

**REVIEW PLAN**

**CENTRAL VALLEY INTEGRATED  
FLOOD MANAGEMENT STUDY  
CALIFORNIA**

**PROGRAMMATIC FEASIBILITY STUDY**

**SACRAMENTO DISTRICT**

**September 2012**

**MSC Approval Date: 9 November 2012  
Last Revision Date: None**



**US Army Corps  
of Engineers®**

**REVIEW PLAN**

***CENTRAL VALLEY INTEGRATED FLOOD MANAGEMENT STUDY***  
*Central Valley, California*  
*Framework and Programmatic Feasibility Study*

**TABLE OF CONTENTS**

1. PURPOSE AND REQUIREMENTS ..... 3

2. REVIEW MANAGEMENT ORGANIZATION COORDINATION ..... 5

3. STUDY INFORMATION ..... 5

4. DISTRICT QUALITY CONTROL (DQC)..... 8

5. AGENCY TECHNICAL REVIEW..... 8

6. TYPE I INDEPENDENT EXTERNAL PEER REVIEW ..... 11

7. MODEL CERTIFICATION AND APPROVAL ..... 16

8. REVIEW SCHEDULES AND COSTS..... 18

9. PUBLIC PARTICIPATION ..... 19

10. REVIEW PLAN APPROVAL AND UPDATES..... 20

11. REVIEW PLAN POINTS OF CONTACT..... 20

ATTACHMENT 1: TEAM ROSTERS ..... 21

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS..... 23

ATTACHMENT 3: REVIEW PLAN REVISIONS ..... 24

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS..... 25

**LIST OF TABLES**

Table 1. Factors Affecting Scope and Level of Review for the Feasibility Study..... 7

Table 2. Decision on Type I IEPR ..... 12

Table 3. DCQ Schedule ..... 18

Table 4. ATR Schedule..... 18

Table 5. Type 1 IEPR Schedule ..... 19

Table 6. Project Delivery Team ..... 21

Table 7. District Quality Control Team ..... 21

Table 8. Vertical Team ..... 21

Table 9. Agency Technical Review Team..... 22

Table 10. Type I Independent External Peer Review Panel..... 22

Table 11. Planning Center of Expertise Points of Contact..... 22

## 1. PURPOSE AND REQUIREMENTS

**a. Purpose.** This Review Plan defines the scope and level of peer review for the Central Valley Integrated Flood Management Study (CVIFMS), Central Valley, California. The study is a programmatic feasibility study (Feasibility Study) **decision document** and combined Environmental Impact Statement/Environmental Impact Report (EIS/EIR)), scheduled for completion in 2015.

### b. References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (5) CVIFMS Project Management Plan, April 2011

**c. Requirements.** This review plan was developed in accordance with EC 1165-2-209, 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. The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, **decision documents** are subject to cost engineering review and certification (per EC 1165-2-209) and planning model certification/approval (per EC 1105-2-412).

- (1) District Quality Control/Quality Assurance (DQC). All **decision documents** (including supporting data, analyses, and environmental compliance documents) will undergo DQC. This is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home Major Subordinate Command (MSC). The home district will manage DQC.
- (2) Agency Technical Review (ATR). ATR is mandatory for all **decision documents**, including supporting data, analyses, and environmental compliance documents. 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 and comply with published US Army Corps of Engineers (USACE) guidance and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within the USACE by a designated Risk Management Organization (RMO) and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be composed of senior USACE personnel and may be supplemented by outside experts, as appropriate. To ensure independence, the leader of the ATR team will be from outside the home MSC.
- (3) Independent External Peer Review (IEPR). An 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 the USACE is warranted. A risk-informed decision, as described in EC 1165-2-209, is made as to whether

IEPR is appropriate. IEPR panels will consist of independent recognized experts from outside the USACE 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 is generally for **decision documents** and Type II is generally for implementation products.

- (a) Type I IEPR. Type I IEPRs are managed outside the USACE 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, alternative plan formulation, 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 IEPRs cover the entire **decision document** or action and address all the 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 will also be addressed during the Type I IEPR, per EC 1165-2-209.
  - (b) Type II IEPR. Type II IEPR, or Safety Assurance Review, are managed outside the USACE and are 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 review the design and construction activities before construction begins and, until construction is completed, periodically thereafter on a regular schedule. The reviews will consider the adequacy, appropriateness, and acceptability of the design and construction activities in ensuring public health safety and welfare. Type II IEPR will likely apply to the CVIFMS.
- (4) Policy and Legal Compliance Review. 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 Chief of Engineers. 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**.
  - (5) Cost Engineering Review and Certification. All **decision documents** will be coordinated with the Cost Engineering Directory of Expertise (DX), located in the Walla Walla District. The DX, or in some circumstances regional cost personnel that are pre-certified by the DX, will conduct the cost ATR. The DX will certify the final total project cost.
  - (6) Model Certification/Approval. EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, that they are compliant with USACE policy and computationally accurate, and that they are based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use 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 the planning product. The selection and application of the model and the input and output data are still the responsibility of the users and are subject to DQC, ATR,

and IEPR. 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, and the professional practice of documenting the application of the software and modeling results will be followed. Use of engineering models is also subject to DQC, ATR, and IEPR.

## 2. REVIEW MANAGEMENT ORGANIZATION COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for **decision documents** is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the **decision document**. The RMO for the peer review effort described in this Review Plan is the Flood Risk Management PCX.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to conduct ATR of cost estimates, construction schedules, and contingencies. In addition, RMO will coordinate with the Ecosystem Restoration PCX and the Risk Management Center to ensure that review teams with appropriate expertise are assembled.

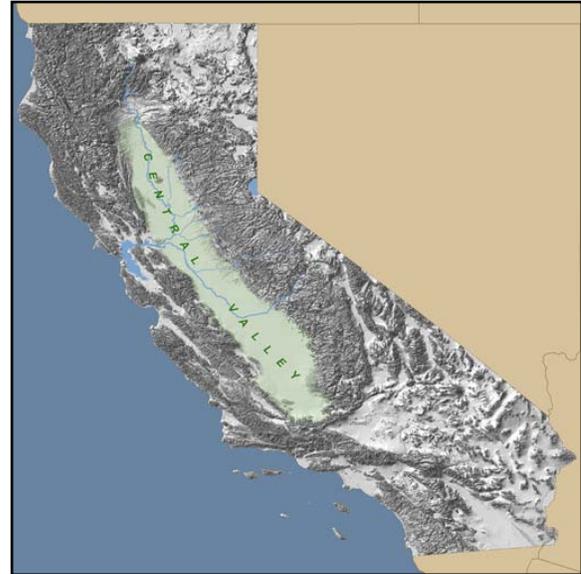
## 3. STUDY INFORMATION

- a. **Decision Document.** The purpose of the study is to identify flood risk management measures in the study area. The **decision document**, which is the Feasibility Study, a programmatic report, is expected to be the basis for a recommendation to Congress for authorizing new management or protection measures. The Feasibility Study will present planning, engineering, and implementation details of the recommended plan and may include project-specific design and construction components. The feasibility phase of this project will be cost shared, 50 percent Federal and 50 percent non-Federal, with the project sponsors. The sponsors are the California Department of Water Resources (DWR) and the California Central Valley Flood Protection Board (CVFPB). These agencies are herein referred to as non-Federal sponsors.
- b. **Study/Project Description.** In 2007, the California Legislature passed five interrelated bills aimed at addressing the problems of flood protection and liability: Senate Bill (SB) 5, SB 17, Assembly Bill (AB) 5, AB 70, and AB 156. SB 5 directed the DWR to develop and the CVFPB to adopt a Central Valley Flood Protection Plan (CVFPP), one of the objectives of which is to provide a vision for future flood management in the Central Valley. Due to the interests of the CVFPB, DWR, and the USACE in existing and future Federal/State water resource projects and programs in the Central Valley, the non-Federal sponsors have requested USACE assistance in developing the CVFPP. The intent is to build off the Sacramento River and San Joaquin River Basins Comprehensive Study (Comp Study) and other existing studies to develop the 2012 and subsequent CVFPP documents. The non-Federal sponsors and the USACE are developing PMPs and a new Federal Cost Share Agreement (FCSA) to prepare an integrated watershed study of the Central Valley (CVIFMS) that will support preparation of the CVFPP. The total estimated project cost is \$43,440,000, of which 50 percent will be Federal and 50 percent will be non-Federal in-kind.

The purpose and intent of the CVIFMS is to provide Federal support for the CVFPP vision of improved flood risk management in the Central Valley. As with the CVFPP effort, the CVIFMS will build upon the tools and recommendations that were developed during the Comp Study. The CVIFMS team, in developing the PMP and associated documents, will synchronize with the CVFPP process to stress efficiency, coordination, and communication. The CVIFMS will focus on flood risk management and ecosystem restoration measures and alternatives that will be within the Federal interest and consistent with USACE guidelines and policies. It will provide parallel technical and

policy support to the CVFPP study. In addition, the CVIFMS will include investigations of, and, potentially, recommendations for Federal actions that the USACE could pursue through design and construction, given concurrent local sponsor interest. USACE participation will include support, communication, and lead roles in completing various technical tasks.

The study is being conducted in the Central Valley of California within the watershed boundaries of the Sacramento and San Joaquin Rivers. For planning and analysis purposes, and consistent with legislative direction of the non-Federal sponsors, two geographical planning areas are important for the CVIFMS consideration in Federal/State participation, as follows:



- **State Plan of Flood Control Planning Area.**

This area is defined by the lands currently receiving protection from facilities of the State Plan of Flood Control. The State's flood management responsibility is limited to this area.

- **System-Wide Planning Area.**

This area includes the lands that are subject to flooding under the current facilities and operation of the Sacramento-San Joaquin River Flood Management System (Water Code Section 9611). The State Plan of Flood Control Planning Area is completely contained within the system-wide planning area.

**c. Factors Affecting the Scope and Level of Review.** Quality control will be reviewed through DQC, ATR, Type I IEPR, and Policy and Legal Compliance Review. The Framework Document is an informational document that will only require DQC and ATR. Questions that must be considered in determining the scope and level of review for the Feasibility Study are identified in column 1 of Table 1; the Project Delivery Team's (PDT's) assessment of these questions in relation to this study is listed in column 2 of Table 1.

**d. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsors are planning and engineering services for flood management and protection through the State's CVFMP Program. All in-kind technical work will be reviewed by ATR for compliance with the USACE criteria and guidelines.

The following categories of in-kind contributions are expected to be completed under the State's CVFMP Program:

- Floodplain surveys and mapping;
- Hydrologic and hydraulic engineering investigations, including flood routing computer modeling;
- Geotechnical investigations, particularly related to levee stability and design;
- Data management; and
- Watershed investigations.

**Table 1. Factors Affecting Scope and Level of Review for the Feasibility Study**

Questions to Determine Scope	CVIFMS Program
Will parts of the study be challenging?	Developing an integrated approach for improved flood management and protection in the Central Valley is considered challenging from both a technical and implementation perspective and from a public and social perspective.
Will the Feasibility Study contain influential scientific information or be a highly influential scientific assessment?	It is not anticipated that the study will include influential scientific information, although it may include extensive hydraulic and hydrologic data management and modeling.
Will the study have significant economic environmental or social effects on the nation?	The study may have significant economic and environmental effects. An environmental impact analysis will be conducted as part of the study.
Will the study have significant interagency interest?	The study has local, State, and Federal interest; thus, a variety of agencies will be included as part of the coordination process.
Will the alternatives have a significant threat on human life and safety?	The goal of the study is improved flood risk management and flood protection; thus, the alternatives are expected to reduce threats to life and improve public safety; however, because the proposed project may include structural measures such as levees, the life safety consequences of project non-performance could potentially be increased. The current study area has approximately 15 million residents within the floodplain at risk and over \$100 billion in structures and contents. In addition, over \$2 billion in agricultural crops and infrastructure are also within the floodplain. The District Chief of Engineering concurs with this statement of risk.
Will the study be highly controversial?	The project has a potential for public controversy due to the potential for land use changes within both the urban areas and non-urban agricultural areas.
Will the information in the <b>decision document</b> be based on novel methods, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?	It is not likely that the study will result in precedent-setting methods or models. However, it is possible that legislative or rule changes could be recommended that could affect operational practices of reservoirs or other water storage or conveyance facilities.
What are the likely study risks and the magnitude of the risks?	<p><b>Technical in-kind contributions.</b> The non-Federal sponsors will be completing a number of technical analyses for this study. There is a risk that their Federal work may not meet USACE requirements, that they will require modification, and thus that they will result in cost and schedule risks. These risks will be mitigated through in-progress communication and coordination with the non-Federal sponsors.</p> <p><b>Public controversy.</b> The study has the potential for public controversy, which will be mitigated through a carefully planned and implemented public involvement program.</p>

#### 4. DISTRICT QUALITY CONTROL (DQC)

- a. **Documentation of DQC.** DQC of all District study efforts and products including A/E contract work will be performed as per respective section QC/QA procedures and documentation. A DQC lead will be designated to track and coordinate documents and certification.
- b. **Products to Undergo DQC.** The study products to undergo DQC the Feasibility Study **decision document** and combined EIS/EIR scheduled for completion in 2015.

#### 5. AGENCY TECHNICAL REVIEW

- a. **Products to Undergo ATR.** The products to undergo ATR for the study will include:
  - In-kind technical contributions from non-Federal sponsors;
  - Without-project hydrology (USACE South Pacific Division (SPD) requirement);
  - Tentative Selected Plan milestone documentation;
  - Agency Decision milestone documentation;
  - Draft Feasibility Study, including NEPA/CEQA environmental compliance documentation and technical appendices; and
  - Final Feasibility Study, including NEPA/CEQA environmental compliance documentation and technical appendices.

The TSP and Agency Decision milestone materials and supporting analyses warrant ATR because they provide the basis for Headquarters, USACE (HQUSACE) to determine if there is Washington-level agreement with the future without-project condition and if support for the CVIFMS alternatives will be warranted. The milestone submittal materials, draft Feasibility Study, and supporting materials merit ATR because they will be released to the public for review and will determine the public, stakeholder, State, other agency, and other interest group positions on the CVIFMS alternatives. The final Feasibility Study and supporting analyses warrant ATR because they will provide the basis for the Chief of Engineers interagency coordination and the Chiefs' approval or further recommendation to the Secretary of the Army and the Congress, as needed.

ATR members will be provided with any significant public comments made during public meetings and on the products under review. Each application of ATR should build upon any and all prior cycles of review for the study. Each ATR review iteration need address only incremental changes and additions to documents and analyses addressed in prior ATR reviews, unless the ATR team determines that certain subjects or aspects warrant revisiting due to other changes or a need to adequately understand a larger portion of the project.

- b. **Required ATR Team Expertise.** The ATR team will be established shortly after the FCSA is executed. The team will be composed of individuals from outside the home district who have not been involved in the development of the **decision document** and will be chosen based on expertise, experience, and skills. It is anticipated that the team will consist of at least 13 reviewers. The following types of expertise may be represented on the ATR team:

- **Planning**—Team members will be experienced with the civil works process, watershed level projects, and current flood damage reduction planning and policy guidance. Team members will have experience in plan formulation for multipurpose projects and planning in a collaborative environment.
- **Surveying, Mapping, and Data Management**—Team member will have expertise in the evaluation of survey data, mapping, and geo-spatial data management and analysis. Team member will have familiarity with mapping in California’s Central Valley.
- **Hydrology**—Team members will be experienced in the field of rainfall runoff models, flow-frequency analysis, hydrologic effects of flood control operations, and hydrologic analysis using the Hydrologic Modeling System 3.4. Team members will have familiarity with flood control challenges in California’s Central Valley.
- **Hydraulics**—Team member will be experienced in the field of hydraulics and will have a thorough understanding of open channel dynamics, channel systems, detention/retention basins, application of levees and flood walls, sediment transport, computer modeling techniques such as HEC-RAS and FLO-2D, and non-structural solutions involving flood warning systems and flood proofing. Team member will have a thorough understanding of the field of reservoir operations (flood risk reduction and other common purposes) and modeling in a large and complex flood risk management system context.
- **Floodplain and Sedimentation Studies**—Team member or members will have expertise in floodplain studies, including mapping of overflows of various frequencies and in conducting sedimentation studies. Team member will have familiarity with floodplain and sedimentation issues in California’s Central Valley.
- **Geotechnical Engineering**—Team member will have experience in geotechnical evaluation of flood risk management structures, such as static and dynamic slope stability evaluation; evaluation of the, seepage through earthen embankments; evaluation, and under-seepage through the foundation of flood risk management structures.
- **Engineering and Design Analysis**—Team member will have expertise in structural components of flood management; typical issues may include utility relocations, positive closure requirements and internal drainage for levee construction, and application of non-structural flood damage reduction.
- **Economics**—Team member will have expertise in the processes used in evaluating flood risk management, ecosystem restoration and recreation projects. Team member will have recent experience in preparing economic analysis plans for multipurpose feasibility, including all four project accounts: National Economic Development (NED), Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE).
- **Risk Analysis** – Team member 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.

- Real Estate Studies—Team members will have experience with the USACE’s process of valuating real estate costs associated with acquiring the project’s real property.
- Environmental Studies —Team member(s) will have expertise in the habitat types found in California’s Central Valley, will understand the factors that influence the reestablishment of native species of plants and animals, will have expertise in the requirements for NEPA/CEQA documentation, and will be experienced in the cultural resource discipline and other environmental areas, such as air quality, as they relate to programmatic planning studies.
- Hazardous, Toxic, and Radiological Waste (HTRW)—Team member will have expertise in assessing HTRW to determine the nature and extent of HTRW materials within the project area.
- Regulatory —Team member will have experience in wetland delineation and regulatory permitting with knowledge of wetlands in the Central Valley that may be affected by the CVIFMS alternatives and will be evaluated for Section 404 requirements and State and local laws.
- Cost Engineering—Team member will have USACE expertise in the application of scientific principles and techniques to problems of cost estimating, cost control, business planning and management science, profitability analysis, project management, and planning and scheduling.

The PCX, in cooperation with the PDT and vertical team (the vertical team is the district, RMO, MSC, and HQUSACE), will determine the final makeup of the ATR team. It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential ATR members. The name, organization, contact information, credentials, and years of experience of each member will be identified at the time the review is conducted.

- c. Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses, and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include the following:

- The review concern—Identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- The basis for the concern—Cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- The significance of the concern—Indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- The probable specific action needed to resolve the concern—Identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, commenters may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination, 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. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

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

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers and 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;
- Identify and summarize any unresolved issue; 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.

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 statement of technical review, certifying that the issues raised by the ATR team have been resolved or elevated to the vertical team. A statement of technical review should be completed, based on work reviewed to date, for the TSP and Agency Decision milestones, draft report, and final report. A sample statement of technical review is included in Attachment 2.

## 6. TYPE I and II INDEPENDENT EXTERNAL PEER REVIEW

- a. **Decision on IEPR, Type I.** Type I IEPR is conducted for **decision documents** if there is a vertical team decision involving the district (MSC, PCX, and HQUSACE members) that the covered subject matter meets certain criteria (described in EC 11 65-2-209), where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside the USACE is warranted. Type I IEPR is coordinated by the appropriate PCX and managed by an outside eligible organization (OEO), external to the USACE. Type I IEPR panels will evaluate whether the interpretations of analysis and conclusions based on analysis are reasonable. To provide effective review, in terms of both usefulness of results and credibility, the review panels should be given the flexibility to bring important issues to the attention of decision makers; however, review panels should be instructed to not make a recommendation on whether a particular alternative should be implemented, as the Chief of Engineers is ultimately responsible for the final decision on a planning study. Type I IEPR panels will accomplish a concurrent review that covers the entire **decision document** and will address all the 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 1165-2-209. Whenever feasible and appropriate, the office producing the document will make the draft **decision document** available to the public for comment at the same

time it is submitted for review (or during the review process) and will sponsor a public meeting where oral presentations on scientific issues can be made to the reviewers by interested members of the public. A Type I IEPR panel or OEO representative will participate in the Civil Works Review Board.

The decision to conduct Type I IEPR is made by comparing EC 1165-2-209 criteria to the study, as shown in Table 2. Based on these factors, Type I IEPR will be conducted.

- b. Products to Undergo Type I IEPR.** The Type I IEPR will be performed for the draft Feasibility Report, including NEPA/CEQA environmental compliance documentation and technical appendices. Type I IEPR panel members will be provided with ATR documentation and significant public comments made during public meetings and on the products under review.
- c. Required Type I IEPR Panel Expertise.** The Type 1 IEPR panel members will be composed of individuals who have not been involved in the development of the **decision document** and will be chosen based on expertise, experience, and skills. It is anticipated that the team will consist of approximately seven reviewers.

**Table 2. Decision on Type I IEPR**

EC 1165-2-209 Criteria	CVIFMS Program
Is there significant threat to human life?	The goal of the study is improved flood risk management and flood protection; thus, the alternatives are expected to reduce threats to life and improve public safety. The current study area has approximately 15 million residents within the floodplain at risk and over \$100 billion in structures and contents. In addition, over \$2 billion in agricultural crops and infrastructure are also within the floodplain. The District Chief of Engineering concurs with this statement of risk.
Is the total project cost more than \$45 million?	The cost to implement the CVIFMS alternatives will likely be more than \$45 million.
Has the Governor of California requested a Type I IEPR?	The Governor has not requested a Type I IEPR.
Has the head of a Federal or State agency charged with reviewing the project study requested a Type I IEPR?	No requests have been received for a Type I IEPR for this study.
Will the alternatives be a significant threat to human life and safety?	The goal of the study is improved flood risk management and flood protection; thus, the alternatives are expected to reduce threats to life and improvement to public safety; however, because the proposed project may include structural measures such as levees, the life safety consequences of project non-performance could potentially be increased. The current study area has approximately 15 million residents within the floodplain at risk and over \$100 billion in structures and contents. In addition, over \$2 billion in agricultural crops and infrastructure are also within the floodplain. The District Chief of Engineering concurs with this statement of risk.
Will there be significant public controversy as to the size, nature, or effects of the project?	The project has the potential for public controversy due to the potential for land use changes in both the urban and non-urban

	agricultural areas.
Will there be significant public controversy as to the economic or environmental cost or benefit of the project?	The project has the potential for public controversy with disputes regarding the benefit of the project for urban land owners at the expense of rural land owners.
Will the study be based on information from novel methods, present complex challenges or interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?	The integrated approach of the CVIFMS and CVFPP working together to improve flood management may be considered novel.

d. The following types of expertise may be represented on the Type I IEPR team:

- Hydrology and Hydraulics—Panel member will be an expert in the field of hydrology and hydraulics and will have a thorough understanding of rainfall runoff models, flow-frequency analysis, hydrologic effects of flood control operations, open channel dynamics, detention/retention basins and bypass channels, application of levees and flood walls, and nonstructural solutions.
- Economics—Panel member will have extensive experience with the processes used in evaluating flood risk management ecosystem restoration and recreation projects. Team members will have recent experience in preparing economic analysis plans for multipurpose feasibility including all four project accounts: NED, EQ, RED, and OSE.
- Environmental Resources—Panel member will have expertise in the habitat types found in California’s Central Valley, understand the factors that influence the reestablishment of native species of plants and animals, be experienced in the preparation of NEPA/CEQA documentation, and have expertise in the cultural resources discipline.
- Cost Engineering—Panel member will have extensive USACE experience in applying scientific principles and techniques to problems of cost estimating, cost control, business planning and management science, profitability analysis, project management, planning and scheduling.
- Civil Design—Panel member will have expertise in designing flood protection measures, including levees, channels, and retention structures, as well as application of nonstructural flood damage reduction.
- Geotechnical Engineering—Panel member will have extensive experience in geotechnical evaluation of flood risk management structures, such as static and dynamic slope stability evaluation, seepage through earthen embankments evaluation, and under-seepage through the foundation of flood risk management structures.
- HTRW—Panel member will have expertise in assessment of HTRW to determine the nature and extent of HTRW materials within the project area.

The OEO will determine the final participants on the Type I IEPR panel. The name, organization, contact information, credentials, and years of experience of each member will be identified at the time the review is conducted and will be included in Attachment 1 of this Review Plan.

**e. Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an OEO, per EC 1165-2-209, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final **decision document** and will:

- 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.

The OEO will submit the final Review Report no later than 60 days following the close of the public comment period for the draft **decision document**. The USACE will consider all recommendations contained in the Review Report and will prepare a written response for all recommendations adopted or not adopted. The final **decision document** will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the Internet.

**f.** The OEO will prepare the final Review Report after reviewing the complete **decision document** package. If IEPR of interim products are performed, these reviews will be documented in interim Review Reports, which will be incorporated into the final Review Report. The official USACE response to the IEPR panel recommendations will be provided in the final Review Report only. Initial responses to IEPR panel recommendations will be developed and documented by the PDT and provided to the vertical team for consideration in developing the official USACE response. The use of DrChecks to document the IEPR comments and initial District responses is not required, but its use may be negotiated with the OEO.

**g. Type II IEPR**

Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are 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.

**f. Decision on IEPR, Type II.** This Feasibility Study will be subject to Type I IEPR, including Safety Assurance Review factors, and Type II IEPR during the subsequent Design and Implementation Phase if a project is recommended for construction. This decision is based on the information presented above in Section 2.c., including the presence of life safety issues and complexity of the project (including potential robustness measures). No requests to conduct IEPR have been received from a head of a Federal or state agency charged with reviewing the project.

**g. Products to Undergo Type II IEPR.** The Final Feasibility Report (including NEPA/CEQA documentation and technical appendices), Review Plan, O&M Manual, and design and construction activities will be subject to Type II IEPR.

- h. Required Type II IEPR Panel Expertise.** The Type II IEPR Team will be selected and managed by an organization external to the Corps, per EC 1165-2-209. The RMC will coordinate the Type II IEPR and work with the PDT to write a scope of work for the review that includes developing a charge to reviewers that outlines the scope and requirements of the review, identifying potential reviewers, contracting them, managing the review, and documenting the review. Due to the nature and complexity of the study it is expected that multiple team members will be needed for certain disciplines. The team will consist of approximately 5 reviewers.

<b>IEPR II Panel Members/Disciplines</b>	<b>Expertise Required</b>
Environmental	Team member will be experienced in NEPA/CEQA process and analysis, and have a biological or environmental background that is familiar with the project area and ecosystem restoration.
Civil/Structural Engineering	Team member will have experience in levee, floodwall, box culvert and drainage structure design, and utility relocations. Experience with design and construction of flood control structures in areas of high peat content is recommended. A certified professional engineer is highly recommended.
Geotechnical Engineering	Team member will be experienced in levee and floodwall design, post construction evaluation and rehabilitation. Certified professional engineer recommended.
Hydrology and Hydraulic Engineering	Team member will be an expert in the field of hydrology & hydraulics and have a thorough understanding of river flows and of but not limited to, flood conditions, low flow/drought, channel flows, reservoir operations, and potential impacts of urban and farmland run-off. Team member will have a working knowledge of RMA computer modeling programs. Knowledge of flood walls and levee impacts is recommended and experience working with non structural measures in preferred. A certified flood plain manager is recommended but not required.
Hydrologic Engineer	Team member will have a thorough understanding of the field of reservoir operations (flood risk reduction and other common purposes) and modeling in a large and complex flood risk management system context.
Construction	Team member will have experience in construction of levees, floodwalls, box culverts, and drainage structures. Experience with construction of flood control structures in areas of high peat content is recommended.

**i. Documentation of Type II IEPR.**

Per EC 1165-2-209, Appendix E, the review team will prepare a Review Report. All review panel comments shall be entered as team comments that represent the group and be non-attributable to individuals. The team lead is to seek consensus, but where there is a lack of consensus, note the non-concurrence and why. A suggested report outline includes:

- Introduction,
- Composition of the review team,
- Summary of the review during design,
- Summary of the review during construction,
- Lessons learned in both the process and/or design and construction,
- Appendices for conflict of disclosure forms for comments to include any appendices for supporting analyses and assessments of the adequacy and acceptability of the methods, models, and analyses used.

All comments in the report will be finalized by the panel prior to their release to USACE for each review plan milestone. The final Review Report will be submitted no later than 60 days following the close of the review period. The District Chief of Engineering, with full coordination with the Chiefs of Construction and Operations, shall consider all comments contained in the report and prepare a written response for all comments and note concurrence and subsequent action or non-concurrence with an explanation. The District Chief of Engineering shall submit the panel's report and the Districts responses shall be submitted to the MSC for final MSC Commander approval and then make the report and responses available to the public on the District's website.

## 7. MODEL CERTIFICATION AND APPROVAL

- a. Planning Models.** The Hydrologic Engineering Center's Flood Damage Reduction Analysis program (HEC-FDA 1.2.5a (Certified)) provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using a risk-based analysis method. It is anticipated that the program will be used to evaluate and compare the future with- and without-project plans for the CVIFMS alternatives to aid in the selection of a recommended plan to manage flood risk. As the study progresses, other models may be added, and some may require custom modifications to address the CVIFMS and CVFPP differences. The PDT will coordinate all certification with the Flood Risk Management (FRM) PCX.

Several environmental and ecological models have been used in the Central Valley and may be used to support the CVFPP and CVIFMS. For example, models are used to evaluate effects on various aquatic species from changes in temperature, turbidity, and other water quality parameters. These models typically involve hydrodynamic flow calculations, coupled with computations of water quality and other ecological variables that are important to aquatic species. In addition, models may be used to assess air quality and noise effects. If and when specific environmental or ecosystem planning models are identified for use in this study, the District will coordinate with the FRM-PCX and/or ECO-PCX to determine the certification/approval status of the models and, if required, initiate the process for certification or approval.

- b. Engineering Models.** The following engineering models are anticipated to be used in the development of the **decision document**. All of these models are certified for use in this study.
- The Hydrologic Modeling System HEC-HMS 3.4 is designed to simulate the precipitation runoff processes of dendritic watershed systems. It is designed to be applicable in geographic areas for solving the widest possible range of problems. This includes large river basin water supply, flood hydrology, and small urban or natural watershed runoff. Hydrographs produced by the program are used directly or in conjunction with other software for studies of water availability, urban drainage, flow forecasting, future urbanization impact, reservoir spillway design, flood damage reduction, floodplain regulation, and systems operation. It is expected that this software program will be used to create inflow hydrographs for development for

with- and without-project conditions.

- Hydrologic Engineering Center's River Analysis System HEC-RAS 4.0 provides one-dimensional steady and unsteady flow river hydraulics calculations, sediment transport-mobile bed modeling, and water temperature analysis. The software supersedes the HEC-2 river hydraulics package, which was a one-dimensional, steady flow water surface profile program. This software program will create water surface profile elevations for with- and without-project conditions.
- FLO-2D is a volume conservation flood routing model used to simulate river overbank flows. It can also be used on unconventional flooding problems, such as unconfined flows over complex alluvial fan topography and roughness, split channel flows, mud/debris flows, and urban flooding. This software program will be used to develop economic floodplains for the benefits analysis for with- and without-project conditions.
- ArcMap is the main component of ESRI's ArcGIS suite of geospatial processing programs, and it is used primarily to view, edit, create, and analyze geospatial data. ArcMap allows users to explore data within a data set, to symbolize features accordingly, and to create maps. ArcMap 9.3/HEC-GeoRAS 4.1.1 is a set of procedures, tools, and utilities for processing geospatial data in ArcGIS/ArcMap using a graphical user interface. The interface allows the preparation of geometric data for import into HEC-RAS and processes simulation results exported from HEC-RAS.
- HEC-6 is a one-dimensional, movable boundary, open channel flow, numerical model designed to simulate and predict changes in river profiles from scour and deposition over moderate periods (typically years, although applications to single flood events are possible). A continuous flow record is partitioned into a series of steady flows of variable discharges and durations. For each flow a water surface profile is calculated, thereby providing energy slope, velocity, and depth at each cross section. Potential sediment transport rates are then computed at each section. These rates, combined with the duration of the flow, permit a volumetric accounting of sediment within each reach. The amount of scour or deposition at each section is then computed and the cross section is adjusted accordingly. The computations then proceed to the next flow in the sequence and the cycle is repeated, beginning with the updated geometry. The sediment calculations are performed by grain size fraction, thereby allowing the simulation of hydraulic sorting and armoring. Features of HEC-6 include capability to analyze networks of streams, channel dredging, and various levee and encroachment alternatives. HEC-6 uses several methods for computing sediment transport.
- HEC-RAS 4.1 for sediment transport incorporates the simulation of one-dimensional sediment transport/movable boundary calculations resulting from scour and deposition over moderate periods (typically years, although applications to single flood events are possible). The sediment transport potential is computed by grain size fraction, thereby allowing the simulation of hydraulic sorting and armoring. Major features include the ability to model a full network of streams, channel dredging, and various levee and encroachment alternatives. HEC-RAS 4.1 uses several different equations to compute sediment transport. The model is designed to simulate long-term trends of scour and deposition in a stream channel that might result from modifying the frequency and duration of the water discharge and stage or modifying the channel geometry. This system can be used to evaluate deposition in reservoirs, to design channel contractions required to maintain navigation depths, to predict the influence of dredging on the rate of deposition, to estimate maximum possible scour

during large floods, and to evaluate sedimentation in fixed channels.

## 8. REVIEW SCHEDULES AND COSTS

- a. **DQC Schedule and Cost.** The DQC schedule is shown in Table 3.

**Table 3. DCQ Schedule**

Task	Date
DQC team identified.	December 2012
Draft report, including NEPA/environmental compliance documentation and technical appendices.	2014
Final report, including NEPA/environmental compliance documentation and technical appendices.	2015

The USACE Sacramento District will provide labor funding by cross charge labor codes. The Project Manager will work with the DQC team leader to ensure that adequate funding is available and is commensurate with the level of review needed. Any funding shortages will be negotiated on a case-by-case basis and in advance of a negative charge occurring.

The DQC team leader will provide organization codes for each team member and a responsible financial point of contact (CEFMS responsible employee) for creating labor codes. Reviewers will monitor individual labor code balances and will alert the DQC team leader of any possible funding shortages. DQC review is estimated to be \$100,000 for the Feasibility Study.

- b. **ATR Schedule and Cost.** The ATR schedule is shown in Table 4. Additional detail will be added to this schedule when the time for the first review draws closer. It is not anticipated that any review will be needed before 2012. All products for these milestones will be reviewed, including those produced as in-kind services by the non-Federal sponsors.

**Table 4. ATR Schedule**

Task	Date
	Feasibility Study
Prepare ATR scope of work.	December 2012
Identify ATR team.	January 2013
Initiate review.	2013
ATR review of in-kind technical work.	2013
ATR review of without project hydrology.	2013
ATR of TSP milestone documentation.	2013
ATR of Agency Decision documentation.	2014
ATR review of draft report, including NEPA/environmental compliance documentation and technical appendices.	2015
ATR review of final report, including NEPA/environmental compliance documentation and technical appendices.	2015
Respond to ATR comments.	2015

The USACE Sacramento District will provide labor funding by cross charge labor codes. Funding for travel, if needed, will be provided through government order. The Project Manager will work with the ATR team leader to ensure that adequate funding is available and is commensurate with the level of

review needed. Any funding shortages will be negotiated on a case-by-case basis and in advance of a negative charge occurring.

The ATR team leader will provide organization codes for each team member and a responsible financial point of contact (CEFMS responsible employee) for creating labor codes. Reviewers will monitor individual labor code balances and will alert the ATR team leader to any possible funding shortages. ATR review is estimated to be \$300,000 for the Feasibility Study.

- c. **Type I IEPR Schedule and Cost.** The schedule for Type I IEPR will be determined as the time for review draws closer. The IEPR panel will be engaged early in the study to reduce the chances of significant changes to the study occurring at the end due to IEPR findings. Interim products for hydrology, hydraulics, geotechnical design, and economics will be provided to the panel before the draft report is released for public review. The full Type I IEPR panel will receive the entire Feasibility Study, including environmental impact documentation and all technical appendices, concurrent with public and agency review. The final report to be submitted by the Type I IEPR panel must be submitted to the PDT within 60 days of conclusion of public review. The schedule is shown in Table 5.

**Table 5. Type I IEPR Schedule**

Task	Date
Prepare scope of work.	2013
Award contract.	2013
Identify IEPR team.	2013
Initiate review.	2014
IEPR briefing meeting.	2014
IEPR review of draft report, including NEPA/environmental compliance documentation and technical appendices.	2014
IEPR review of final report, including NEPA/environmental compliance documentation and technical appendices.	2014
Respond to IEPR comments.	2014

The Type I IEPR is estimated to be \$500,000.

- d. **Type II IEPR Schedule and Cost.** The RMC will identify someone independent from the PDT to scope the IEPR and develop an Independent Government Estimate. The Sacramento District will provide funding to the IEPR panel and for RMC support for the IEPR. The next milestone review for IEPR will occur during the PED phase in 2013. Due to the complex and unique nature of the study the estimated cost for the IEPR is \$300,000, which is not cost-shared with the non-Federal sponsor. This cost is a preliminary estimate and will be refined as the study progresses.
- e. **Model Certification/Approval Schedule and Cost.** No model certification is anticipated based on the programmatic nature of the analysis. If other planning models are added during the study, the PDT will coordinate model certification/approval with the FRM PCX.

## 9. PUBLIC PARTICIPATION

An extensive public participation program is planned, the details of which are specified in the Communications Plan. As part of this process, significant and relevant public comments will be provided to reviewers before they conduct their review. The final **decision document**, associated Review Reports, and USACE responses to IEPR comments (if applicable) will be made available to the public, as indicated in the Communication Plan.

## **10. REVIEW PLAN APPROVAL AND UPDATES**

The USACE SPD Commander is responsible for approving this review plan. The Commander's approval reflects vertical team input (involving USACE, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the **decision document**. Like the PMP, the review plan is a living document and may change as the study progresses. The home district is responsible for keeping the review plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the review plan, such as those to the scope and level of review, should be reapproved 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, should be posted on the home district's website. The latest review plan should also be provided to the RMO and home MSC.

## **11. REVIEW PLAN POINTS OF CONTACT**

Public questions and comments on this review plan can be directed to the following points of contact:

- Jerry Fuentes, (916) 557-6706, at the USACE Sacramento District;
- Karen Berresford, (415) 503-6557, at the home MSC; and
- Dean McLeod, FRM-PCX SPD Manager, (916) 557-7436, at the RMO.

**ATTACHMENT 1: TEAM ROSTERS**

Table 6 through 11 include rosters and contact information for the current PDT, DQC team, vertical team, ATR team, Type I and PCX points of contact.

**Table 6. Project Delivery Team**

<b>Name</b>	<b>Discipline</b>	<b>Phone (all are Area Code 916)</b>
Bartlett, Joseph	DWR Representative	574-2395
Bedker, Gary	Economics	574-6707
Stonestreet, Scott	Hydraulic Design	557-7719
Edwards, Doug	Environmental Planning	557-7026
Finan, Mike	Regulatory	557-5324
Fuentes, Jerry	Regional Technical Specialist	557-6706
Gray-Garcia, Chris	PAO/Communications	557-5101
Guevin, Bryan	Cultural Resources	557-7378
Hansberry, Alarice	Office of Counsel	557-7264
Holmstrom, Steve	Hydrology	557-7129
Karvonen, Tom	Project Manager	557-7630
TBD	Water Management	
Motoike, Steve	GIS	557-7042
Perlea, Mary	Geotechnical Engineering	557-7185
TBD	Engineering	557-6618
Williams, Christopher	DWR Representative	574-2511
Wright, Michael	CVFPB Representative	574-1043
Zianno, Paul	Real Estate Studies	557-6993

**Table 7. District Quality Control Team**

<b>Name</b>	<b>Discipline</b>	<b>Phone</b>
TBD	Lead DQC	TBD
TBD	Planning	TBD
TBD	Surveying, Mapping, and Data Management	TBD
TBD	Hydrology	TBD
TBD	Hydraulics	TBD
TBD	Floodplain and Sedimentation Studies	TBD
TBD	Geotechnical Engineering	TBD
TBD	Engineering Design and Analysis	TBD
TBD	Economics	TBD
TBD	Risk Analysis	TBD
TBD	Real Estate Studies	TBD
TBD	Environmental Studies	TBD
TBD	Cultural Resources	TBD
TBD	HTRW	TBD
TBD	Regulatory	TBD
TBD	Cost Engineering	TBD

**Table 8. Vertical Team**

<b>Name</b>	<b>Discipline</b>	<b>Phone (all are Area Code 415)</b>
Berresford, Karen	District Lead	503-6557

Skaggs, Leigh	Planning	503-6588
Kennedy, Nedenia	Environmental	503-6585
Gillespie, Mary	Real Estate	503-6553
Kuz, Annette	Office of Counsel	503-6633
McAllister, Victoria	Public Affairs Office	503-6514
Sing, Edward	Quality Management	503-6533
Bartha, James	Contracting	503-6548

**Table 9. Agency Technical Review Team**

<b>Name</b>	<b>Discipline</b>	<b>Phone</b>
TBD	ATR Team Leader	TBD
TBD	Planning	TBD
TBD	Surveying, Mapping, and Data Management	TBD
TBD	Hydrology	TBD
TBD	Hydraulics	TBD
TBD	Floodplain and Sedimentation Studies	TBD
TBD	Geotechnical Engineering	TBD
TBD	Engineering Design and Analysis	TBD
TBD	Economics	TBD
TBD	Real Estate Studies	TBD
TBD	Environmental Studies	TBD
TBD	Cultural Resources	TBD
TBD	HTRW	TBD
TBD	Regulatory	TBD
TBD	Cost Engineering	TBD
TBD	Risk Analysis	TBD

**Table 10. Type I Independent External Peer Review Panel**

<b>Name</b>	<b>Discipline</b>	<b>Phone</b>
TBD	Hydrology and Hydraulics	TBD
TBD	Economics	TBD
TBD	Environmental Resources	TBD
TBD	Cost Engineering	TBD
TBD	Civil Design	TBD
TBD	Geotechnical Engineering	TBD
TBD	HTRW	TBD

**Table 11. Planning Center of Expertise Points of Contact**

<b>Name</b>	<b>Discipline</b>	<b>Phone</b>
Thaut, Eric	Program Manager, PCX Flood Risk Management	(415) 503-6852
Snortland, Nathan	Risk Management Center	(571) 232-9189
Creswell, Jodie	Operational Director, PCX Ecosystem Restoration	(309) 794-5448
Jacobs, Michael	Cost Engineering Directory of Expertise	(509) 527-7516

## ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

### COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the report for the Central Valley Integrated Flood Management Study. The ATR was conducted as defined in the project's review plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.

*SIGNATURE*

Name

ATR Team Leader

Office Symbol/Company

Date

*SIGNATURE*

Name

Project Manager

Office Symbol

Date

*SIGNATURE*

Name

Review Management Office Representative

Office Symbol

Date

### CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

*SIGNATURE*

Name

Chief, Engineering Division

Office Symbol

Date

*SIGNATURE*

Name

Chief, Planning Division

Office Symbol

Date

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page/Paragraph Number</b>

**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

<b>Term</b>	<b>Definition</b>	<b>Term</b>	<b>Definition</b>
AFB	Alternative Formulation Briefing	IEPR	Independent External Peer Review
ATR	Agency Technical Review	MSC	Major Subordinate Command
CEQA	California Environmental Quality Act	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
CVFMP	Central Valley Flood Management Planning	OMB	Office of Management and Budget
CVFPB	California Central Valley Flood Protection Board	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
CVFPP	Central Valley Flood Protection Plan	OEO	Outside Eligible Organization
CVIFMS	Central Valley Integrated Flood Management Study	OSE	Other Social Effects
DPR	Detailed Project Report	PCX	Planning Center of Expertise
DQC	District Quality Control/Quality Assurance	PDT	Project Delivery Team
DWR	California Department of Water Resources	PAC	Post Authorization Change
DX	Directory of Expertise		
EA	Environmental Assessment	PMP	Project Management Plan
EC	Engineer Circular	PL	Public Law
EIR	Environmental Impact Report	QMP	Quality Management Plan
EIS	Environmental Impact Statement	QA	Quality Assurance
EO	Executive Order	QC	Quality Control
ER	Ecosystem Restoration	RED	Regional Economic Development
FDR	Flood Damage Reduction	RMC	Risk Management Center
FCSA	Federal Cost Share Agreement	RMO	Review Management Organization
FEMA	Federal Emergency Management Agency	RTS	Regional Technical Specialist
FRM	Flood Risk Management	SAR	Safety Assurance Review
FSM	Feasibility Scoping Meeting	SPD	South Pacific Division
GRR	General Reevaluation Report	USACE	U.S. Army Corps of Engineers
HQUSACE	Headquarters, U.S. Army Corps of Engineers	WRDA	Water Resources Development Act



DEPARTMENT OF THE ARMY  
SOUTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS  
1455 MARKET STREET  
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO  
ATTENTION OF

CESPD-PDP

18 September 2012

MEMORANDUM FOR Jerry Fuentes, Sacramento District

SUBJECT: Central Valley Integrated Flood Management Study (CVIFMS), Central Valley, California Review Plan

1. The Flood Risk Management Planning Center of Expertise (FRM-PCX) has reviewed the Review Plan (RP) for the subject study and concurs that the RP satisfies peer review policy requirements outlined in Engineering Circular (EC) 1165-2-209 Civil Works Review Policy, dated 31 January 2010.
2. The significant PCX comments and District responses documented during the review are attached.
3. The FRM-PCX recommends the RP for approval by the MSC. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander approval memorandum, and the link to where the RP is posted on the District website to Eric Thaut, FRM-PCX National Program Manager (eric.w.thaut@usace.army.mil), and Dean McLeod, FRM-PCX Regional Manager for SPD (dean.m.mcleod@usace.army.mil).
4. Thank you for the opportunity to assist in the preparation of the RP. Please coordinate the Agency Technical Review and Independent External Peer Review outlined in the RP with Dean McLeod, 916-557-7436.

Digitally signed by  
THAUT.ERIC.WILLIAM.1231631824  
Date: 2012.09.18 13:32:27 -07'00'

Encl

Eric Thaut  
Program Manager, FRM-PCX

## **FRM-PCX Review Plan Critical Comments**

REVIEW PLAN: Central Valley Integrated Flood Management Study, Sep 2012

REVIEW DATE: Comments provided 9/17/12

REVIEWER: Eric Thaut, FRM-PCX

RESPONSE DATE: September 18, 2012

RESPONDER: Jerry Fuentes, RTS, SPK-PD

BACKCHECK DATE: September 18, 2012

---

**1. PCX COMMENT:** The review plan does not include an assessment by the District Chief of Engineering regarding the risk to human life.

- Basis of Concern: The frequently asked questions to EC 1165-2-209 (dated 21 May 2010 and posted on the Civil Works Planning and Policy EC 1165-2-209 SharePoint site) require that the review plan include an assessment by the District Chief of Engineering as to whether there is a significant threat to human life. Specifically, FAQ 3.j states:

Appendix E, paragraph 1.b gives the responsibility for the Type II reviews to the district Chief of Engineering, but the EC does not state it is the responsibility for the district Chief of Engineering to make the assessment. However, that is intent of the Directorate of Civil Works, life safety rests with the Chief of Engineering, and what has been presented in the roll-out briefings and webinars. The following two changes will be made the EC in the near future:

Page 10, paragraph 11.d(1)(a): Significant Threat to human life. The decision document phase is the initial concept design phase of a project. Therefore, when life safety issues exist, a Type I IEPR that includes a Safety Assurance Review is required. "The responsibility rests with the district Chief of Engineering to assess and document in the Review Plan as to whether there is a significant threat to human life. The Risk Management Center can assist with the assessment."

Page B-2, paragraph 4.b: Document of risk-informed decision on which levels of review are appropriate for the product. "This documentation is to include the district Chief of Engineering's assessment as to whether there is a significant threat to human life."

- Significance of Concern: Studies considering alternative plans that may increase the life safety consequences of flooding (even though they may reduce the probability of flooding) warrant more intensive peer review.

- Action to Resolve Concern: Include a statement from the District Chief of Engineering in the review plan on his/her assessment as to whether there is a significant threat to human life.

**DISTRICT RESPONSE:** Concur. The following statement has been added to Table 1 on page 79: *The District Chief of Engineering has concurred with this statement of risk.*

**2. PCX COMMENT:** The review plan includes an inadequate discussion of life safety risks.

- Basis of Concern: The review plan states that the threat to life safety will be reduced by the project. EC 1165-2-209, Section 15.d. requires that the risk informed decision discussion should “explicitly consider the consequences of non-performance on...public safety.” The review plan should discuss the risks to human life in the event of non-performance of a proposed project and compare them to the risks under the existing condition.

- Significance of Concern: Studies considering alternative plans that may increase the life safety consequences of flooding (even though they may reduce the probability of flooding) warrant more intensive peer review. The discussion of life safety consequences also informs the determination of the expertise required on review teams and the appropriate charge questions for those teams.

- Action to Resolve Concern: The discussion of life safety needs to explicitly address the consequences of project non-performance.

**DISTRICT RESPONSE:** Concur. The following has been added to Tables 1 and 2: *The alternatives are expected to reduce threats to life and improvement to public safety; however, because the proposed project may include structural measures such as levees, the life safety consequences of project non-performance could potentially be increased. The current study area has approximately 15 million residents within the floodplain at risk and over \$100 billion in structures and contents. In addition, over \$2 billion in agricultural crops and infrastructure are also within the floodplain.*

**3. PCX COMMENT:** The ATR team should include a risk analysis reviewer.

- Basis of Concern: The risk analysis discussion, and compliance with ER 1105-2-101, Risk Analysis for FDR Studies, in FRM decision documents has consistently been insufficient to support quality decision making. In response to this deficiency, Mr. James Dalton, USACE Chief of Engineering and Construction, directed in Nov 2010 that HEC (and the PCXs) ensure that all planning decision documents involving HH&C related flood risk reduction measures are fully reviewed and all issues resolved.

- Significance of Concern: Accurate and understandable discussion of the risks of flooding and any residual risks of a project alternative are critical to ensuring sound recommendations and to sound decision making.

- Action to Resolve Concern: The discussion of life safety needs to explicitly address the consequences of project non-performance.  
Per the direction of Mr. James Dalton (Nov 2010), please add a risk analysis reviewer to the ATR team. A possible description of the expertise required is "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."

**DISTRICT RESPONSE:** Concur. Risk Analysis review has been added to ATR team list and table. Specific individual will be identified with the rest of the ATR team.