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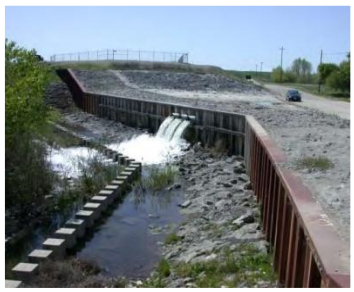
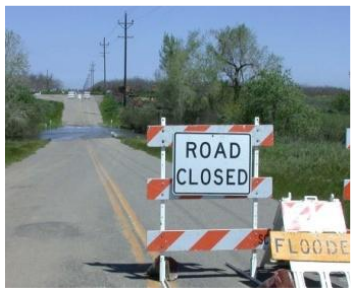
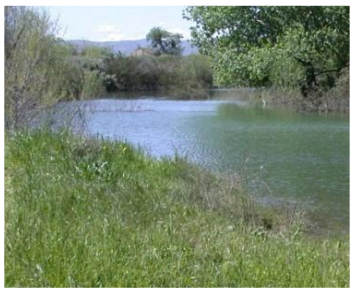
October 10, 2012

Final Independent External Peer Review Report Orestimba Creek – West Stanislaus County, California, Feasibility Study







Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise
Baltimore District

Contract No. W912HQ-10-D-0002

Task Order: 0026

Final Independent External Peer Review Report
Orestimba Creek – West Stanislaus County, California, Feasibility Study

by

Battelle
505 King Avenue
Columbus, OH 43201

for

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Final Independent External Peer Review Report for the

Orestimba Creek – West Stanislaus County, California, Feasibility Study

EXECUTIVE SUMMARY

Project Background and Purpose

The Orestimba Creek study area is located on the west side of the San Joaquin River in Stanislaus County, California. It encompasses approximately 186 square miles of rangeland and very productive irrigated cropland. The largest community in the study area is the City of Newman, which is located along State Highway 33. Orestimba Creek, a "west side tributary" to the San Joaquin River, originates from the eastern slopes of the Diablo Range, a section of the larger Coast Range of California. Orestimba Creek is traversed by U.S. Interstate Highway 5, the California Aqueduct, the Delta-Mendota Canal, State Highway 33, the Northern California Railroad, and the Central California Irrigation District (CCID) Main Canal. The creek is ephemeral, with high flows normally occurring in late winter, and irrigation drainage accounting for low flows during the summer months. The creek flows in a northeasterly direction through steep mountain canyons until it emerges at the edge of the foothills. Here on the gently sloping valley floor, the decreased slope and size of the streambed reduces the creek's channel capacity. Flood flows spread over a wide undefined alluvial fan.

The purpose of the Orestimba Creek Feasibility Study is to investigate plans that provide flood risk management (FRM) for the City of Newman and surrounding agricultural areas. In the course of identifying these plans, opportunities to address some of the environmental degradation along portions of Orestimba Creek may be identified. At this time, a sponsor has not been identified for the potential ecosystem restoration portion of this project, so the study will progress as a single-purpose project. It is envisioned that the final FRM feasibility study plan, when implemented, would provide the opportunity for future ecosystem restoration along Orestimba Creek by other interested parties.

The study has considered a full range of alternatives, including detention basins, bypasses, setback levees, channel improvements, and ring levees. The study has developed several hybrid alternatives that are in the process of being optimized in order to identify the National Economic Development (NED) and locally preferred plans. The estimated costs of these plans range from $40 million to $50 million. The non-Federal sponsor for the FRM portion of the project is Stanislaus County, which is receiving financial assistance from the State of California, Department of Water Resources.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Orestimba Creek – West Stanislaus County, California,

Feasibility Study (hereinafter: Orestimba Creek IEPR) Battelle, a 501(c)(3) non-profit science and technology organization with experience in establishing and administering more than 100 peer review panels for USACE since 2005, was engaged to coordinate the IEPR of the technical basis for the economic, engineering, and environmental methods, models, data and analyses, and assumptions supporting the Orestimba Creek Feasibility Study. Battelle is independent, is free from conflicts of interest (COI), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012), USACE (2007), and OMB (2004). This final report describes the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

Based on the technical content of the Orestimba Creek review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: Civil Works planning/economics, biology/ecology, geotechnical engineering, and hydrologic and hydraulic engineering. Four panel members were selected for the IEPR from more than 15 candidates identified. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received electronic versions of the Orestimba Creek IEPR documents, totaling approximately 1,300 pages, along with a charge that solicited comments on specific sections of the documents to be reviewed. The charge was prepared by USACE according to guidance provided in USACE (2012) and OMB (2004). Charge questions were provided by USACE and included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review. In addition to the kick-off teleconference, a teleconference with USACE, the Panel, and Battelle was held on September 10, 2012, to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties.

IEPR panel members reviewed the Orestimba Creek IEPR documents individually. The Panel produced more than 200 individual comments in response to the 64 charge questions. The panel members then met via teleconference with Battelle to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium, or low); and (4) recommendations on how to resolve the comment. Overall, 15 Final Panel Comments were identified and documented. Of these, none were identified as having high significance, nine had medium significance, and six had low significance.

Results of the Independent External Peer Review

The panel members agreed among one another on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Orestimba Creek review documents. Overall, the

Orestimba Creek report was well organized and comprehensive. A reasonable array of engineering measures was considered in the development of alternatives, and the criteria to eliminate plans from future study were well described and logical. Although the models and analyses were adequate and acceptable for a feasibility-level study, issues related to sensitivity to FLO-2D model inputs and the lack of specific subsurface data exist. The descriptions of, and nexus between, environmental baseline conditions, anticipated effects, significance findings, and proposed mitigation were not fully developed. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following statements summarize the Panel's findings.

Planning/Economics – The Panel concluded that the criteria used in the screening process and their application were consistent with good planning principles and guidelines. The report does an excellent job in presenting potential impacts to infrastructure, quality of life, and environmental issues.

Engineering – The Panel concluded that the engineering analyses appear to be well done. The assumptions underlying the hydraulics and hydrologic and geotechnical analyses were largely sound, and the potential geomorphic issues associated with direct channel manipulation and setback levees were well-highlighted. Most of the issues found with the hydraulics and hydrologic analysis dealt with the sensitivity of model outputs and the accuracy of the input data. In addition, a comprehensive evaluation of the project area's topography is warranted to verify anticipated flow patterns around the ends of the proposed chevron levee. Issues identified with the geotechnical analysis focused on the lack of alignment-specific subsurface data and unconservative assumptions regarding the existence/thickness of clay blanket layers that could potentially affect the linear extent of seepage berms required along the alignment.

Environmental – The Panel's review of the biological/ecological analyses of the Affected Environment and Effects Assessment included an assessment of their adequacy for California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review. The report was reasonably thorough in describing the history of the project and screening of plan alternatives, and how the project would meet a clear purpose and need. Some key issues limit the ability of the Panel to determine whether the appropriate range of biological resources has been adequately analyzed and what the anticipated effects would be, and whether the context, intensity, and significance (per NEPA and CEQA requirements) of potential impacts have been fully considered.

Table ES-1. Overview of 15 Final Panel Comments Identified by the Orestimba Creek IEPR Panel.

No.	Final Panel Comment
	Significance – Medium
1	The use of geotechnical data from the initial western alignment introduces uncertainty regarding subsurface conditions, which is reflected throughout the seepage analyses.
2	Model testing and validation with respect to the influence of topographic features on the FLO-2D output are not clearly documented in quantitative terms.
3	Stage error used in the uncertainty analysis reflects error in the topographic data, but the analysis appears to overlook other potential sources of modeling error.
4	A risk analysis associated with the operation of the railroad floodgate and roadway stoplogs was not included in the Draft Interim Feasibility Study and Draft EA/IS, resulting in unknown impacts associated with the operation of the structures.
5	Baseline conditions of biological resources specifically affected by project implementation are not clearly described and do not directly support the effects analysis and conclusions.
6	Baseline conditions for invasive plants/noxious weeds specific to the area affected by the Tentatively Recommended Plan (TRP), and a risk analysis for weed spread as a result of project construction, have not been presented.
7	Potential impacts to three special-status species associated with agricultural and/or grassland habitats – tricolored blackbird, loggerhead shrike, and California horned lark – are not addressed in the effects analysis.
8	The effects analysis, conclusions, and proposed mitigation for biological resources do not include the appropriate rationale and supporting evidence required for CEQA and NEPA review.
9	The presence of and potential impacts to waters of the U.S., including wetlands, specifically in areas affected by the TRP have not been described.
	Significance – Low
10	The seepage analysis, which relied solely on Finite Element (FE) methods, did not verify the analysis using blanket theory in accordance with USACE guidance.
11	Mechanisms and pathways of urban flooding are not clearly described for with- and without-project conditions.
12	The uncertainty and risk analysis does not acknowledge the potential effects of climate change.
13	The summary of biological effects in Table 3-12 is inconsistent with the effects described in the impact analysis.

Table ES-1. Overview of 15 Final Panel Comments Identified by the Orestimba Creek IEPR Panel, continued.

No.	Final Panel Comment
14	The potential for erosion of farmland to the east of the railroad is not fully addressed for the TRP.
15	A plan for communicating residual risk to the affected population has not been described.

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Table of Contents

List of Tables

LIST OF ACRONYMS

ACE	annual change exceedance
ASCE	American Society of Civil Engineers
ATR	agency technical review
BA	biological assessment
BE	biological evaluation
BMP	best management practice
CCID	Central California Irrigation District
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
COI	Conflict of Interest
COPRI	Coasts, Oceans, Ports and Rivers Institute
CSU	Colorado State University
CWRB	Civil Works Review Board
DrChecks	Design Review and Checking System
EA	environmental assessment
EC	Engineer Circular
EIR	environmental impact report
EIS	environmental impact statement
EM	Engineer Manual
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Federal Endangered Species Act
FE	Finite Element

LIST OF ACRONYMS, continued

FRM	flood risk management
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
LPP	Locally Preferred Plan
NED	National Economic Development
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
NWI	National Wetland Inventory
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
SAR	Safety Assurance Review
TRP	Tentatively Recommended Plan
USACE	United States Army Corps of Engineers
VELB	valley elderberry longhorn beetle

1. INTRODUCTION

The Orestimba Creek study area is located on the west side of the San Joaquin River in Stanislaus County, California. It encompasses approximately 186 square miles of rangeland and very productive irrigated cropland. The largest community in the study area is the City of Newman, which is located along State Highway 33. Orestimba Creek, a "west side tributary" to the San Joaquin River, originates from the eastern slopes of the Diablo Range, a section of the larger Coast Range of California. Orestimba Creek is traversed by U.S. Interstate Highway 5, the California Aqueduct, the Delta-Mendota Canal, State Highway 33, the Northern California Railroad, and the Central California Irrigation District (CCID) Main Canal. The creek is ephemeral, with high flows normally occurring in late winter, and irrigation drainage accounting for low flows during the summer months. The creek flows in a northeasterly direction through steep mountain canyons until it emerges at the edge of the foothills. Here on the gently sloping valley floor, the decreased slope and size of the streambed reduces the creek's channel capacity. Flood flows spread over a wide undefined alluvial fan.

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The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Orestimba Creek – West Stanislaus County, California, Feasibility Study (hereinafter: Orestimba Creek IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE) *Civil Works Review Policy* (Engineer Circular [EC] 1165-2-209, Change 1) (USACE, 2012), USACE CECW-CP memorandum *Peer Review Process* (USACE, 2007), and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process conducted by Battelle, describes the IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel on the existing environmental, economic, and engineering analyses contained in the Orestimba Creek review documents. The full text of the Final Panel Comments is presented in Appendix A.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012) and USACE (2007). In general, the purpose of peer review is to strengthen the quality and credibility of USACE's decision documents in support of its Civil Works program.

IEPR provides an independent assessment of the economic, engineering, and environmental analysis of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the Orestimba Creek project was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-209, Change 1, January 31, 2012) under Section 501(c)(3) of the U.S. Internal Revenue Code, with experience conducting IEPRs for USACE.

3. METHODS

This section describes the method followed in selecting the members of the IEPR Panel (the Panel) and in planning and conducting the IEPR. The IEPR was conducted following procedures described by USACE (2012) and in accordance with USACE (2007) and OMB (2004) guidance. Supplemental guidance on evaluation for conflict of interest (COI) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

After receiving the notice of award (NOA), Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Battelle also completed the process of selecting the four members of the Panel. Any revisions to the schedule were submitted as part of the final Work Plan.

Table 1 presents the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the NOA date of August 17, 2012. The review documents were provided by USACE on September 4, 2012.

Table 1. Orestimba Creek IEPR Schedule.

Task	Action	Due Date
1	**Award/Effective Date (NOA)**	8/17/2012
	Review documents available	9/4/2012
	[a]Battelle submits draft Work Plan	8/24/2012
	USACE provides comments on draft Work Plan	8/27/2012
	Battelle convenes teleconference (if necessary)	8/27/2012
	[a]Battelle submits final Work Plan	8/29/2012
2	Battelle requests input from USACE on COI questionnaire	8/21/2012
	USACE provides comments on COI questionnaire	8/21/2012
	[a]Battelle submits list of selected panel members	8/23/2012
	USACE confirms the Panel has no COI	8/24/2012
	Battelle completes subcontracts for panel members	8/31/2012
3	Battelle convenes kick-off meeting with USACE	8/23/2012
	Battelle sends review documents to Panel	8/31/2012
	USACE/Battelle convenes kickoff meeting with Panel	9/5/2012
	Battelle convenes mid-review teleconference for Panel to ask clarifying questions of USACE	9/10/2012
	[b] Civil Works Review Board Meeting	TBD
4	Panel members complete their individual reviews	9/14/2012
	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	9/19/2012
	Battelle convenes Panel Review Teleconference	9/20/2012
	Panel members provide draft Final Panel Comments to Battelle	9/28/2012
	Final Panel Comments finalized	10/4/2012
5	[a]**Battelle submits Final IEPR Report to USACE**	**10/10/2012**
6[c]	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	10/10/2012
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	10/16/2012
	Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments and draft responses	10/23/2012
	USACE inputs final PDT Evaluator Responses in DrChecks	10/25/2012
	Battelle inputs the Panel's BackCheck Responses in DrChecks	10/26/2012
	Project Closeout (Includes time to close out subcontracts with panel members)	11/28/2012

[a] *Deliverable.*
[b] *CWRB to be rescheduled for second quarter of FY2013*
[c] *Task 6 occurs after the submission of this report.*

Note that the work items listed in Task 6 occur after the submission of this report. Battelle will enter the 15 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle.

3.2 Identification and Selection of IEPR Panel Members

The candidates for the Panel were evaluated based on their technical expertise in the following four key areas: Civil Works planning/economics, biology/ecology, geotechnical engineering, and hydrologic and hydraulic engineering. These areas correspond to the technical content and overall scope of the Orestimba Creek project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle initially identified more than 15 candidates for the Panel, evaluated their technical expertise, and inquired about potential COIs. Of these, Battelle chose four of the most qualified candidates, confirmed their interest and availability, and proposed them for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required. Information about the candidate panel members, including brief biographical information, highest level of education attained, and years of experience, was provided to USACE for feedback. Battelle made the final selection of panel members according to the selection criteria described in the Work Plan.

The candidates were screened for the following potential exclusion criteria or COIs.[1] These COI questions were intended to serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

[1] Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

- Previous and/or current involvement by you or your firm[2] in the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS) and technical appendices.
- Previous and/or current involvement by you or your firm[2] in flood control studies associated with Orestimba Creek, the San Joaquin River, Stanislaus County, City of Newman, California Aqueduct, Delta-Mendota Canal, the Northern California Railroad, and the Central California Irrigation District Main Canal.
- Previous and/or current involvement by you or your firm[2] in the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS) related projects.
- Previous and/or current involvement by you or your firm[2] in the conceptual or actual design, construction, or operation and management of any projects associated with the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS) related projects.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS).
- Previous and/or current employment or affiliation with the non-Federal sponsors or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups (for pay or pro bono): Stanislaus County and the California Department of Water Resources.
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or children related to Orestimba Creek, the San Joaquin River, Stanislaus County, City of Newman, California Aqueduct, Delta-Mendota Canal, the Northern California Railroad, and the Central California Irrigation District Main Canal.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Sacramento District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS) project.
- Current firm[2] involvement with other USACE projects, specifically those projects/contracts that are with the Sacramento District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Sacramento District. Please explain.

[2] Includes any joint ventures in which your firm is involved and if your firm serves as a prime or as a subcontractor to a prime. Please clarify which relationship exists.

- Any previous employment by USACE as a direct employee or contractor (either as an individual or through your firm[2]) within the last 10 years, notably if those projects/contracts are with the Sacramento District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning flood risk management, and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS) related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[2] revenues within the last 3 years came from USACE contracts.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS).
- Participation in relevant prior Federal studies relevant to this project and/or the Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS).
- Previous and/or current participation in prior non-Federal studies relevant to this project and/or Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study and Environmental Assessment/Initial Study (EA/IS).
- Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

In selecting the final members of the Panel from the list of candidates, Battelle chose experts who best fit the expertise areas and had no COIs. The four final reviewers either were affiliated with consulting firms or academia, or were independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle made the final selections of the Panel. Section 4 of this report provides names and biographical information on the panel members.

Prior to beginning their review and within 2 days of their subcontracts being finalized, all members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel.

3.3 Preparation of the Charge and Conduct of the IEPR

Charge questions were provided by USACE and included in the draft and final Work Plans. In addition to a list of 64 charge questions/discussion points, the final charge included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this final report).

Battelle planned and facilitated a kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meeting, the IEPR Panel received an electronic version of the final charge as well as the Orestimba Creek IEPR review documents (Table 2) and supplemental documents (Table 3). In addition, throughout the review period, USACE provided additional documents at the request of panel members. These additional documents were provided to Battelle and then disseminated to the Panel as supplemental information only and were not part of the official review. A list of these additional documents requested by the Panel is provided in Table 4. These three tables are followed by a bulleted list of the USACE reference materials that were followed in conducting the Orestimba Creek IEPR.

Table 2. Review Documents for the Orestimba Creek IEPR.

Title	No. of Pages
Orestimba_Report_081512	266
B.1_USFWS_Coordination_Act_Report	13
B.2_Mitigation_Monitoring_Plan	4
B.3_Extracted_Channel_Modification_Analysis	35
B.4_Orestimba_Draft_FONSI	1
Appendix_C-1_	93
Appendix_C-2_Hydraulic_Analysis	88
Appendix_C-2a_Attachment_A_-Orestimba_Plan	25
Appendix_C-2b_Attachment_B_-Orestimba_Plan_WithChannelMod	35
Appendix_C-3_Civil_Design	12
Appendix_C-3a_Civil_Design_AttachmentA	27
Appendix_C-4_Cost_DX_ATR_Cert_for_SPK_Orestimba_Creek_2012	5
Appendix_C-4_Orestimba_Cost_Engr	99
Appendix_C-5_Orestimba_Geotech	354
Appendix_D_-_Orestimba_REP_2012_Final	19
Appendix_E_-_Orestimba_Economic_Appendix_Draft	130

Table 3. Supplemental Documents for the Orestimba Creek IEPR.

Title	No. of Pages
Geotechnical Levee Practice REFP10L0.DOC	11
Urban Levee Design Criteria May 2012	98

Table 4. Additional Documents Provided by USACE during the Orestimba Creek IEPR.

Title	No. of Pages
Orestimba Economic Results and their Sensitivity to Risk and Uncertainty Parameters	1
USACE Process for the National Flood Insurance Program (NFIP) Levee System Evaluation	104
Documentation for the Repair, Replacement and Rehabilitation Costs	3

Reference Documents Adhered to During the Orestimba Creek IEPR

- EC 1165-2-209, Water Resources Policies and Authorities - Civil Works Review Policy, Change 1, January 31, 2012
- CECW-CP Memorandum dated March 30, 2007
- OMB's Final Information Quality Bulletin for Peer Review released December 16, 2004

About halfway through the review of the Orestimba Creek review documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 13 panel member questions to USACE. USACE was able to provide responses to some of the questions during the teleconference; the remaining panel member questions that required additional coordination within USACE were addressed by USACE by September 13, 2012.

3.4 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle. At the end of the review period, the Panel produced approximately 200 individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify recurring themes, areas of potential conflict, and other overall impressions. As a result of the review, Battelle summarized the 200 comments into a preliminary list of 30 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

3.5 IEPR Panel Teleconference

Battelle facilitated a 4-hour teleconference with the Panel so that the panel members, many of whom are from diverse scientific backgrounds, could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of high-level importance to the findings, and merged any related individual comments. In addition, Battelle confirmed each Final Panel Comment's level of significance to the Panel.

The Panel also discussed responses to one specific charge question where there appeared to be disagreement among panel members. The conflicting comment was resolved based on the professional judgment of the Panel, determined not to be conflicting, and incorporated into a Final Panel Comment.

At the end of these discussions, the Panel identified 20 comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Orestimba Creek IEPR:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- Directive to the Lead: Each lead was encouraged to communicate directly with other IEPR panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:
    1. Comment Statement (succinct summary statement of concern)
    2. Basis for Comment (details regarding the concern)
    3. Significance (high, medium, low; see description below)
    4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
    1. High: Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project. Comments rated as high indicate that the Panel analyzed or assessed the methods, models, and/or analyses and determined that there is a "showstopper" issue.
    2. Medium: Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium indicate that the Panel does not have sufficient information to analyze or assess the methods, models, or analyses.
    3. Low: Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information (tables, figures, equations, discussions) that was mislabeled or incorrect or data or report

sections that were not clearly described or presented.

- Guidance for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

During the Final Panel Comment development process, the Panel felt that 5 of the Final Panel Comments no longer met the criteria for a high, medium, or low level significance; therefore, the total Final Panel Comment count was reduced to 15. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Candidates for the Panel were identified using Battelle's Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and referrals. Battelle prepared a draft list of primary candidate panel members (who were screened for availability, technical background, and COIs), and provided it to USACE for feedback. Battelle made the final selection of panel members.

An overview of the credentials of the final four primary members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table 5. More detailed biographical information regarding each panel member and his area of technical expertise is presented below.

Table 5. Orestimba Creek IEPR Panel: Technical Criteria and Areas of Expertise.

Technical Criterion	Rudolph	Bledsoe	Henderson	Saunders
Geotechnical Engineering (one expert needed)				
Minimum 10 years of experience in geotechnical engineering	X			
Experienced in performing geotechnical evaluation and geo-civil design for FRM projects	X			
Demonstrated experience related to structural and geotechnical practices associated with levee and floodwall design and construction, including:	X			
Static and dynamic slope stability	X			
Seepage through earthen embankments	X			
Underseepage through the foundation	X			
Settlement evaluation of FRM structures, including levee embankments, floodwalls, closure structures, and other pertinent structural features	X			
Capable of addressing the USACE Safety Assurance Review (SAR) aspect of projects	X			
Active participation in related professional engineering and scientific societies	X			
Minimum M.S. in engineering	X			
Registered professional engineer	X			
Hydraulic and Hydrologic Engineering (one expert needed)				
Registered professional engineer with a minimum 15 years of experience in hydrologic and hydraulic engineering		X		
Understanding of dynamics of open-channel flow systems		X		
Understanding of alluvial fan systems		X		
Understanding of enclosed systems		X		
Understanding of application of detention/retention basins		X		
Experience related to modeling levees and flood walls in an urban environment with space constraints		X		
Experience related to nonstructural measures especially as they relate to multipurpose alternatives, including ecosystem restoration		X		

Table 5. Orestimba Creek IEPR Panel: Technical Criteria and Areas of Expertise, continued.

Technical Criterion	Rudolph	Bledsoe	Henderson	Saunders
Experience related to nonstructural solutions involving flood warning systems		X		
Experience related to nonstructural alternatives related to flood proofing		X		
Experience evaluating the effects of best management practices (BMPs) and low-impact development on hydrology and approaches that can benefit water quality		X		
Experience in application of risk and uncertainty in defining project performance and assurance		X		
Familiar with standard USACE hydrologic and hydraulic computer models including HEC-HMS, HEC-RAS, FLO-2D, UNET, and TABS		X		
[a]Certified floodplain manager				
Active participation in related professional societies		X		
Minimum M.S. degree in engineering		X		
Civil Works Planning/Economics (one expert needed)				
Minimum 5 years of experience directly related to water resource economic evaluation or review				X
Minimum 5 years of experience working directly for or with USACE				X
Experience with HEC-FDA				X
Minimum 2 years of experience reviewing Federal water resource economic documents justifying construction efforts				X
Understanding of social well-being				X
Understanding of regional economic development				X
Understanding of traditional NED benefits				X
Experience with general concepts and procedures used in the computation of agricultural benefits incurred by assumed flood events				X
Minimum BS degree in Economics				X

[a]Floodplain Manager certification encouraged but not required.

Table 5. Orestimba Creek IEPR Panel: Technical Criteria and Areas of Expertise, continued.

Technical Criterion	Rudolph	Bledsoe	Henderson	Saunders
Biologist/Ecologist (one expert needed)				
Minimum 10 years of experience in evaluation and conducting National Environmental Policy Act (NEPA) impact assessments			X	
Experienced in performing cumulative effects analyses for complex multi-objective public works projects with competing trade-offs			X	
Familiar with the biological and environmental resources located in central California as well as the Coastal Range of California			X	
Minimum M.S. in appropriate field of study			X	

Bill Rudolph, P.E., G.E.

Role: Geotechnical engineering experience and expertise.
Affiliation: Independent Consultant

Bill Rudolph, P.E., G.E., is an independent consultant with 34 years of experience as a principal engineer and project manager on a wide variety of geotechnical engineering and flood control projects throughout the western United States, including small earthfill dams, levees, lined and unlined canals, weirs, pump stations, pipelines, flood walls, and bulkheads. He earned his M.S. degree in geotechnical engineering from the University of California at Berkeley in 1978 and is a registered civil engineer and geotechnical engineer in California. Mr. Rudolph has extensive experience in the evaluation of static and seismic stability of dams, levees, and natural slope, having served on peer review panels for FRM design, flood control/FRM planning, and design and construction issues (e.g., the American River Common Features Project in Sacramento, California, and the East Saint Louis Flood Protection Project in East St. Louis, Illinois).

He has conducted extensive through-seepage evaluations of new and proposed dams and levees and has used state-of-the-practice analytical tools, including the program Seep/W, to evaluate through-seepage and its effect on stability and internal erosion/piping. He has been involved in the design and review of cutoff trenches and internal drainage measures to address through-seepage and has extensive experience in USACE methods and criteria relative to under-seepage and in the design/construction of relief wells, seepage berms, and cutoffs. In addition, Mr. Rudolph has significant experience evaluating settlement and its effects on levees and flood control structures, including settlement investigations and modeling and analysis of drained and undrained deformation/settlement due to immediate and long-term loadings. He has also evaluated the effect/benefits of staged construction for levees on soft ground. Through his involvement with USACE peer reviews, he is knowledgeable of the USACE Safety Assurance Review (SAR) procedures, Risk Based Analysis of Flood Damage Reduction Studies (Engineer Regulation [ER] 1110-2-1619), and Reporting Evidence of Distress of Civil Works.

Mr. Rudolph is an active member of the American Society of Civil Engineers (ASCE), including the Coasts, Oceans, Ports and Rivers Institute (COPRI) and the Geo-Institute, and he recently attended a U.S. Society on Dams specialty workshop on levees in Sacramento. He is a corresponding member of the ASCE 7-10 Seismic Subcommittee and recently participated in an earthquake damage reconnaissance of waterfront facilities in Japan following the Honshu Earthquake and tsunami as part of a COPRI team.

Brian Bledsoe, P.E., Ph.D.

Role: Hydraulic and hydrologic engineering experience and expertise
Affiliation: Colorado State University

Brian Bledsoe, P.E., Ph.D., is an associate professor in the Civil and Environmental Engineering department at Colorado State University (CSU). He earned his Ph.D. in civil engineering and river mechanics from CSU in 1999 and is a registered professional engineer in Colorado and North Carolina with 25 years of experience. Dr. Bledsoe has been conducting engineering analyses and wetland restoration-related research since 1991. His research and

teaching interests are focused on the interface between hydraulic engineering and ecology, with an emphasis on the development of effective and ecologically based stream, river, wetland, and watershed restoration practices. The dynamics of open-channel flow systems has been a primary focus of his work since 1991, and he has extensive experience in fluvial geomorphology, including practical experience with alluvial fan systems in urbanized areas of California. Dr. Bledsoe has experience modeling hydraulic structures, including levees, floodplain encroachments, culverts, and pipes. He has modeled a variety of hydraulic structures in urban areas with space constraints and is very familiar with such models as HEC-RAS, HEC-2, HEC-1, HEC-6T, HEC-HMS, FLO-2D, UNET, and TABS (including RMA-2 and TABS-MDS).

Dr. Bledsoe has more than 20 years of experience in river restoration and has taught short courses for the Colorado Association of Stormwater and Floodplain managers on non-structural measures and ecosystem restoration. He served as environmental specialist for the North Carolina Department of Environment and Natural Resources' Divisions of Coastal Management and Water Quality. He has conducted research on the hydrology, hydraulics, water quality, and ecology of wetlands to determine design criteria for wetland/riparian restoration projects. He later served as the state's lead engineer in the development and implementation of best management practices (BMPs) and ecosystem rehabilitation measures designed to restore water quality to impaired water bodies. He has collaborated with the city of Fort Collins, Colorado, on its stormwater gauging network and flood warning system and has worked extensively on risk analysis and assessment of various types of uncertainty in defining project performance and assurance.

Dr. Bledsoe is a member of the ASCE and American Geophysical Union.

Steven Henderson, M.S.

Role: Biology/ecology experience and expertise.
Affiliation: Ascent Environmental, Inc.

Steven Henderson, M.S., is a senior biologist at Ascent Environmental, Inc. specializing in natural resources planning and management, impact assessment and mitigation design, design and conduct of biological inventories and analyses, wildlife surveys and habitat suitability assessments, and biological monitoring and adaptive management. He earned his M.S. in biological sciences (ecology and conservation biology emphasis) from Montana State University and has 15 years of professional experience. Mr. Henderson works closely, and coordinates frequently, with local, state, and Federal regulatory and resource management agencies and has worked on many complex public work projects with multiple objectives, including transportation planning (roads and bike trails), flood protection, water supply reliability, river restoration, upland habitat restoration, and sensitive biological resource protection. He is familiar with the biological and environmental resources located in both central California and the coastal range of California and has extensive project experience in several regions of California and Nevada, including the Sierra Nevada and Cascade ranges, and Central Valley and foothills, north coast, and the Mojave and Colorado desert regions.

He is experienced in performing analyses of direct, indirect, and cumulative impacts for biological resources and prepared numerous documents in accordance with the requirements of

the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) for projects such as the State Route 89 Community Revitalization Project environmental impact report (EIR)/environmental impact statement (EIS)/environmental assessment (EA) for the Tahoe Transportation District and the Upper Truckee River and Marsh Restoration Project Planning and EIR/EIS/EIS, South Lake Tahoe, California. Mr. Henderson has experience with the Federal Endangered Species Act (ESA) (Sections 7 and 10), California Endangered Species Act (CESA), CEQA, NEPA, and Tahoe Regional Planning Agency regulatory compliance, including preparing biological assessments (BAs), CESA 2081(b) permit applications, EIR and EIS sections, biological evaluations (BEs)/BAs, EAs, habitat conservation plans, and resource inventory reports. Representative studies include Willow Flycatcher Studies in Support of ESA Compliance for Operation of Isabella Dam and Reservoir for USACE, Brockway Erosion Control Project for the Placer County Department of Public Works, Alameda Watershed Habitat Conservation Plan for the San Francisco Public Utilities Commission, and Biological Studies for the Upper San Joaquin River Basin Storage Investigation Project for the U.S. Bureau of Reclamation.

Larry Saunders, M.S.

Role: Civil Works planning and economics experience and expertise.
Affiliation: Horizon Planning Group

Larry Saunders, M.S., is principal and study manager for Horizon Planning Group, a consulting firm specializing in water resource planning and economics. He earned his M.S. in water resource economics from Cornell University in 1972 and has more than 40 years of experience supervising and performing benefit-cost analyses on a variety of large, multi-objective water resource projects. Mr. Saunders has been conducting and reviewing economic analyses since 1966 when he served with USACE, Galveston District, and later as the Chief of the Economic and Social Analysis Branch (1972-1980) and Chief of the Plan Formulation Branch (1980-1985) with USACE Wilmington District. He is experienced in all phases of USACE economic standards and plan formulation (ER 1105-2-100) and has conducted numerous plan formulation studies according to USACE, OMB, and Institute for Water Resources (IWR) planning guidance and regulations.

Mr. Saunders is familiar with both the HEC-FDA and the IMPLN models and reviewed their use as part of IEPR Panels for both the Chacon Creek Study, Texas, and the Truckee Meadows Project, Nevada. He understands the assessment of social well-being in the planning process: all his reviews and evaluations were conducted using the planning process outlined in ER 1105-2-100, the Planning Guidance Notebook and all other relevant USACE/OMB/IWR regulations and guidance that includes social well-being as part of the system of accounts. He also conducted specific social impact analyses for two environmental restoration projects in Florida that provided decision-makers with a matrix for comprehensive comparison of social impacts associated with an array of alternatives. He understands regional development and has conducted a number of regional analyses of various projects and their alternatives in order to identify not only regional benefits, but also the negative impacts. Most recently, he evaluated the regional impacts of removing large cattle, citrus, and sugar cane operations from Central Florida resulting from the restoration of the Everglades. He has extensive experience in the evaluation of traditional NED benefits using relevant USACE regulations, guidance, and policies.

Mr. Saunders has evaluated agricultural damages and benefits for a variety of agricultural operations for both fresh and salt water inundation events. As such, he is familiar with the general concepts and procedures used in the analysis of agricultural benefits.

Mr. Saunders is a member and past president of a Society of American Military Engineers post.

5. SUMMARY OF FINAL PANEL COMMENTS

The panel members agreed among one another on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Orestimba Creek review documents. Overall, the Orestimba Creek report was well organized and comprehensive. A reasonable array of engineering measures was considered in the development of alternatives and the criteria to eliminate plans from future study were well described and logical. Although the models and analyses were adequate and acceptable for a feasibility-level study, issues related to sensitivity modeling and outputs and the lack of alignment specific subsurface data exist. The descriptions of, and nexus between, environmental baseline conditions, anticipated effects, significance findings, and proposed mitigation were not fully developed. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following statements summarize the Panel's findings.

Planning/Economics – The Panel concluded that the criteria used in the screening process and their application were consistent with good planning principles and guidelines. The report does an excellent job in presenting potential impacts to infrastructure, quality of life, and environmental issues.

Engineering – The Panel concluded that the engineering analyses appear to be well done. The assumptions underlying the hydraulics and hydrologic and geotechnical analyses were largely sound, and the potential geomorphic issues associated with direct channel manipulation and setback levees were well-highlighted. Most of the issues found with the hydraulics and hydrologic analysis dealt with the sensitivity of model outputs and the accuracy of the input data. In addition, a comprehensive evaluation of the project area's topography is warranted to verify anticipated flow patterns around the ends of the proposed chevron levee. Issues identified with the geotechnical analysis focused on the lack of alignment-specific subsurface data and unconservative assumptions regarding the existence/thickness of clay blanket layers that could potentially affect the linear extent of seepage berms required along the alignment.

Environmental – The Panel's review of the biological/ecological analyses of the Affected Environment and Effects Assessment included an assessment of their adequacy for CEQA and NEPA review. The report was reasonably thorough in describing the history of the project and screening of plan alternatives, and how the project would meet a clear purpose and need. Some key issues limit the ability of the Panel to determine whether the appropriate range of biological resources has been adequately analyzed and what the anticipated effects would be, and whether the context, intensity, and significance (per NEPA and CEQA requirements) of potential impacts have been fully considered.

Table 6. Overview of 15 Final Panel Comments Identified by the Orestimba Creek IEPR Panel.

No.	Final Panel Comment
	Significance – Medium
1	The use of geotechnical data from the initial western alignment introduces uncertainty regarding subsurface conditions, which is reflected throughout the seepage analyses.
2	Model testing and validation with respect to the influence of topographic features on the FLO-2D output are not clearly documented in quantitative terms.
3	Stage error used in the uncertainty analysis reflects error in the topographic data, but the analysis appears to overlook other potential sources of modeling error.
4	A risk analysis associated with the operation of the railroad floodgate and roadway stoplogs was not included in the Draft Interim Feasibility Study and Draft EA/IS, resulting in unknown impacts associated with the operation of the structures.
5	Baseline conditions of biological resources specifically affected by project implementation are not clearly described and do not directly support the effects analysis and conclusions.
6	Baseline conditions for invasive plants/noxious weeds specific to the area affected by the TRP, and a risk analysis for weed spread as a result of project construction, have not been presented.
7	Potential impacts to three special-status species associated with agricultural and/or grassland habitats – tricolored blackbird, loggerhead shrike, and California horned lark – are not addressed in the effects analysis.
8	The effects analysis, conclusions, and proposed mitigation for biological resources do not include the appropriate rationale and supporting evidence required for CEQA and NEPA review.
9	The presence of and potential impacts to waters of the U.S., including wetlands, specifically in areas affected by the TRP have not been described.
	Significance – Low
10	The seepage analysis, which relied solely on Finite Element (FE) methods, did not verify the analysis using blanket theory in accordance with USACE guidance.
11	Mechanisms and pathways of urban flooding are not clearly described for with- and without-project conditions.
12	The uncertainty and risk analysis does not acknowledge the potential effects of climate change.

Table 6. Overview of 15 Final Panel Comments Identified by the Orestimba Creek IEPR Panel, continued.

No.	Final Panel Comment
13	The summary of biological effects in Table 3-12 is inconsistent with the effects described in the impact analysis.
14	The potential for erosion of farmland to the east of the railroad is not fully addressed for the TRP.
15	A plan for communicating residual risk to the affected population has not been described.

6. REFERENCES

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APPENDIX A

Final Panel Comments

on the

Orestimba Creek IEPR

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Final Panel Comment 1

The use of geotechnical data from the initial western alignment introduces uncertainty regarding subsurface conditions, which is reflected throughout the seepage analyses.

Basis for Comment

The subsurface exploration conducted as part of the Geotechnical Engineering Evaluation for the Orestimba Feasibility Study, Newman, California, consisted of geotechnical borings along an initially proposed levee alignment west of the Central California Irrigation District (CCID) Canal. Preliminary seepage analyses indicated adverse seepage conditions for the western alignment. The Geotechnical Engineering Evaluation states that "Due to funding limitations, it was decided that the subsurface investigations that took place on the west side of the canal would be used to establish subsurface conditions and soil parameters for an alignment offset from the east side of the canal a few hundred feet away." As a result, the borings are offset generally on the order of 200 feet from the proposed alignment.

The Panel generally concurs that this is a reasonable assumption for a feasibility-level study, given that the sites are underlain by alluvial fan deposits that are not expected to vary significantly over moderate distances. However, there is increased uncertainty associated with the absence of alignment-specific subsurface data. Another source of uncertainty is shown by Boring 2F-11-01, which was prematurely terminated at a depth of 6.5 feet in a sand layer. While this boring provides incomplete data, the existence of sand at 6 feet is inconsistent with the model used to characterize Reach A. The finding from Boring 2F-11-01 could suggest that adverse conditions exist in this area and that a seepage berm may be required for the initial portion of Reach A.

In addition, the typical cross sections considered representative for each reach show a continuous clay blanket layer or clay liner below the CCID Canal. The assumptions made relative to the existence and thickness of a clay blanket and/or liner have the potential to influence the results of the seepage analyses. This could influence computed exit gradients and determine whether or not a seepage berm is required in Reaches B and D, in addition to the berm planned for Reach C. The exit gradient values computed with an assumed clay blanket/canal liner are just below the maximum value of 0.5; if the unverified blanket/liner is not included, the exit gradients may exceed 0.5.

Additional seepage analyses conducted on cross sections incorporating a shallow sand layer near Boring 2F-11-01 and no clay blanket/liner in the CCID Canal for Reaches B and D would allow the sensitivity of the seepage analyses to these conditions to be assessed. If the additional analyses indicate excessive exit gradients, additional seepage berms could be considered in the feasibility-level design.

Significance – Medium

The selection of cross sections which reflect the uncertainty in subsurface conditions may affect seepage analysis results. This could indicate the need for additional seepage berms, impacting

the scope and cost of the project improvements.

Recommendations for Resolution

1. Discuss the uncertainties in subsurface characterization and its impacts on the need for and extent of seepage berms.
2. Conduct additional seepage analysis for a cross section near Boring 2F-11-01, considering the potential presence of a shallow sand layer along the initial portion of Reach A.
3. Conduct additional seepage analyses for Reaches B and D assuming no clay blanket or liner is present in the CCID Canal.

Final Panel Comment 2

Model testing and validation with respect to the influence of topographic features on the FLO-2D output are not clearly documented in quantitative terms.

Basis for Comment

The accuracy of the flood predictions and economic analysis primarily depends on the accuracy of the topography and structural features specified in the FLO-2D model. Appendix C-2 states that some sensitivity analyses were performed to assess the influence of key topographic features on the model output. The model was also tested with historical events and made adjustments to parameters to improve correspondence with recorded inundation areas. However, the description of these testing and validation exercises is mostly qualitative and is not clearly documented in the reports.

As one example, Appendix C-2 states that within the City of Newman, the modeled extent of flooding appears to be less than the flooding shown in a map provided to the U.S. Army Corps of Engineers (USACE), Project Delivery Team (PDT) by the City of Newman Public Works Director, which was not included in the review documents. Appendix C-2 suggests that this discrepancy between the model output and actual flooding possibly occurs because the CCID Canal berm in the model is higher than it actually was at the time of the flood event, but the Draft Interim Feasibility Study and Draft EA/IS does not document any efforts to quantitatively assess the validity of this conjecture.

In another example, the FLO-2D model predicts that the flow path of water passing around the north end of the proposed chevron levee at the tie-in with the railroad will continue flowing east, as opposed to south along the railroad berm toward the urban area. Subtle differences in topography around the northern levee terminus and east side of the railroad berm could potentially produce a southward flow path toward Newman. The predicted model benefits are highly sensitive to the model representation of topography and structural features in such locations, but the documentation is not clear on what sort of model testing and refinement was performed in this context.

Significance – Medium

An understanding of model testing and validation is necessary for assessing the accuracy and robustness of predictions regarding flood extents and project benefits.

Recommendations for Resolution

1. Include a more thorough and quantitative description of model calibration and validation that was performed with respect to historical flooding patterns and extents.
2. Include additional discussion of the reliability of FLO-2D predictions based on a 200-foot grid size versus actual flood behavior in key locations, such as the area around the northern levee tie-in, that strongly influence project benefits.
3. Include a statement regarding the potential need for additional topographic surveying and analysis during the Preconstruction Engineering and Design phase to ensure that potential flooding pathways east of the levee tie-ins are addressed by the project.

Final Panel Comment 3

Stage error used in the uncertainty analysis reflects error in the topographic data, but the analysis appears to overlook other potential sources of modeling error.

Basis for Comment

Uncertainty in the flooding predictions and economic analysis derives from several sources, including the stage-discharge relationship. It appears that topographic error (standard deviation 0.6 foot) is used as the sole source of error in the stage-discharge relationship for the urban environmental impact assessment. Engineer Manual (EM) 1110-2-1619 (USACE, 1996) provides minimum standard deviations for stage error, but it is not clear whether the 0.6-foot value used in the analysis conforms to this guidance in the context of ungauged alluvial fan flows and fair to poor Manning's n reliability. EM-1110-2-1619 states that the analysis should combine natural and model uncertainty while recognizing that uncertainty generally increases with complex flows like the ones occurring on the alluvial fan in this study. The accuracy of the topographic data is indeed a primary source of uncertainty in the analysis, but there are other potentially important sources of error, including model specification, model parameterization, and the representation of existing structural features that have not been well documented.

It is not clear to the Panel how well the assumed 0.6-foot error in the stage-discharge relationship reflects the actual accuracy of the topographic data (LiDAR is usually more accurate), and whether other sources of uncertainty are represented in that value. For example, the calibration Manning's n selected for overland flow is quite low and yielded discrepancies between model predictions and historical records of flooding. The magnitude of these stage discrepancies was not clearly described. In another example, the analysis assumed that the approximately 24 exiting culverts under the railroad are 36 feet in diameter and convey the 1/10 year annual change exceedance (ACE) event. This assumption does not appear to be based on actual field reconnaissance (assessed with aerials and Google Earth Streetview). The analysis also assumes that existing culverts under Highway 33 and the railroad track will continue to operate in the future; however, the Panel cannot find field-based evidence that the culverts are currently operating. The sensitivity (or lack thereof) of the model output to assumptions about existing structures was not described as part of the risk and uncertainty analysis. If the stage-discharge relationship is relatively insensitive to model parameterization, the representation of existing structures, and the other potential sources of uncertainty described above, then that case should be made more explicitly in the documentation.

Significance – Medium

Error bounds that reflect all important sources of error in the stage-discharge relationship are necessary for assessing uncertainty in predicted damages and benefits, and a clearer rationale for the selection of stage error would improve the completeness of the report.

Recommendations for Resolution

1. Clarify the actual uncertainty of the topographic data, especially in areas that highly influence model results.
2. Discuss in the Risk and Uncertainty section whether the 0.6-foot standard deviation reasonably reflects not only errors in topographic data, but also uncertainties associated with model parameterization, model specification, existing structures, and the inherent complexity of alluvial fan flows.
3. Document the sensitivity of the model results to assumptions made about existing culverts and the selection of Manning's n values.
4. Describe the sources of uncertainty discussed in Appendix E (p. 22) in the Draft Interim Feasibility Study and Draft EA/IS section on Risk and Uncertainty (p. 9-6).

Literature Cited:

USACE (1996). Risk-Based Analysis for Flood Damage Reduction Studies. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Manual (EM) No. 1110-2-1619. August 1.

Final Panel Comment 4

A risk analysis associated with the operation of the railroad floodgate and roadway stoplogs was not included in the Draft Interim Feasibility Study and Draft EA/IS, resulting in unknown impacts associated with the operation of the structures.

Basis for Comment

The Tentatively Recommended Plan (TRP) includes a proposed floodgate where the railroad berm crosses through the chevron levee and stoplog structures where roads cross through the chevron levee. These structures must be closed during floods to prevent flow through several 1- to 3-foot gaps in the levee. The railroad floodgate is especially notable because the railroad berm currently acts as a primary impediment to flow toward the San Joaquin River and conveys floodwaters southward along its alignment into the city of Newman. As such, the floodgate structures at the railroad and adjacent Highway 33 potentially play an important role in conveying flow east of the berm instead of south toward Newman. It is unclear to the Panel how the operation of the railroad floodgate and the other structures affects the performance of the TRP. Although USACE documented its assumption (Appendix C-6, p. 8) that these structures will be operated by the responsible local parties, the Draft Interim Feasibility Study and Draft EA/IS does not present evidence indicating that local entities have committed to operating the structures in a manner that achieves the full effectiveness of the levee and ensures safety for trains and motorists. The Panel cannot find evidence that the sensitivity of project performance to these structures was analyzed, and therefore it is not clear to what extent the assumption of proper floodgate and stoplog operation affects residual risks and the benefits derived from the TRP.

Significance – Medium

Operation of the floodgate and stoplogs represents a potential residual risk with undocumented consequences that could affect the performance of the TRP.

Recommendations for Resolution

1. Assess the potential effects of improper operation of the floodgate and stoplog structures on project performance and benefits.
2. Discuss and clarify the potential consequences and residual risks associated with structure operation.

Final Panel Comment 5

Baseline conditions of biological resources specifically affected by project implementation are not clearly described and do not directly support the effects analysis and conclusions.

Basis for Comment

It appears that most of the Affected Environment chapter of the Draft Interim Feasibility Study and Draft EA/IS for biological resource was broadly developed for earlier alternatives of the project, focusing on the Orestimba Creek riparian zone, and does not specifically describe the areas that would be affected as a result of constructing and operating the TRP. Therefore, in several instances, the discussion of existing conditions for biological resources does not clearly link to or meet the "substantial evidence" standard to support the effects analysis for purposes of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). For example, the description of vegetation communities covers the entire study area and includes eight natural communities (including several sensitive habitats). However, the effects analysis states that 152 acres of agricultural land would be affected by project implementation, and that no natural communities would be affected. As written, the discussion of vegetation communities and other resources in the Affected Environment chapter appear to overemphasize the biological sensitivity of locations that could be affected under the current design, and do not match with or support the impact analysis clearly.

Most of the biological surveys were completed 11 years ago, in 2001. The report indicates that biological reconnaissance was also conducted in August 2008. Without additional discussion of survey methodology and location, the Panel cannot determine whether the areas affected by the TRP were specifically evaluated and considered in the field. The Panel agrees that reconnaissance-level surveys are adequate, but additional detail is needed to determine whether they apply specifically to the TRP.

The methods for identifying sensitive biological resources that could be affected under the TRP, as well as the biological resources considered and eliminated from further analysis, have not been fully described. For biological resources, methods and assumptions used to define specific impact areas, the potential for occurrence of special-status species and waters of the U.S. in those areas, and specific impacts to those resources are not clear.

Section 4.2.12 (Special Status Species), including supporting tables, does not clearly describe which of the special-status species could potentially occur in the areas specifically affected by the alternatives analyzed (Alternative 1 [National Economic Development (NED)] and Alternative 2 [Locally Preferred Plan (LPP)/TRP]), in addition to the larger study area or along Orestimba Creek. Presently, the discussion of "Potential to Occur" in the species tables and text seem to apply to the entire study area and the Orestimba Creek riparian zone. Clarifying this in the Affected Environment chapter would more directly support the impact analysis discussion and conclusion. In addition to the larger study area that is emphasized throughout the biological resources sections, specifying a smaller "project area" or something similar (for focusing the baseline resource conditions in the Affected Environment chapter, and the effects analysis later in the report) would help clarify this issue.

For special-status species that could be affected, descriptions of likely use of affected habitats in the study/project area (e.g., agricultural) are not included (e.g., foraging, breeding, seasonal use, etc.). This issue limits completeness of the Affected Environment chapter as it relates to the subsequent effects analysis and conclusions about the type and magnitude of impact.

The title of Figure 4-15 refers to California Natural Diversity Database (CNDDB) occurrences near "Proposed … Channel Modifications," which is not part of the NED or LPP/TRP. Therefore, it is not clear whether the locations affected by Alternatives 1 (NED) or 2 (LPP/TRP) were specifically considered in the CNDDB review.

Overall, these issues limit the ability to determine which common and sensitive biological resources could be affected in the floodplain. The Panel recognizes that the TRP would avoid several potential impacts to sensitive biological resources relative to other project alternatives that were originally evaluated and eliminated. However, these issues could be raised as substantive issues and questions during CEQA and NEPA public review.

Significance – Medium

Without a clear nexus between baseline conditions of biological resources, how those resources were considered during project design, and potential effects on those resources, the conclusions for biological resources presented in the report are not well-supported.

Recommendations for Resolution

1. Consider identifying and defining a specific "project area" (where direct and indirect effects are expected to occur), in addition to the broader study area that is presently discussed, and focus the Affected Environment section and analysis on that area.
2. Expand the definition of special-status species (paragraph 1, Section 4.2.12 (Special Status Species) to specify species designated by California Department of Fish and Game (CDFG) as species of special concern. (The Panel recognizes that CDFG species of special concern were considered, but recommends specifying that in the definitions.)
3. Add a discussion of vegetation communities and other land cover types (e.g., agricultural, disturbed, etc.) specifically affected by the TRP to the Affected Environment chapter, and clarify that the other vegetation communities described are within other areas of the larger study area.
4. Provide additional discussion of survey methodology and location, to determine whether the areas affected by the TRP were specifically evaluated and considered in the field.
5. Revise Section 4.2.12 (Special Status Species), including supporting tables, to clarify which of the special-status species could potentially occur in the areas specifically affected by the alternatives evaluated, in addition to the larger study area or along Orestimba Creek.
6. Provide additional discussion of the likely use of affected habitats in the study/project area (e.g., foraging, breeding, seasonal use, etc.) for special-status species that could be affected.
7. Revise the title of Figure 4-15 (and the figure itself and related text discussion, if needed) to reflect specific consideration of Alternatives 1 (NED) and 2 (LPP/TRP).

Final Panel Comment 6

Baseline conditions for invasive plants/noxious weeds specific to the area affected by the TRP, and a risk analysis for weed spread as a result of project construction, have not been presented.

Basis for Comment

The description of existing conditions for invasive plants/noxious weeds focuses on the Orestimba Creek riparian zone. However, the primary risk of noxious weed spread as a result of implementing the TRP is probably associated with project construction. To determine the risk of invasive plant/noxious weed spread as a result of project construction, existing conditions for invasive plants/noxious weeds should be described specifically for the area affected by the TRP and adjacent areas.

The effects analysis of invasive plants/noxious weeds does not discuss construction-related impacts. For example, invasive weeds could inadvertently be introduced or spread in the project area during construction activities if nearby source populations passively colonize disturbed ground, or if construction and personnel equipment is transported to the site from an infested area. Soil, vegetation, and other materials transported to the project area from off-site sources for best management practices (BMPs), revegetation, or fill for project construction could contain invasive weed seeds or plant material that could become established in the project area. If significant impacts could occur, standard weed management practices are available and should be considered.

Significance – Medium

The Draft Interim Feasibility Study and Draft EA/IS is not clear regarding whether the effects related to invasive plants/noxious weeds have been adequately evaluated and mitigated, if needed.

Recommendations for Resolution

1. Discuss existing conditions for invasive plants/noxious weeds specifically in the area affected by the TRP (i.e., project area). If recent field or other site-specific data to characterize invasive plant/noxious weed conditions in the project area are not available, then summarizing the expected or likely conditions there based on land cover types, levels of disturbance, and known invasive plant/weed occurrences in nearby areas would be adequate.
2. Discuss construction-related impacts in the effects analysis and consider whether mitigation to prevent weed spread during construction is needed.

Final Panel Comment 7

Potential impacts to three special-status species associated with agricultural and/or grassland habitats – tricolored blackbird, loggerhead shrike, and California horned lark – are not addressed in the effects analysis.

Basis for Comment

The tricolored blackbird (*Agelaius tricolor*), loggerhead shrike (*Lanius ludovicianus*), and California horned lark (*Eremophila alpestrisare*) are designated by CDFG as species of special concern. These species are associated with grassland and/or agricultural habitats in California, and the Draft Interim Feasibility Study and Draft EA/IS describes two of these species (tricolored blackbird and loggerhead shrike) as having a "moderate" potential to occur in the study area. Based on the agricultural habitats in the proposed project/impact areas and potential for occurrence of these species, it is unclear why they were not carried through and evaluated in the effects analysis. Conversely, although the burrowing owl is described in the report as having a "low" potential to occur, mitigation measures are proposed for this species, implying that the project could significantly affect burrowing owl.

As presented, it is unclear whether these special-status species have been adequately considered in the design of the TRP, and whether potential effects of project implementation have been adequately evaluated and disclosed.

Significance – Medium

If any of these (or other) special-status species could reasonably occur in the project area, omitting them from the effects analysis could be raised as a substantive issue during CEQA and NEPA public review.

Recommendations for Resolution

1. Analyze the potential effects of project implementation on the tricolored blackbird, loggerhead shrike, and California horned lark, or clarify (in the Affected Environment chapter or elsewhere) why they are not carried through the effects analysis (e.g., based on potential for occurrence, etc.).
2. Include a clear and consistent description of the approach to identifying sensitive biological resources that could be affected by the TRP, as well as the biological resources considered and eliminated from further analysis.

Final Panel Comment 8

The effects analysis, conclusions, and proposed mitigation for biological resources do not include the appropriate rationale and supporting evidence required for CEQA and NEPA review.

Basis for Comment

The following issues limit the ability of the Panel to determine (1) whether the appropriate range of biological resources has been adequately analyzed and what the anticipated effects would be, and (2) whether the context, intensity, and significance (per NEPA and CEQA requirements) of potential impacts have been fully considered.

The significance criteria used for special-status species do not appear to be from the CEQA Guidelines (Environmental Checklist Form, Appendix G) (codified in the California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387). A CEQA lead agency (e.g., Stanislaus County) may develop and use its own significance thresholds, provided that they are formally adopted. The Panel could not find the significance criteria for special-status species used in the Draft Interim Feasibility Study and Draft EA/IS in other Stanislaus County documents. Therefore, the source and rationale for using these criteria in the effects analysis are unclear.

In the Draft Interim Feasibility Study and Draft EA/IS (Chapter 5 [Effects Assessment], Section 5.2.11 [Wildlife and Fisheries], page 5-17), the effects analysis for fisheries is limited to the follow statement: "…impacts on water quality would have short-term and less than significant impacts on local fish populations." However, there is no additional discussion. The analysis does not describe what the short-term effects would be, and why they were considered less than significant.

The analysis of special-status species in the report is limited to: "Special-status species are known to occur within the study area, and there is a potential for associated habitats to be impacted both directly and indirectly by construction of a chevron levee. Impacts to these habitats may affect, though are not likely to adversely affect these species." The analysis does not describe which species would be affected or what the direct and indirect effects would be. The discussion is not developed enough to directly support and understand the conclusion and the proposed mitigation. For example, impact mechanisms (e.g., construction, habitat loss, etc.) and anticipated biological effects for each special-status species for which an impact is expected should be described. The mitigation measures that follow the impact discussion address mitigation for impacts to Swainson's hawk, burrowing owl, San Joaquin kit fox, and valley elderberry longhorn beetle (VELB); however, the impact analysis does not mention those species or describe what specific impacts are being mitigated.

The mitigation measures imply that impacts to VELB could occur; however, the Affected Environment chapter only discusses elderberry shrubs and VELB as potentially occurring along the Orestimba Creek riparian zone. The analysis does not include a discussion of anticipated impacts to VELB, and the rationale for why it could occur in areas potentially affected by the TRP.

Significance – Medium

The conclusions of the analysis may be accurate, and the biological effects of implementing and operating the TRP could be relatively minor. However, the biological rationale and supporting evidence to support the conclusions are not clearly presented, which is a substantive issue for CEQA and NEPA review.

Recommendations for Resolution

1. Provide the source of significance criteria used in the effects analysis. If needed, a copy of the 2012 CEQA Statute and Guidelines (AEP, 2012) is located at: http://ceres.ca.gov/ceqa/docs/CEQA_Handbook_2012_wo_covers.pdf.
2. Describe what the short-term effects for fish would be and why those were considered less than significant.
3. Expand the discussion of anticipated project effects on special-status species and other biological resources covered. The discussion should describe, for each species/resource affected, impact mechanisms and the types and magnitude of biological effects.
4. Discuss the anticipated impacts to VELB and the rationale for why they could occur in areas potentially affected by implementation of Alternatives 1 or 2.
5. Include additional detail in the cumulative effects discussions for biological resources, based on other revisions made.

Literature Cited:

AEP (2012). *2012 California Environmental Quality Act (CEQA) Statute and Guidelines*. Association of Environmental Professionals, Palm Desert, California. Available at http://ceres.ca.gov/ceqa/docs/CEQA_Handbook_2012_wo_covers.pdf.

Final Panel Comment 9

The presence of and potential impacts to waters of the U.S., including wetlands, specifically in areas affected by the TRP have not been described.

Basis for Comment

Chapter 4 (Affected Environment), Section 4.2.8 (Waters of the U.S. and Wetlands) of the Draft Interim Feasibility Study and Draft EA/IS states that a delineation of waters of the U.S. identified potential jurisdictional wetlands in the upper reach of the study area, and the discussion focuses on the Orestimba Creek riparian zone. However, it is not clear whether a delineation of the impact area for the TRP was conducted, and whether potentially jurisdictional wetlands are present there based on a delineation or other information. Because the effects analysis for wetlands is based on and references this delineation, the text should be clear as to whether the delineation included areas specifically affected by the TRP. Additionally, the discussion references "USACE, 2002" as the source of the delineation, but that document is not included in Chapter 12 (References).

It is not clear whether the effects conclusions for wetlands are based on appropriate site-specific information. The National Wetland Inventory (NWI) mapping shown on Figure 4-8 appears to cover the TRP project area, but much of the report discussion on wetlands focuses on the Orestimba Creek riparian zone.

A jurisdictional delineation may not be required to identify and describe potential effects on wetlands at the feasibility-study phase of the project (i.e., wetland delineation and permitting could occur later); rather, the analysis of wetlands for the Draft Interim Feasibility Study and Draft EA/IS could rely on other information (e.g., land cover mapping, NWI data, identification of potential wetlands during reconnaissance surveys, etc.).

Significance – Medium

The report's focus on wetlands along the Orestimba Creek riparian zone, rather than in areas affected by TRP implementation, limits the completeness and quality of the report.

Recommendations for Resolution

1. Clarify whether the wetland delineation covers the TRP project area.
2. If the wetland delineation does not cover the TRP project area, state that a wetland delineation was not conducted specifically in the TRP project area, de-emphasize reference to a delineation that may not apply to TRP-related impacts, and revise the effects discussion accordingly.
3. Clarify the discussion of wetlands to focus on the TRP project area, and include sources of information used to identify potential wetlands in that area.
4. Add the full citation for USACE 2002 to Chapter 12 (References).

Final Panel Comment 10

The seepage analysis, which relied solely on Finite Element (FE) methods, did not verify the analysis using blanket theory in accordance with USACE guidance.

Basis for Comment

The seepage analyses presented in the Geotechnical Engineering Evaluation relied solely on the FE program Seep 2D. The USACE Sacramento District's Geotechnical Levee Practice procedure suggests that "blanket theory be used to check the results of the FE modeling at some section in every study" (USACE, 2008). USACE guidance for conducting seepage analysis using blanket theory is provided in Engineering Manual (EM) 1110-2-1913, *Design and Construction of Levees*, Appendix C and D (USACE, 2000). Blanket theory is a useful simplified tool in checking the results of the FE method. Since the method has been used extensively by the USACE for levee projects, it provides a basis for comparing the seepage analysis results with other similar projects.

Significance – Low

The absence of blanket theory analysis results is a procedural inconsistency that is not likely to materially change the analysis results.

Recommendations for Resolution

1. Conduct seepage analysis and check seepage blanket design for critical reaches using blanket theory methods as described in EM 1110-2-1913, Appendix C and D.

Literature Cited:

USACE (2000). Design and Construction of Levees. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Manual (EM) No. 1110-2-1913. April 30.

USACE (2008). Geotechnical Levee Practice. Department of the Army, U.S. Army Corps of Engineers, Sacramento District. Procedure REFP10L0.DOC, Rev. 2. April 11. Available at http://iso9000.spk.usace.army.mil/docs/REFP10L0.pdf.

Final Panel Comment 11

Mechanisms and pathways of urban flooding are not clearly described for with- and without-project conditions.

Basis for Comment

Floodwaters currently enter the City of Newman via a variety of flow paths, including conveyance along the California Northern Railroad berm and overtopping of the CCID Canal directly west of the city. Knowledge of the current mechanisms of flooding provides an important basis for understanding the potential effectiveness of various flood mitigation measures; however, the predominant flow paths into the City of Newman without the project (and their relative importance) are not clearly described in the project documentation. Although the TRP potentially addresses the proximate sources of urban floodwaters more effectively than most or all of the other alternatives, a clearer description of the primary flow paths that convey floodwaters to Newman is necessary.

In addition, the mechanisms responsible for residual flooding in Newman under the with-project condition are not clearly described in the documentation. The hydrologic model output suggests that some areas of Newman may remain inundated during the 1/50 ACE and larger events despite implementation of the TRP. It is unclear to the Panel whether the areas of residual urban flooding are simply artifacts of impervious depressions in the FLO-2D model grid, or whether flow is still being conveyed into the city from other areas east of the levee such as the Newman Wasteway. The capacity of the existing urban drainage system to convey stormwater is also unclear.

Significance – Low

Clarification of current flooding processes, the capacity of existing stormwater infrastructure, and residual urban flooding with the TRP would improve understanding of project performance and the technical quality of the Draft Interim Feasibility Study and Draft EA/IS.

Recommendations for Resolution

1. Clarify the major pathways by which floodwaters are conveyed into the City of Newman.
2. Provide a brief qualitative description of the relative effectiveness of the alternatives in directly addressing the predominant flooding mechanisms.
3. Provide a brief qualitative description of the extent to which existing stormwater infrastructure in Newman affects flood risk.
4. Clarify the cause(s) and extent of residual flooding in Newman that is expected with the project.

Final Panel Comment 12

The uncertainty and risk analysis does not acknowledge the potential effects of climate change.

Basis for Comment

The uncertainty and risk analysis assumes that the flood frequency distribution is stationary and does not consider climate change. Page 2-10 of the Draft Interim Feasibility Study and Draft EA/IS states that "…climate change would not substantially alter runoff since the existing watershed has rainfall rather than snowmelt runoff" (also see Appendix C-2, p. 19). This statement is oversimplified and does not acknowledge the risk that runoff could increase despite a lack of snowmelt runoff. It is plausible that runoff could increase due to changes in vegetative cover and/or fire regime in the watershed, and extreme rainfall events could increase in frequency even with no snowmelt and an overall trend toward a drier/warmer climate. In addition, flooding in the study area is influenced by the stage of the San Joaquin River, which is dominated by snowmelt runoff.

Non-stationary approaches to flood forecasting are increasingly becoming a standard practice, so the assumptions regarding climate change warrant a more appropriate physical explanation and justification.

Significance – Low

A clear and physically based rationale (e.g., stage insensitivity to possible landcover-vegetation-climate interactions) for assumptions about climate change is necessary for an understanding of the hydrologic risk analysis.

Recommendations for Resolution

1. Acknowledge that the flood frequency distribution may not be stationary and that extreme events could increase in the future.
2. Include a more hydrologically sound rationale for not including the effects of climate change in the risk analysis.
3. Include a brief discussion of the relative sensitivity of model predictions to climate change compared to other key sources of uncertainty such as error in the topographic data and model parameterization.

Final Panel Comment 13

The summary of biological effects in Table 3-12 is inconsistent with the effects described in the impact analysis.

Basis for Comment

The comparisons among alternatives (Alternative 1–No Action, Alternative 2–NED, and Alternative 3–LPP/TRP) for biological resources in Table 3-12 on page 3-48 of the Draft Interim Feasibility Study and Draft EA/IS do not correspond with the effects described in the impact analysis. For example, the table identifies temporary loss of habitat connectivity, but this issue is not discussed in the effects analysis. Also, potential impacts to other resources suggested in the mitigation measure for special-status species (Swainson's hawk, burrowing owl, and VELB) are not included in Table 3-12. Additionally, the summary of effects for "Threatened & Endangered Species" in the table mentions "Surveys to protect endangered species including San Joaquin Kit Fox," which seems to summarize the mitigation but not the effect.

Significance – Low

This is a consistency issue that affects the completeness and quality of the report regarding how carefully biological resources were considered during project design and review of effects.

Recommendations for Resolution

1. Update Table 3-12 to clearly summarize, and correspond directly with, the main conclusions of the revised/completed effects analysis for biological resources.

Final Panel Comment 14

The potential for erosion of farmland to the east of the railroad is not fully addressed for the TRP.

Basis for Comment

During floods, the chevron levee in the TRP concentrates overland flow at its northern tie-in with the railroad berm. FLO-2D modeling of with- and without-project conditions indicates that inundation depths may increase by 0.5 to 1 foot during a 1/10 ACE on some cropland areas east of the chevron levee tie-in as a result of the project. The potential for erosion of the railroad embankment where the chevron levee ties in was addressed; however, the Panel cannot find documentation that the potential for increased erosion of the farmland east of the railroad embankment has been considered as a possible secondary effect of the TRP.

Significance – Low

A description of potential secondary impacts associated with concentrated overland flows resulting from the TRP would improve the clarity and completeness of the project documentation.

Recommendations for Resolution

1. Describe whether existing hydrologic modeling suggests that erosion and degradation of cropland are likely to increase east of the armored levee tie-in at the railroad berm.
2. Acknowledge that the potential for farmland degradation in areas where the TRP concentrates overland was considered as part of the secondary impacts analysis.

Final Panel Comment 15

A plan for communicating residual risk to the affected population has not been described.

Basis for Comment

The Draft Interim Feasibility Study and Draft EA/IS addresses the residual risk to affected populations associated with the TRP. Chapter 6, which discusses the public involvement program, is unclear regarding the extent to which residual flooding risks have been or will be communicated to the affected public.

Section 9.16 *Executive Order 1988* describes the eight-step process that agencies should perform as part of their decision-making on projects that have potential impacts to, or within, the floodplain. Step 7 of the process involves advising the general public of the TRP and specifies that a public meeting is to be conducted during the public and agency review. The report would be strengthened by describing how the issue of residual risk was presented at past public meetings. In addition, outlining how residual risks will be addressed in future public meetings would provide more clarity.

Overall, it appears that the stakeholders have been engaged throughout project formulation and that there is broad acceptance of the project.

Significance – Low

Clear, well-documented communication of residual risk to the affected populations is an important element of the public involvement process and only minor additional documentation is needed.

Recommendations for Resolution

1. Provide additional description of the communication of residual risk in Chapter 6.

APPENDIX B

Final Charge to the Independent External Peer Review Panel as submitted to USACE on August 29, 2012 for the Orestimba Creek IEPR

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Charge Questions and Guidance to the Peer Reviewers
for the
Independent External Peer Review of the
Orestimba Creek – West Stanislaus County, California, Feasibility Study

BACKGROUND

The study area is located on the west side of the San Joaquin River in Stanislaus County, California. It encompasses approximately 186 square miles of rangeland and very productive irrigated cropland. The largest community in the study area is the City of Newman, which is located along State Highway 33. Orestimba Creek is a "west side tributary" to the San Joaquin River, and originates from the eastern slopes of the Diablo Range, a section of the larger Coast Range of California. Orestimba Creek is traversed by US Interstate Highway 5, the California Aqueduct, the Delta-Mendota Canal, State Highway 33, the Northern California Railroad, and the Central California Irrigation District Main Canal. The creek is ephemeral, with high flows normally occurring in late winter, and irrigation drainage accounting for low flows during the summer months. The creek flows in a northeasterly direction through steep mountain canyons until it emerges at the edge of the foothills. Here on the gently sloping valley floor, the decreased slope and size of the streambed reduces the creek's channel capacity. Flood flows spread over a wide undefined alluvial fan.

The purpose of this study is to investigate plans that provide flood risk management (FRM) for the City of Newman and surrounding agricultural areas. In the course of identifying these plans, opportunities to address some of the environmental degradation along portions of Orestimba Creek may be identified. At this time, a sponsor has not been identified for the potential ecosystem restoration portion of this project, so the study will progress as a single purpose project. It is envisioned that this FRM feasibility study, when constructed, would provide the opportunity for future ecosystem restoration along Orestimba Creek by other interested parties.

The study has considered a full range of alternatives, including detention basins, bypasses, setback levees, channel improvements and ring levees. The study has developed several hybrid alternatives that are in the process of being optimized in order to identify the National Economic Development and locally preferred plans. The estimated costs of these plans range from $40 - $50 million. The non-Federal sponsor is Stanislaus County, which is receiving financial assistance from the State of California, Department of Water Resources.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Orestimba Creek –West Stanislaus County, California, Feasibility Study (hereinafter: Orestimba Creek IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review Policy* (EC 1165-2-209, Change 1) dated January 31, 2012, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-209, Change 1; p. D-4) for the Orestimba Creek documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in Civil Works planning/economics, biology/ecology, geotechnical engineering, and hydrologic and hydraulic engineering issues relevant to the project. They will also have experience applying their subject matter expertise to FRM.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-209, Change 1, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following documents are to be reviewed by designated discipline:

Title	Approximate Number of Pages	Required Disciplines
Orestimba Creek – West Stanislaus County, California, Draft Interim Feasibility Study Report and Environmental Assessment/Initial Study (EA/IS)	270	All Disciplines
Environmental Assessment (integrated with Feasibility Study	150	All Disciplines
Hydrologic and Hydraulic Analyses Design Appendix	220	All Disciplines

Title	Approximate Number of Pages	Required Disciplines
Civil Engineering Design Appendix	40	All Disciplines
Geotechnical Engineering Design Appendix	350	All Disciplines
Economics Appendix	125	All Disciplines
Real Estate Appendix	14	All Disciplines
Cost Engineering	100	All Disciplines

Supporting Information

Title	Approximate Number of Pages	Required Disciplines
Geotechnical Levee Practice REFP10L0.DOC	10	All Disciplines
Urban Levee Design Criteria May 2012	100	All Disciplines

Documents for Reference

- USACE guidance Civil Works Review Policy (EC 1165-2-209, Change 1) dated January 31, 2012
- CECW-CP Memorandum dated March 31, 2007
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review released December 16, 2004.

SCHEDULE

This draft schedule is based on the August 29, 2012 receipt of the final review documents. The schedule will be revised upon receipt of final review documents.

TASK	ACTION	DAYS TO COMPLETE ACTION	DUE DATE
Conduct Peer Review	Battelle sends review documents to Panel	Within 0 days of Panel being under subcontract	8/31/2012
	Battelle convenes kickoff meeting with Panel	Within 1 day of Panel being under subcontract or submission of final Work Plan, whichever is later	9/5/2012
	USACE/Battelle convenes kickoff meeting with Panel	Within 1 day of Panel being under subcontract or submission of final Work Plan, whichever is later	9/5/2012
	Battelle convenes mid-review teleconference for Panel to ask clarifying questions of USACE	At the halfway point of Panel review	9/10/2012
	Panel members complete their individual reviews	Within 8 days of Battelle/Panel kick-off meeting	9/14/2012
Prepare Final Panel Comments and Final IEPR Report	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	Within 3 days of panel members completing their review	9/19/2012
	Battelle convenes Panel Review Teleconference	Within 4 days of panel members completing their review	9/20/2012
	Final Panel Comments finalized	Within 4 days of receipt of draft Final Panel Comments	10/4/2012
	Battelle provides Final IEPR Report to Panel for review	Within 1 day Final Panel Comments being finalized	10/5/2012
	Panel provides comments on Final IEPR Report	Within 1 day of receipt of Final IEPR Report	10/9/2012
	*Battelle submits Final IEPR Report to USACE	Within 7 days of panel members providing draft Final Panel Comments to Battelle	10/10/2012
Comment/ Response Process	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process (if necessary)	Within 1 day of submittal of Final IEPR Report	10/11/2012

TASK	ACTION	DAYS TO COMPLETE ACTION	DUE DATE
	USACE provides draft PDT Evaluator Responses to Battelle	Within 4 days of receipt of Final IEPR Report	10/16/2012
	Battelle provides the Panel the draft PDT Evaluator Responses	Within 2 days of receipt of draft PDT Evaluator Responses	10/18/2012
	Panel members provide Battelle with draft comments on draft PDT Evaluator Responses (i.e., draft BackCheck Responses)	Within 2 days of receipt of draft PDT Evaluator Responses from Battelle	10/22/2012
Comment/ Response Process, Continued	Battelle convenes teleconference with Panel to discuss draft BackCheck Responses	Within 0 days of receipt of draft BackCheck Responses	10/22/2012
	Battelle convenes teleconference with Panel and USACE to discuss Final Panel Comments and draft responses	Within 5 days of USACE providing draft PDT Evaluator Responses	10/23/2012
	USACE inputs final PDT Evaluator Responses in DrChecks	Within 2 days of Final Panel Teleconference	10/25/2012
	Battelle provides PDT Evaluator Responses to Panel	Within 0 days of final PDT Evaluator Responses being available	10/25/2012
	Panel members provide Battelle with final BackCheck Responses	Within 1 day of receipt of final PDT Evaluator Responses	10/26/2012
	Battelle inputs the Panel's BackCheck Responses in DrChecks	Within 1 day of notification that USACE final PDT Evaluator Responses have been posted in DrChecks	10/26/2012
	*Battelle submits pdf printout of DrChecks project file and Comment-Response Record	Within 0 days of DrChecks closeout	10/26/2012
Civil Works Review Board (CWRB)	Battelle prepares and Panel reviews slides for CWRB		10/31/2012
	Civil Works Review Board		11/14/2012

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Orestimba Creek IEPR documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or Appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Orestimba Creek IEPR documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-209, Change 1; Appendix D).

1. Your response to the charge questions should not be limited to a "yes" or "no." Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making.

Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
2. Please contact the Battelle Project Manager (Julian Digialleonardo, digialleonardoj@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Julian Digialleonardo, digialleonardoj@battelle.org, no later than September 14, 2012, 10 pm ET.

Independent External Peer Review
of the
Orestimba Creek –
West Stanislaus County, California, Feasibility Study

Charge Questions and Relevant Sections As Supplied By USACE

General Questions

1. Are the assumptions that underlie the hydrologic and hydraulic, economic, and environmental analyses sound?
2. Are the hydrologic and hydraulic, economic, and environmental methods, models and analyses used adequate and acceptable?
3. Were all models used in the analyses used in an appropriate manner with assumptions appropriately documented and explained?
4. Were risk and uncertainty sufficiently considered?

Safety Assurance Review Questions

5. Have the appropriate alternatives been considered and adequately described for this project and do they appear reasonable?
6. Do the project features adequately address redundancy, resiliency, or robustness with an emphasis on interfaces between structures, materials, members, and project phases?
7. Are the quality and quantity of the surveys, investigations, and engineering sufficient to assess expected risk reduction?
8. Have the hazards that affect the structures been adequately documented and described?
9. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses?
10. Are there any additional analyses or information available or readily obtainable that would affect decisions regarding the structures?
11. Does the physical data and observed data provide adequate information to characterize the structures and their performance?
12. Have all characteristics, conditions, and scenarios leading to potential failure, along with the potential impacts and consequences, been clearly identified and described? Have all pertinent factors, including but not necessarily limited to population-at-risk been considered?
13. Does the analysis adequately address the uncertainty given the consequences associated with the potential loss of life for this type of project?
14. From a public safety perspective, is the proposed alternative reasonably appropriate or are there other alternatives that should be considered?

15. Has anything significant been overlooked in the development of the assessment of the project or the alternatives?
16. Were the methods used to evaluate the conditions of the structure adequate and appropriate given the circumstances?
17. Do the alternatives and their associated costs appear reasonable? Do the benefits and the consequences appear reasonably?

Specific Charge Questions

Chapter 4.0-Affected Environment

18. Are the existing conditions of the study area sufficiently detailed and accurate? If not, why?

Chapter 3.0 –Alternative Plans

Future Without-Project Conditions

19. Were the forecasted future without-project conditions clearly and adequately described?
20. Has anything significant been overlooked in the evaluation of the future without-project conditions? Please explain.

Alternatives

21. Were the assumptions made for use in developing the future with project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?
22. Was a reasonably complete array of possible measures considered in the development of alternatives?
23. Has the criteria to eliminate plans from further study been clearly described?
24. Is each of the different alternative plans clearly described?
25. Are the changes between the without and with project conditions adequately described for each alternative?
26. Have comparative impacts been clearly and adequately described?

Evaluation

27. Was the alternative evaluation process used to select the recommended alternative rational and was the process implemented in a reasonable manner given the project constraints?
28. Discuss the extent to which risk and uncertainty in the plan selection has been addressed.
29. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and are the estimated cost of those efforts reasonable for each alternative?
30. Please comment on the completeness of the recommended plan. (i.e., will any additional efforts, measures, or projects be needed to realize the expected benefits?)
31. Are the costs adequately justified?

32. Please comment on the likelihood of the recommended plan will achieve the expected outputs.

Chapter 5- Effects Assessment

33. Have impacts to significant resources been adequately and clearly described?
34. To what extent have the potential impacts of the alternatives on significant resources been addressed and supported?
35. Are unavoidable adverse environmental effects adequately described and discussed? If not, please explain.
36. In your opinion, were there any other issues, resources, or concerns not identified and/or addressed?
37. Are the decisions consistent with the EA?
38. Does the EA satisfy the requirements of NEPA? Were adequate considerations given to significant resources by the project along with the impacts?
39. Is the description of cultural and archeological resources complete and accurate? If not, explain.
40. Was the discussion of natural resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?
41. Comment on the accuracy and completeness of the description of the current ecological resource conditions in the study area.
42. Are cumulative impacts adequately described and discussed? If not, please explain.
43. Are indirect impacts adequately described and discussed? If not, please explain.
44. Are there any unmitigated environmental impacts not identified and if so could they impact project designs?
45. Have the public concerns been identified and adequately described?

Chapter 9-Tentatively Selected Plan

46. Are the scope and detail of the potential adverse effects that may arise as a result of project implementation sufficiently described and supported?
47. Are the differences between the NED plan and the LPP implementation adequately described?

Appendix C - Engineering

48. To what extent are the input parameters, methods, models and analyses used in the flood risk analysis appropriate and consistent with current best management practices?
49. Have all hydrologic modeling input parameters been identified and justified?
50. Comment on the use and justification of the hydraulic model boundary conditions?
51. Were the methods used to compute water surface elevations within the alluvial fan/divided flow environment appropriate?

52. Have the design and engineering considerations presented been clearly outlined?
53. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?
54. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?
55. Have the impacts to existing infrastructure, such as utilities, been adequately addressed?
56. Are there other items/methods that should be included in the HTRW investigation? Please explain.
57. To what extent have significant project construction costs been adequately identified and described?
58. Are the assumptions used to determine the cost of operations and maintenance for the proposed project adequate?

Appendix E - Economics

59. To what extent are the input parameters, methods, models, and analyses used in the study methodology as documented in the Economics Appendix appropriate and consistent with current best management practices?
60. Were the methods to calculate structure and content values appropriate and adequately described?
61. Were the methods to calculate agricultural damage values appropriate and adequately described?

Appendix D - Real Estate

62. Does the Real Estate Plan adequately address all real estate interests (public and private)?
63. Comment on the extent to which assumptions and data sources used in the economics analyses are clearly identified and the assumptions are justified and reasonable.

Final Overview Question

64. What is the most important concern you have with the document or its appendices that was not covered in your answers to the questions above?