall have experience in the analysis and design of hydraulic structures related to dams including the design of spillways, tunnels, outlet works, and diversion dams. The hydraulic engineer shall be knowledgeable and experienced with the routing of inflow hydrographs through flood control systems utilizing multiple discharge devices, Corps application of risk and uncertainty analyses in flood damage reduction studies, standard Corps hydrologic and hydraulic computer models, dam break inundation studies, sediment transport, geomorphology, hydrologic modeling, and analysis for dam safety investigations.

**Structural Engineer** – Reviewer shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis including foundations on high head mass concrete dams. The structural engineer shall have specialized experience in the design, construction, and analysis of concrete dams.

**Construction Engineer** – Reviewer should be a senior level, professionally registered engineer with extensive experience in the engineering construction field with particular emphasis on dam safety projects. The construction reviewer should have a minimum of 10 years of experience. It is anticipated that the Structural Engineer ATR Reviewer can also conduct the construction ATR review.

**Planning** - The Planning reviewer should be a senior water resources planner with extensive experience in the Corps planning process and be knowledgeable of current Corps policies and guidance. Experience with flood risk management projects is required.

**Economics** - The economics reviewer should be experienced in economic evaluation of flood risk management projects. Experience with HEC-FDA and HEC-FIA is required.

**Environmental Resources** - The environmental reviewer should be experienced in terrestrial and marine ecosystems and the NEPA process and analysis procedures. The reviewer should also be experienced in cultural and tribal aspects of Corps

projects. It is anticipated that the Planning ATR Reviewer can also conduct the environmental resources ATR review.

**Cost Engineering** - The cost engineering reviewer will be familiar with cost estimating using the Microcomputer Aided Cost Engineering System (MCACES) model and preparation of an MII Cost Estimate. The reviewer will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. Coordination with the Cost Engineering MCX will be required for their approval of the selected cost engineering reviewer and to obtain Cost Engineering MCX certification of the cost estimate.

**Real Estate** - The real estate reviewer will be experienced in Federal civil works real estate law, policy, and guidance, development of Real Estate Plans for civil works studies, particularly regarding application of navigational servitude.

**Tunneling** – The unique nature of this study requires that a recognized expert in tunnel construction and maintenance be part of the ATR Team.

**Risk Reviewer** - The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results.

**Climate Change** – In accordance with ECB 2016-25, at least one member of an Agency Technical Review Team for projects covered by this ECB must be certified by the Climate Preparedness and Resilience CoP in the Corps of Engineers Review Certification and Access Program (CERCAP). This requirement may be covered by one of the other discipline specific reviewers listed above.

#### **f. Completion and Certification of the ATR**

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. ATR Review Reports should generally include the same four key parts as described for CR Review Reports in Section 5. Review Reports will be considered an integral part of the ATR documentation and shall:

- (1) Identify the document(s) reviewed and the purpose of the review;
- (2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- (3) Include the charge to the reviewers;
- (4) Describe the nature of their review and their findings and conclusions;
- (5) Identify and summarize each unresolved issue (if any); and

- (6) Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR lead will prepare a completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project. A Sample Completion of ATR and Certification of ATR are included in Attachment 1.

## **6. Independent External Peer Review (IEPR)/Safety Assurance Review (SAR)**

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of Corps is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside the Corps in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPR reviews are managed outside the Corps and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), is managed outside the Corps and is conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy,

appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

**a. Decision on Type I IEPR**

A risk-informed decision was made as to whether Type I IEPR is appropriate based on the factors outlined in EC 1165-2-214, Section 11d(1). A risk informed decision was made that this project does pose a significant threat to human life (public safety) since it involves a flood diversion system subject to overtopping from a probable maximum flood (PMF) event, a plugged tunnel, or a surge-release event. Residential and commercial properties (to include the hospital and senior citizens home) are in the inundation area and are subject to high velocities and water depths along with large debris should overtopping occur.

For a Type I IEPR, review panel members will be made up of independent recognized experts from outside the Corps in the appropriate disciplines, representing a balance of expertise suitable for the review being conducted. IEPR review panel members will be selected using the National Academy of Science (NAS) Policy, which sets the standard for “independence” in the review process. Pending sufficient funding, a site visit will be scheduled for the IEPR Team.

**b. Products to Undergo Type I IEPR**

A Type I IEPR will be performed on the Integrated Feasibility Report and National Environmental Policy Act (NEPA) document prior to the Agency Decision Milestone.

**c. Required Type I IEPR Panel Expertise**

The following provides an estimate of the Type I IEPR panel members and the types of expertise that should be represented on the review panel. All panel members shall be recognized experts in their field and have specialized experience pertaining to the work being performed in this project. In addition, all panel members should have an advanced degree and be professionally registered.

**Geotechnical Engineer** - The Geotechnical Engineering panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of diversion dams and tunnels. The panel member should have knowledge and experience in the forensic investigation and evaluation of settlement, slope stability, and deformations problems associated with embankments constructed on weathered and jointed rock and alluvial soils. The panel member should have experience in failure mode analysis, risk assessment of embankment dams, and evaluating risk reduction measures for dam safety assurance projects.

**Hydraulic Engineer** – The panel member should have experience with engineering analysis related to flood risk management and dam safety projects. The panel member will hold a degree in Civil Engineering, or Hydrology and Hydraulics Engineering. The panel member should have experience with unsteady flow dam failure analysis modeling. The panel member must demonstrate knowledge and

experience with the routing of inflow hydrographs through multipurpose flood control reservoirs. Experience should emphasize modeling spillways and outlet works related to flood control reservoirs, particularly for large dams. The panel member must demonstrate experience in dealing with discharge being utilized at the individual flood control reservoir during a large flood event such as the Probable Maximum Flood (PMF). The panel member should have experience with estimating flows in ungaged basins.

**Structural Engineer** – The panel member shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis, including foundations on concrete dams. The structural engineer shall have specialized experience in the design, construction, and analysis of concrete dams.

**Construction Engineer** – Reviewer should be a senior level, professionally registered engineer with extensive experience in the engineering construction field with particular emphasis on dam safety projects. The construction reviewer should have a minimum of 15 years of experience.

**Planning** - The planning reviewer should be a senior water resources planner with extensive experience in the Corps planning process and be knowledgeable of current Corps policies and guidance. Experience with flood risk management projects is required.

**Economics** - The economics reviewer should be experienced in economic evaluation of flood risk management projects. Experience with HEC-FDA and HEC-FIA is required.

**Environmental Resources** - The environmental reviewer should be experienced in terrestrial and marine ecosystems and the NEPA process and analysis procedures. The reviewer should also be experienced in cultural and tribal aspects of Corps projects.

#### **d. Documentation of Type I IEPR**

The Type I IEPR will be managed by an AE firm or Government entity that meets the criteria set forth in EC 1165-2-214. DrChecks<sup>sm</sup> review software may be used to document the Type I IEPR comments and aid in the preparation of the Review Report but is not required.

Comments should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. Type I IEPR comments should generally include the same four key parts as described for ATR comments in Section 5.

The Type I IEPR panel will prepare a Review Report that will accompany the publication of the final report for the project that shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

This review report, including reviewer comments and a recommendation letter, will be provided to the RMC as soon as the documents become available. Written responses to the IEPR Review Report will be prepared to explain the agreement or disagreement with the views expressed in the report, the actions undertaken or to be undertaken in response to the report, and the reasons those actions are believed to satisfy the key concerns stated in the report (if applicable). These comment responses will be provided to the RMC for concurrence. The revised submittal will be provided to the RMO with the Corps response and all other materials related to the review.

The Alaska District's responses shall be submitted to the POD MSC for final MSC Commander Approval. After the MSC Commander's approval, the District will make the report and responses available to the public on the District's website at <http://www.poa.usace.army.mil/>.

In addition, after receiving the IEPR report, the Chief of Engineers (through the respective HQUSACE RIT) shall:

- (1) Post the panel report on the HQUSACE public website within ten days of receipt of the report
- (2) Make a copy of the report, and any written response of the Chief of Engineers on recommendations contained in the report, available to the public by electronic means, including the Internet; and
- (3) Transmit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a copy of the report, together with any such written response, on the date of a final report of the Chief of Engineers or other final decision document for the project study.

**e. Decision on Type II IEPR - Safety Assurance Review (SAR)**

Due to the life safety concerns identified for this project, a Type II IEPR is appropriate for this project. The Type II IEPR will be conducted during the Planning, Engineering, and Design (PED) Phase of the project prior to the initiation of any construction.

**f. Scope of Safety Assurance Reviews**

Milestones to consider for Type II IEPR are at the record of final design in the Design Documentation Report; at the completion of the plans, specifications, and cost estimate; at the midpoint of construction for a particular contract, prior to final inspection, or at any critical design or construction decision milestones. Note WRDA says “... a review of the design and construction activities prior to the initiation of physical construction and periodically thereafter until construction activities are completed on a regular schedule sufficient to inform the Chief of Engineers on the adequacy, appropriateness, and acceptability of the design and construction activities for the purpose of assuring public health, safety, and welfare.”

**7. Policy and Legal Compliance Review**

All decision documents will be reviewed throughout the project for their compliance with law and policy. 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.

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. Review Schedule and Costs**

**a. Schedule of Reviews**

To the extent practical, reviews should not extend the design schedule but should be embedded in the design process. Reviewers should be involved at key decision points and are encouraged to provide timely over the shoulder comments.

PROJECT PHASE/SUBMITTAL	REVIEW START DATE	REVIEW END DATE
Existing Conditions Potential Failure Mode Analysis		
DQC Review of AM submittals	May 2017	Jun 2017
Alternatives Milestone		
Alternatives Potential Failure Mode Analysis		
September 2017		
October 2017		



DQC Review of TSP submittals	April 2018	May 2018
Tentatively Selected Plan Milestone June 2018		
ATR Review of Draft Integrated Report and Hybrid Risk Assessment Report	July 2018	August 2018
Type I IEPR	October 2018	December 2018
DQC Review of ADM submittals	December 2018	January 2019
Agency Decision Milestone February 2019		
ATR Review of Final Integrated Report and Hybrid Risk Assessment	February 2019	March 2019
MSC Submittal of Final Report May 2019		

**b. ATR Schedule and Cost**

The preliminary review schedule is listed in the table in paragraph “a” of this section. The cost for the ATRs is approximately \$120,000.

**c. IEPR Schedule and Costs**

A Type I IEPR will be required for this project. Initial indications are that the estimated cost for the Type I IEPR is in the range of \$350,000. This estimate will be refined when the Scope of Work for the IEPR Type I contract is completed.

**9. Public Posting**

As required by EC 1165-2-214, the approved Review Plan and all future revisions will be posted on the District public website (<http://www.poa.usace.army.mil/Library/Reports-and-Studies/>). Public review of the draft decision document will be held concurrently with MSC review, ATR, and OWPR Policy Review. The public, including scientific or professional societies, will not be asked to nominate potential peer reviewers. If an EIS is required, the public comment period for the draft EIS will be no less than 45 days. Comments received during the public comment period for the draft report will not necessarily be available to the other review teams as part of their reviews, with exception of the IEPR panel, which will receive a copy of any draft report public comments received. Public comments will be reviewed, addressed, and incorporated into the final draft report as appropriate. The final decision document, associated review reports, and Corps responses to IEPR comments will be made available to the public on the internet.

**10. Review Plan Approval and Updates**

The MSC for this is the Pacific Ocean Division. The MSC Commander is responsible for approving this Review Plan. The Commander’s approval reflects vertical team input

(involving the Alaska District, MSC, and RMC) as to the appropriate scope and level of review for the study and endorsement by the RMC. Like the PMP, the Review Plan is a living document and may change as the study progresses; the District is responsible for keeping the Review Plan up to date. Minor changes to the Review Plan since the last MSC Commander approval will be documented in an Attachment to this plan. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-endorsed by the RMC and re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the District's webpage <http://www.poa.usace.army.mil/Library/Reports-and-Studies/> and linked to the HQUSACE webpage. The latest Review Plan should also be provided to the RMO and home MSC.

## 11. Model Certification and Approval

The use of certified or approved models is required for all activities to ensure the models are technically and theoretically sound, compliant with Corps policy, computationally accurate, and based on reasonable assumptions. The responsible use of well-known and proven Corps developed and commercial engineering software will continue, and the professional practice of documenting the application of the software and modeling results will be followed. 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.

MODEL	STATUS
HEC-RAS v 5.0.3	Corps developed and approved model
USACE RECONS v 2016	Corps developed and approved model
Micro-computer Aided Cost Engineering System (MCACES) 2nd Generation (MII)	Corps developed and approved model
HEC-FDA v 1.4.1	Corps developed and approved model
HEC-LifeSim 1.0	Corps developed model
Adaptive Hydraulics (AdH) Modeling System v 4.01	Corps developed and approved model

If needed, a study-specific Excel spreadsheet model will also be used estimate NED benefits not captured through HEC-FIA or HEC-FDA such as recreation benefits and reduction in emergency response costs. The spreadsheet model would require one-time approval by Headquarters.



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*Alaska District*

## 12. Review Plan Points of Contact

NAME/TITLE	ORGANIZATION	PHONE
Plan Formulator	CEPOA-PM-C-PL	(907) 753-2594
Project Manager	CEPOA-PM-C	(907) 753-2539
Senior Economist	CEPOD-PDC	(808) 835-4625
Senior Reviewer	CEIWR-RMC	(304) 399-5217