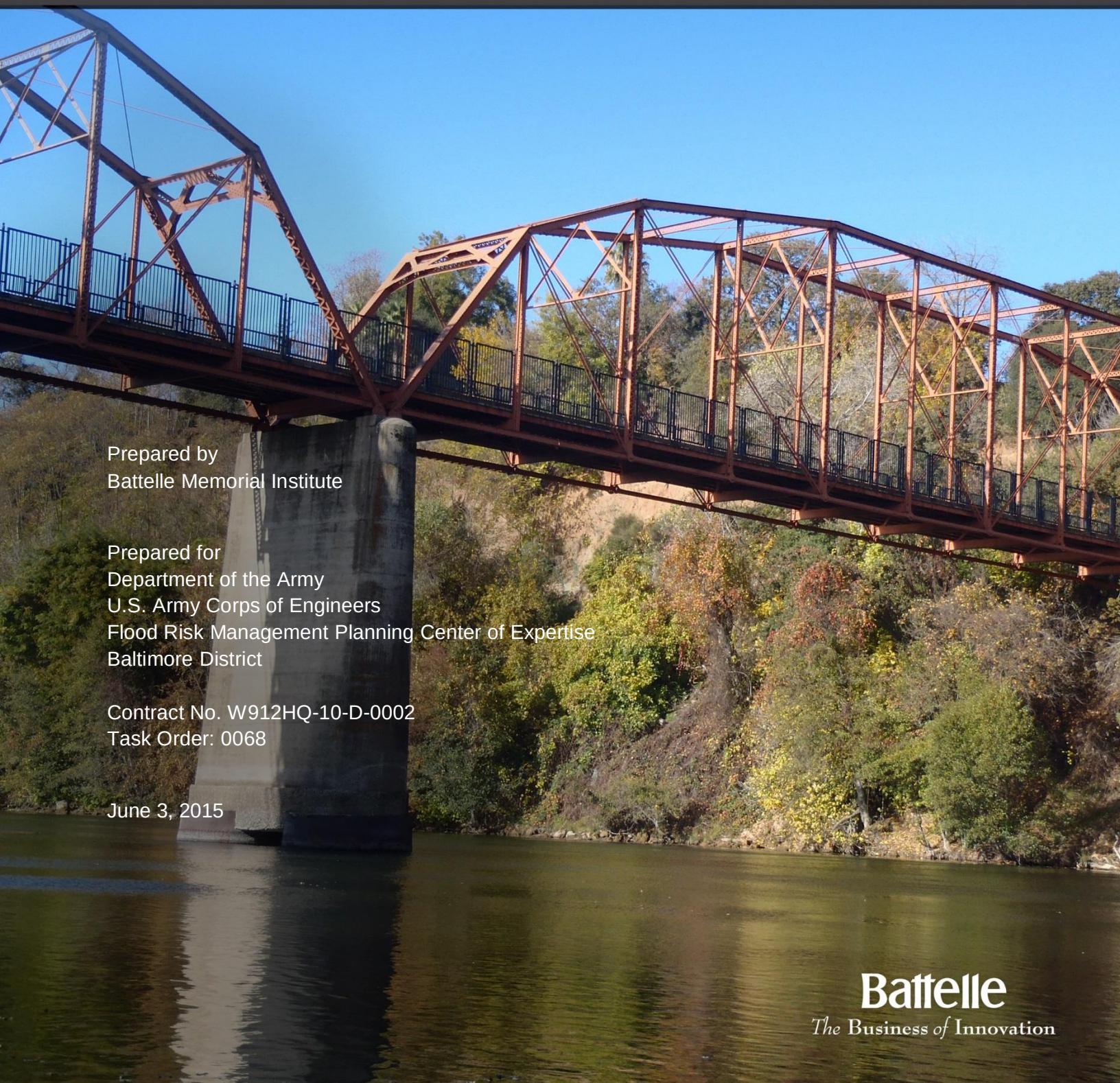
Final Independent External Peer Review Report
American River Common Features
General Re-evaluation Report (GRR)



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
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Prepared by

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

Increased understanding of under seepage and through seepage problems that jeopardize levee stability has drastically increased American River Common Features project cost. Consequently, a general engineering and economic re-evaluation is necessary to determine if the alternative proposed is still viable and justified and if there is another alternative that may be more effective. The Common Features Project General Re-evaluation Report (GRR) includes flood risk management to the City of Sacramento on the north and south sides of the American River, and to the Natomas Basin. This GRR will consider the existing flood control project together as a system, with the purpose of developing analysis tools that truly consider the flood protection system as a whole and identify a comprehensive plan that will lower the risk of flooding in and around the City of Sacramento. The objective of the study is to identify flood-related issues in the American River Watershed, California study area. The GRR presents planning, engineering, and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the recommended plan. The project in total is a GRR undertaken to evaluate structural and non-structural flood risk management measures including in-basin storage, re-operation of existing reservoirs, improvements to existing levees, construction of new levees, and other storage, conveyance, and non-structural options.

The U.S. Army Corps of Engineers (USACE) has conducted an Independent External Peer Review (IEPR) of two prior projects in the area: (1) the Engineering and Economic Re-Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, American River Common Features, and (2) the Optional Increment – Draft Natomas Post-Authorization Change Report and Draft Environmental Impact Statement. These IEPRs were managed and coordinated by Battelle between 2009 and 2010 under the Army Research Office, Scientific Services Program contract (TCN09036).

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. USACE is conducting an IEPR of the American River Common Features General Re-evaluation Report, including the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (hereinafter: ARCF GRR IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the ARCF GRR. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process

for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the ARCF GRR review documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: geotechnical engineering, hydrologic and hydraulic (H&H) engineering, economics/Civil Works Planning, and biology/ecology. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of final candidates to confirm that they had no COIs, but Battelle made the final selection of the four-person Panel.

The Panel received electronic versions of the ARCF GRR review documents (more than 2,000 pages total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2014), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the ARCF GRR documents individually. The panel members then met via teleconference with Battelle to review key technical comments 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/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 17 Final Panel Comments were identified and documented. Of these, one was identified as having high significance, three had medium significance, seven had medium/low significance, and six had low significance.

Battelle also received from USACE 230 pages of public comments on the ARCF GRR and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the ARCF GRR review documents. After completing its review, the Panel confirmed that no issues or concerns were identified other than those already covered in the Final Panel Comments.

Results of the Independent External Peer Review

The panel members agreed 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 ARCF GRR review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the review documents are clearly written, well-organized, and very thorough. Although voluminous, the ARCF GRR review documents were manageable considering the complexity and history of the watershed. The Panel did, however, identify elements of the project that

require further verification and explanation and sections of the GRR and Draft EIS/EIR that should be clarified, revised, or discussed in greater detail.

Hydrologic and Hydraulic (H&H) Engineering: Based on the review of the GRR and the H&H Appendices, the Panel was not clear as to why the hydraulic profile for the future without-project (FWOP) condition is significantly higher than the profile for Alternative 1. This was of primary concern to the Panel. If the baseline condition is not correct, there is a high risk that the flood damage estimates will be incorrect. If, on the other hand, Alternative 1 is incorrect, then there is a risk that the National Economic Development (NED) plan has not been identified. USACE can address this by verifying the baseline conditions and Alternative 1 profiles in the Hydraulic Appendix and adjust analysis, as necessary. The Panel also noted the critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand. USACE can address this by verifying the critical volume durations in the text vs. Figure A-1 and modify text or graph, as necessary. Finally, the Panel noted the 1-year event stage data were not described in sufficient detail to understand how they were derived. USACE can address this matter by adding a brief description of the meaning of "1-year event" for clarification, since a 1-year event cannot be statistically quantified.

Economics/Civil Works Planning: The ARCF GRR adheres to sound planning principles and USACE regulations and policies. The analyses of the alternatives were complete and reasonable. The Panel noted the GRR describes work the non-Federal sponsors have done, and are currently doing, to improve the levee systems in the study area; however, it was not clear to the Panel why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project (FWOP) condition. USACE can address this matter by explaining why it is anticipated that local interests will not make improvements to the levee system in the FWOP condition. The Panel also did not understand the need for several of the planning objectives as some were redundant or not appropriate to fully evaluate alternatives. USACE can address this by streamlining the planning objectives in order to focus the evaluation of alternatives on the most critical metrics. The Panel also noted there was no indication that a systems approach was taken to ensure the Tentatively Selected Plan (TSP) provides an optimum solution; in the future, the Panel urges USACE to implement a systems planning approach.

Biology/Ecology: From a biological resources perspective, an appropriate range of measures were considered within the constraints of meeting the project need and objectives; however, some biological resources in the study area potentially affected by project implementation have not been addressed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis. USACE can address these biological resource issues by adding to and clarifying the EIS/EIR. Not addressing or mitigating (if needed) these potential project-related impacts would increase the risk to special-status species and other biological resources and may affect project approval/implementation. The Panel noted that baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented. USACE can address these issues by discussing existing conditions for invasive plants/noxious weeds in the project area, discussing construction-related impacts in the effects analysis, and considering whether mitigation to prevent invasive plant spread during construction is needed.

Geotechnical Engineering: Geotechnical issues were heavily considered (e.g., levee fragility curves, risk calculations, seismic performance approach) and resolved in the previous two IEPRs (TCN09036). Given that history, the Panel found very few issues with the ARCF GRR. For example, the Panel noted the Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches. Without cross-sections, it is

difficult to evaluate the reasonableness of the geotechnical analyses. USACE can address this matter by providing an illustrative, interpretive cross-section of each of the five index points where geotechnical analysis was conducted, and showing topography, subsurface conditions, water levels, phreatic surfaces, and the failure modes considered. The Panel also noted the seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified. To address this matter, USACE can describe seismic vulnerability and post-earthquake remediation strategies in the GRR, and consider the cost of post-earthquake remediation in the economic analysis.

Table ES-1. Overview of 17 Final Panel Comments Identified by the ARCF GRR IEPR Panel

No.	Final Panel Comment
Significance – High	
1	It is not clear why the hydraulic profile for the future without-project condition is significantly higher than the profile for Alternative 1.
Significance – Medium	
2	Details as to why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project condition are not included in the GRR.
3	Baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented.
4	Some biological resources in the study area potentially affected by project implementation have not been analyzed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis.
Significance – Medium/Low	
5	The justification to use a content-to-structure value ratio of 50% to calculate the value of contents of residential structures has not been explained and the reasonableness of this ratio is unknown.
6	The magnitude of impacts and level of significance for the effects of sedimentation and turbidity on fisheries resources are not easily determined.
7	It is unclear why several of the planning objectives are required; some are redundant or not appropriate to fully evaluate alternatives.
8	The basis for the assumption that the project will receive total Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire 10-year implementation period has not been provided, and the construction period may be too short, which would result in an underestimate of the cost of interest during construction.

Table ES-1. Overview of 17 Final Panel Comments Identified by the ARCF GRR IEPR Panel

No.	Final Panel Comment
9	The rationale and process for selecting the index points are not described or consistently listed in figures, making it difficult to assess whether the index points are representative of potential economic impacts.
10	The Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches.
11	The seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified.
Significance – Low	
12	It is not clear in the GRR whether a water control plan has been developed and will be adopted when construction of the Joint Federal Project auxiliary spillway at Folsom Dam is complete.
13	Several of the proposed non-structural management measures are already in place and should not be considered management measures in the GRR.
14	The critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand.
15	The reason for updating the flow record with additional data for Arcade Creek but not Dry Creek is unclear.
16	The use of the 1-year event stage data has not been described in sufficient detail to understand how it was derived.
17	The level of significance of impacts on biological resources after mitigation is not presented in sufficient detail.

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Table 1. Major Milestones and Deliverables of the ARCF GRR IEPR 2

LIST OF ACRONYMS

ADM	Agency Decision Milestone
AEP	annual exceedance probability
ARCF	American River Common Features
ATR	Agency Technical Review
BA	Biological Assessment
BMP	best management practices
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
COI	Conflict of Interest
CRPR	California Rare Plant Rank
CVFPB	Central Valley Flood Protection Board
CWRB	Civil Works Review Board
DrChecks	Design Review and Checking System
DWR	Department of Water Resources (CA)
EAD	expected annual damages
EC	Engineer Circular
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FWOP	future without-project
GRR	General Re-evaluation Report
H&H	Hydrologic and Hydraulic
HEP	Habitat Evaluation Procedure
HSI	Habitat Suitability Index
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
JFP	Joint Federal Project

NED	National Economic Development
NEPA	National Environmental Policy Act
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PCX	Planning Center of Expertise
PDT	Project Delivery Team
SAFCA	Sacramento Area Flood Control Agency
SAR	Safety Assurance Review
SRA	Shaded Riverine Aquatic
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
VELB	valley elderberry longhorn beetle
WRDA	Water Resources Development Act

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1. INTRODUCTION

Increased understanding of under seepage and through seepage problems that jeopardize levee stability has drastically increased American River Common Features project cost. Consequently, a general engineering and economic re-evaluation is necessary to determine if the alternative proposed is still viable and justified and if there is another alternative that may be more effective. The Common Features Project General Re-evaluation Report (GRR) includes flood risk management to the City of Sacramento on the north and south sides of the American River, and to the Natomas Basin. This GRR will consider the existing flood control project together as a system, with the purpose of developing analysis tools that truly consider the flood protection system as a whole and identify a comprehensive plan that will lower the risk of flooding in and around the City of Sacramento. The objective of the study is to identify flood related issues in the American River Watershed, California study area. The GRR presents planning, engineering, and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the recommended plan. The project in total is a GRR undertaken to evaluate structural and non-structural flood risk management measures including in-basin storage, re-operation of existing reservoirs, improvements to existing levees, construction of new levees, and other storage, conveyance, and non-structural options.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the American River Common Features General Re-evaluation Report including the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (hereinafter: ARCF GRR IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) 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).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the ARCF GRR IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE on March 27, 2015. Appendix D presents the organizational conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the ARCF GRR IEPR.

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).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses 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 ARCF GRR was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the ARCF GRR IEPR. Due dates for milestones and deliverables are based on the award/effective date of June 16, 2014. Note that the work items listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on July 24, 2015. The actual date for contract end will depend on the date that all activities for this IEPR, including Agency Decision Milestone (ADM) Meeting and Civil Works Review Board (CWRB) preparation and participation, are conducted.

Table 1. Major Milestones and Deliverables of the ARCF GRR IEPR

Task	Action	Due Date
1	Award/Effective Date	6/16/2014
	Review documents available	3/13/2015
2	Battelle submits list of selected panel members	2/12/2015
	USACE confirms the panel members have no COI	2/13/2015
3	Battelle convenes kick-off meeting with USACE	6/19/2014
	Battelle convenes kick-off meeting with USACE and panel members	3/25/2015
4	Panel members complete their individual reviews	4/22/2015
	Panel members provide draft Final Panel Comments to Battelle	5/14/2015
	USACE submits public comments to Battelle	5/21/2015
	Battelle submits public comments to Panel	5/21/2015
	Panel members provide response to public comments and confirm no new Final Panel Comment(s) needed for public comments	5/28/2015
5	Battelle submits Final IEPR Report to USACE	6/3/2015
	USACE PCX Provides Decision on Final IEPR Report Acceptance	6/5/2015

Table 2. Major Milestones and Deliverables of the ARCF GRR IEPR (continued)

Task	Action	Due Date
6[a]	Battelle convenes Comment-Response Teleconference with panel members and USACE	7/10/2015
	Battelle submits pdf printout of DrChecks project file to USACE	7/24/2015
	ADM Meeting (Estimated Date)	7/17/2015
	CWRB Meeting (Estimated Date)[b]	12/8/2015
	Contract End/Delivery Date[c]	10/26/2015

[a] *Task 6 occurs after the submission of this report.*

[b] *The ADM and CWRB meetings were listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.*

[c] *A time extension will be needed to account for the CWRB Meeting being held after the Contract End/Delivery Date.*

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: geotechnical engineering, hydrologic and hydraulic engineering, economics/Civil Works Planning, and biology/ecology. The Panel reviewed the ARCF GRR document and produced 17 Final Panel Comments in response to 19 charge questions provided by USACE for the review. This charge included two overview questions and a public comment question added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed 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 ARCF GRR IEPR review document. The following summarizes the Panel's findings.

Based on the Panel's review, the review documents are clearly written, well-organized, and very thorough. Although voluminous, the ARCF GRR review documents were manageable considering the complexity and history of the watershed. The Panel did, however, identify elements of the project that require further verification and explanation and sections of the GRR and Draft EIS/EIR that should be clarified, revised, or discussed in greater detail.

Hydrologic and Hydraulic (H&H) Engineering: Based on the review of the GRR and the H&H Appendices, the Panel was not clear as to why the hydraulic profile for the future without-project (FWOP) condition is significantly higher than the profile for Alternative 1. This was of primary concern to the Panel. If the baseline condition is not correct, there is a high risk that the flood damage estimates will be incorrect. If, on the other hand, Alternative 1 is incorrect, then there is a risk that the National Economic Development (NED) plan has not been identified. USACE can address this by verifying the baseline conditions and Alternative 1 profiles in the Hydraulic Appendix and adjust analysis, as necessary. The Panel also noted the critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand. USACE can address this by verifying the critical volume durations in the text vs. Figure A-1 and modify text or graph, as necessary. Finally, the Panel noted the 1-year event stage data were not described in sufficient detail to understand how they were derived. USACE can address this matter by adding a brief description of the meaning of "1-year event" for clarification, since a 1-year event cannot be statistically quantified.

Economics/Civil Works Planning: The ARCF GRR adheres to sound planning principles and USACE regulations and policies. The analyses of the alternatives were complete and reasonable. The Panel noted the GRR describes work the non-Federal sponsors have done, and are currently doing, to improve the levee systems in the study area; however, it was not clear to the Panel why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project (FWOP) condition. USACE can address this matter by explaining why it is anticipated that local interests will not make improvements to the levee system in the FWOP condition. The Panel also did not understand the need for several of the planning objectives as some were redundant or not appropriate to fully evaluate alternatives. USACE can address this by streamlining the planning objectives in order to focus the evaluation of alternatives on the most critical metrics. The Panel also noted there was no indication that a systems approach was taken to ensure the Tentatively Selected Plan (TSP) provides an optimum solution; in the future, the Panel urges USACE to implement a systems planning approach.

Biology/Ecology: From a biological resources perspective, an appropriate range of measures were considered within the constraints of meeting the project need and objectives; however, some biological resources in the study area potentially affected by project implementation have not been addressed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis. USACE can address these biological resource issues by adding to and clarifying the EIS/EIR. Not addressing or mitigating (if needed) these potential project-related impacts would increase the risk to special-status species and other biological resources and may affect project approval/implementation. The Panel noted that baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented. USACE can address these issues by discussing existing conditions for invasive plants/noxious weeds in the project area, discussing construction-related impacts in the effects analysis, and considering whether mitigation to prevent invasive plant spread during construction is needed.

Geotechnical Engineering: Geotechnical issues were heavily considered (e.g., levee fragility curves, risk calculations, seismic performance approach) and resolved in the previous two IEPRs (TCN09036). Given that history, the Panel found very few issues with the ARCF GRR. For example, the Panel noted the Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches. Without cross-sections, it is difficult to evaluate the reasonableness of the geotechnical analyses. USACE can address this matter by providing an illustrative, interpretive cross-section of each of the five index points where geotechnical analysis was conducted, and showing topography, subsurface conditions, water levels, phreatic surfaces, and the failure modes considered. The Panel also noted the seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified. To address this matter, USACE can describe seismic vulnerability and post-earthquake remediation strategies in the GRR, and consider the cost of post-earthquake remediation in the economic analysis.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

It is not clear why the hydraulic profile for the future without-project condition is significantly higher than the profile for Alternative 1.

Basis for Comment

Based on Section 3.4 of the Hydraulic Appendix Executive Report (Appendix C, Attachment B of the GRR), the future without-project (FWOP) conditions "will serve as the baseline for alternative comparison" in this GRR and, based on Section 2.2 of the Hydraulic Appendix, the FWOP conditions include the change in operations at Folsom Dam due to the Joint Federal Project (JFP).

In Plate 44 of the Hydraulic Appendix, the 200-year water surface profile for the baseline condition (i.e., FWOP) appears to be significantly higher than the profile for Alternative 1. Based on the information above, it would seem that, hydraulically, Alternative 1 would only be affected by raised levee heights south of the American River confluence, which in turn would potentially cause Alternative 1 to be higher than the baseline condition. In addition, since the Natomas levees are not being raised for this analysis and therefore would have no effect on the baseline condition or Alternative 1, the baseline condition would not be expected to be higher than Alternative 1.

For the 10-year flood event, it is not clear why the baseline and Alternative 1 would be any different (see Plate 42 as an example) since the 10-year event would not be expected to overtop levees under either condition.

Plates 42 and 44 represent examples of the two profile issues noted above. These issues are apparent on several other profiles between Plates 31 to 56. Each profile represents a different reach of the rivers and canal systems for either the 10-year (Plates 31 to 43) or the 200-year (Plates 44 to 56) events.

Significance – High

If the baseline condition is not correct, there is a high risk that the flood damage estimates will be incorrect. If, on the other hand, Alternative 1 is incorrect, then there is a risk that the National Economic Development (NED) plan has not been identified.

Recommendation for Resolution

1. Verify the baseline conditions and Alternative 1 profiles on all Plates 31 to 56 in the Hydraulic Appendix Executive Report and adjust analysis as necessary.

Final Panel Comment 2

Details as to why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project condition are not included in the GRR.

Basis for Comment

The GRR describes work the non-Federal sponsors have done, and are currently doing, to improve the levee systems in the study area. However, the FWOP condition described in the report assumes that no additional improvements will be made to the levee system by USACE, the non-Federal sponsors, or other local agencies. It is not clear why local interests would not continue or even increase their efforts to make improvements to the levee system if no USACE project was anticipated. A clear understanding of the rationale supporting the projected FWOP condition is needed to provide confidence in the results of the evaluation and comparison of alternative plans.

Significance – Medium

If, in the future, non-Federal agencies would continue to make improvements to the levee system in the absence of a Federal project, then the flood risk management benefits of the action alternatives for the ARCF GRR may be overstated.

Recommendation for Resolution

1. Explain in the GRR and Economics Appendix why it is anticipated that local interests will not make improvements to the levee system in the FWOP condition.

Final Panel Comment 3

Baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented.

Basis for Comment

The Draft EIS/EIR does not discuss the baseline conditions for invasive plants in the project area (e.g., their presence or potential to occur) and how project implementation could result in their introduction or spread. For example, invasive plants could be inadvertently 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. In addition, 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 plant seeds or plant material that could become established in the project area.

Executive Order 13112 (E.O.13112, 1999), which established a National Invasive Species Council, directs all Federal agencies to prevent the introduction and control the spread of invasive species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. If significant impacts could occur, standard invasive plant management practices are available and should be considered as part of the project design or mitigation. However, the Draft EIS/EIR does not present an effects analysis of invasive plant spread as a result of project construction.

Significance – Medium

The Draft EIS/EIR is not clear whether the effects related to invasive plants have been adequately evaluated and, if needed, mitigated. The potential for construction-related introduction and spread of invasive species that is not addressed or mitigated would elevate the risk to native biological communities and may affect project approval/implementation.

Recommendations for Resolution

1. Discuss existing conditions for invasive plants/noxious weeds in the project area in Section 3.6 (Vegetation and Wildlife) of the Draft EIS/EIR. If recent field or other site-specific data to characterize invasive plant conditions in the study area are not available, then a summary of the expected or likely conditions there based on land cover types, levels of disturbance, and known invasive plant occurrences in nearby areas would be adequate.
2. Discuss construction-related impacts in the effects analysis and consider whether mitigation to prevent invasive plant spread during construction is needed.

Literature Cited:

E.O. 13112 (1999). Invasive Species. Executive Order 13112, 64 Federal Register 6183 (February 8, 1999). Available online at http://www.gpo.gov/fdsys/pkg/FR-1999-02-08/pdf/99-3184.pdf

Final Panel Comment 4

Some biological resources in the study area potentially affected by project implementation have not been analyzed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis.

Basis for Comment

The Panel found that several biological resource issues were not addressed or presented clearly in the Draft EIS/EIR. The following points summarize the Panel's concerns:

- Although the Draft EIS/EIR discusses vegetation/habitat types within the study area, it does not include supporting figures/maps showing the distribution and types of land cover and other biological resources in the study area potentially affected by project implementation. Detailed representations of the distribution and types of land cover and other potentially affected biological resources, using graphics and/or tables, are important for describing the existing conditions and evaluating potential impacts. Also important would be a table that quantifies (in acres) and compares the amount of each land cover type, including waters of the U.S., assumed to be affected under each alternative.
- In Section 3.6 (Vegetation and Wildlife), it is not clear whether or how the vegetation variance to protect riparian vegetation on the waterside of improved levees was factored into the quantification of riparian vegetation impacts (locations, acreages). It is important to describe whether the estimate of riparian/Shaded Riverine Aquatic (SRA) habitat loss presented in the analysis already accounts for reduced impacts under the vegetation variance.
- Section 3.8 (Special-Status Species) does not address any special-status plant species, which include those considered by California Department of Fish and Wildlife (CDFW) to be "rare, threatened or endangered in California" and have a California Rare Plant Rank (CRPR); listed or designated as a candidate as threatened or endangered under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA); etc. For projects subject to California Environmental Quality Act (CEQA), effects on special-status plant species must be considered. In addition, effects on special-status plant species are included in the "Basis of Significance" for evaluating impacts in the Draft EIS/EIR (p.127); however, they are not mentioned elsewhere in the environmental setting or impact analysis.
- Section 3.8 lacks discussion and analysis of several special-status species that could occur in the study area and be affected by project implementation, such as burrowing owl, tricolored blackbird, northern harrier, special-status bats, and others.
- The quantification of impacts on elderberry shrubs and valley elderberry longhorn beetle (VELB) is not clear. Tables 9, 10, and 11 of the Draft Biological Assessment (BA, p. 71) summarize the number of elderberry shrubs and stems that would be affected, observed exit holes, and proposed compensation for loss of shrubs. However, on page 65, the BA states: "The Corps conducted surveys in 2012 of the levee systems within the action area … The survey located elderberry clusters, however, actual shrubs, stem size, nor exit hole presence were determined." These two statements appear inconsistent. Because VELB is listed as threatened under ESA, and the U.S. Fish and Wildlife Service (USFWS) requires the implementation of specific mitigation requirements for impacts on VELB and its habitat (elderberry shrubs), clarifying how impacts on elderberry shrubs and VELB were estimated is important for evaluating the adequacy of the impact analysis and proposed mitigation.

- In the Draft EIS/EIR, tree removal is discussed in adequate detail. However, how it relates specifically to compliance or conflict with the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, or the City of Sacramento Protection of Trees Ordinance is not discussed. Conflict with these plans and ordinances is listed as a criterion for significance in the Draft EIS/EIR (p. 98). However, how the proposed mitigation would achieve compliance with these plans and ordinances is not described.
- Section 3.6 (Vegetation and Wildlife) does not fully discuss project-related impacts on Federally protected wetlands and other waters of the United States, and how those effects would be mitigated (e.g., completion of a wetland delineation and appropriate compensation, as needed). The effects on stream habitats protected under Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) and mitigation of those effects are also not addressed.
- The discussion of cumulative effects on special-status species in the Draft EIS/EIR (Section 4.2.4) is limited to only special-status fish and giant garter snake. However, other special-status species evaluated in Section 3.8 (Special-Status Species) (e.g., valley elderberry longhorn beetle, Swainson's hawk, etc.) belong in the cumulative effects analysis.

Significance – Medium

Some of the biological rationale and evidence to evaluate the magnitude of effects and support the conclusions are not clearly presented, which is a substantive issue for California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review. Not addressing or mitigating (if needed) these potential project-related impacts would increase the risk to special-status species and other biological resources and may affect project approval/implementation.

Recommendations for Resolution

1. Prepare and add to the Draft EIS/EIR figures that depict biological resources within the study area, including vegetation/habitat types in relation to proposed project features.
2. Add a table in Section 3.6 that quantifies (in acres) and compares the amount of each land cover type, including waters of the U.S., assumed to be affected under each alternative.
3. Clarify in Section 3.6 whether the vegetation variance to protect riparian vegetation on the waterside of improved levees was factored into the quantification of riparian vegetation impacts (locations, acreages); describe whether the estimate of riparian/SRA habitat loss presented in the analysis already accounts for reduced impacts under the vegetation variance.
4. In Section 3.8, define which categories of special-species were evaluated (e.g., species listed as threatened or endangered under ESA or CESA, designated by CDFW as species of special concern, Fully Protected under the California Fish and Game Code, plant species with a CRPR rank [formerly California Native Plant Society list], etc.)
5. Add an analysis of special-status plant species to Section 3.8, including information on existing conditions, a table that summarizes special-status plant species with potential to occur in the study area (similar to Table 17 for wildlife), an analysis of potential effects, and proposed mitigation.
6. Expand the analysis in Section 3.8 to include all special-status animal species with potential to occur in the study area (e.g., add species such as tricolored blackbird, northern harrier, special-status bats, etc.). In Table 17, include all special-status animals initially considered or with potential to occur. For any of those species that could occur and be affected, analyze potential

effects of project implementation and, if needed, describe the proposed mitigation for any significant effects. For a more complete list and discussion of species in the area, refer to USACE's West Sacramento Project EIS/EIR.

7. In the Draft BA and the Draft EIS/EIR, clarify how impacts on elderberry shrubs and VELB were quantified from the survey data; resolve the inconsistency in survey information presented in pages 65 and 71 of the Draft BA.
8. In Section 3.6, add a discussion of tree removal as it relates to compliance or conflict with the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, or the City of Sacramento Protection of Trees Ordinance. Describe whether tree removal would conflict with these plans and ordinances, and how the proposed mitigation would achieve compliance with these plans and ordinances.
9. In Section 3.6, add a discussion of project-related impacts on Federally protected wetlands and other waters of the United States, and how those effects would be mitigated (e.g., completion of a wetland delineation and appropriate compensation, as needed). Also discuss the effects on stream habitats protected under Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) and mitigation for those effects.
10. In Section 4.2.4, expand the discussion of cumulative effects to include all special-status species addressed in Section 3.8 (e.g., VELB, Swainson's hawk, etc.).

Final Panel Comment 5

The justification to use a content-to-structure value ratio of 50% to calculate the value of contents of residential structures has not been explained and the reasonableness of this ratio is unknown.

Basis for Comment

The damageable value of the contents of residential structures is estimated to be over $12 billion. This is the second highest category of damageable property for structures or contents – only the damageable value of residential structures is higher. The Economics Appendix (Section 2.7) describes significant field investigation and analyses for estimating the damageable value of residential and non-residential structures.

Given the magnitude of the value of damageable contents of residential structures, it is important that the methodology or rationale for estimating the value be presented. The Economics Appendix (p. 29) states that a 50% content-to-structure ratio was used. The evidence provided to support this assumption is that it was used in prior American River Watershed studies. The GRR does not offer an explanation of why a 50% content-to-structure value ratio is reasonable for use in this study, or how it is specific to the study area and the period of analysis.

Significance – Medium/Low

The value of damageable contents of residential structures represents a significant portion of the total damageable property and requires an explanation of why use of a 50% content-to-value ratio is reasonable in order to provide confidence in the computed flood damages.

Recommendation for Resolution

1. Provide an explanation in the Economics Appendix of why use of a 50% content-to-structure value ratio is appropriate to calculate damageable property for this study.

Final Panel Comment 6

The magnitude of impacts and level of significance for the effects of sedimentation and turbidity on fisheries resources are not easily determined.

Basis for Comment

The analysis presented in Section 3.7 (Fisheries) of the Draft EIS/EIR concludes that an increase in sedimentation and turbidity would result from project construction. In-stream effects such as suspended sediment, turbidity, and sediment deposition is mentioned generally, but the specific types and expected magnitude of these effects under each alternative are not described.

In terms of the specific significance criteria used for fisheries resources (Draft EIS/EIR, p.111), it is not clear how the level of significance was determined. For example, it is not certain what assumptions were made about the amount of increased sedimentation and turbidity that would be considered substantial and therefore significant.

Significance – Medium/Low

Without a discussion of the specific types and magnitude of impacts on fisheries resources relative to baseline conditions, the quality and completeness of the analysis are limited, and the biological rationale to support the conclusions and adequacy of proposed mitigation (e.g., BMPs) are not clear.

Recommendations for Resolution

1. Expand the discussion of anticipated project effects on fisheries resources. The discussion should describe impact mechanisms and the types and magnitude of biological effects. Any applicable modeling projections for project-generated in-stream effects (e.g., sediment and turbidity) and/or modeling of effects on fish habitat that may have been conducted for the project would be appropriate to reference in the fisheries analysis.
2. Discuss the assumptions made about the amount of project-related increased sedimentation and turbidity (relative to baseline conditions) that would result from project implementation, and the amount that would be considered substantial and therefore significant. If any amount of increase is considered significant, then clarify that point.

Final Panel Comment 7

It is unclear why several of the planning objectives are required; some are redundant or not appropriate to fully evaluate alternatives.

Basis for Comment

Limiting the number of planning objectives (and associated metrics) to only those that are necessary to fully evaluate alternatives helps focus the planning process and helps clarify decision making. The GRR presents five planning objectives. The first two appear to be redundant: (1) reduce the probability of flooding, based on annual exceedance probability (AEP), and (2) reduce the consequences of flooding, based on expected annual damages (EAD). The probability of flooding (AEP) is only useful for comparing alternatives if the consequences of flooding are known. The EAD is a measure of both the probability and consequences of flooding. If EAD is used, evaluation of AEP provides no additional information that is useful to decision-making and should not be included.

Given that Sacramento is the state capital and is home to many agencies that are responsible for administering essential state programs, the third planning objective (to reduce impacts on critical infrastructure) provides important information to decision makers that is not addressed in the EAD (or the AEP) and should be retained.

The final two planning objectives identified in the GRR (to encourage wise use of the floodplain and to educate the public about residual risks) are non-structural management measures directed at the objective of reducing EAD. They are a means of achieving an objective. Furthermore, these measures are already in place as part of the existing flood risk management project for the American River. Since the final two planning objectives (to encourage wise use of the floodplain and to educate the public about residual risks) are management measures that should be part of the FWOP condition, they should be eliminated as planning objectives.

The five planning objectives established in the GRR could be reduced to two without losing any information that would be critical to decision making. The remaining planning objectives would be:

1. Reduce flood risk in the study area as measured by the EAD
2. Reduce impacts on critical infrastructure.

Significance – Medium/Low

Streamlining the planning objectives will focus the evaluation of alternatives on the most critical metrics and will simplify decision-making.

Recommendations for Resolution

1. Combine the first and second planning objectives into one: reduce the EAD in the study area. This captures both the frequency of flooding and the consequences of flooding in one metric.
2. Eliminate the final two planning objectives (to encourage wise use of the floodplain and to educate the public about residual risk) and add them to the FWOP condition.

Final Panel Comment 8

The basis for the assumption that the project will receive total Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire 10-year implementation period has not been provided, and the construction period may be too short, which would result in an underestimate of the cost of interest during construction.

Basis for Comment

GRR Table 5-5 summarizes annual Federal and non-Federal funding for implementation of the project (e.g., design, land acquisition, construction) from 2018 through 2027: $29 million to $128 million per year in Federal funding and an additional $16 million to $91 million per year in non-Federal funding. The GRR assumes the project will receive Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire period. The Panel cannot determine whether this is a reasonable funding schedule since the GRR does not provide a rationale for the schedule. In addition, there are several concurrent Federal and non-Federal projects competing for the same funding. If funds are not available at the assumed schedule, the project will accrue additional interest costs that have not been considered in the economic analysis of the TSP.

Significance – Medium/Low

If funding is not available at the proposed schedule, additional interest costs may be incurred. However, given the high benefit-to-cost ratios, this should not affect the recommendation of the TSP or justification of the project.

Recommendations for Resolution

1. Add a description of the basis for the assumption that the project will receive $44 million to $197 million per year during the implementation of the project, including an explanation of why concurrent Sacramento District project funding requirements will not impact the availability of funds for this project.
2. Provide a revised funding schedule to evaluate the potential impact on the TSP benefit-to-cost ratio to account for additional interest costs if the project completion date is extended.

Final Panel Comment 9

The rationale and process for selecting the index points are not described or consistently listed in figures, making it difficult to assess whether the index points are representative of potential economic impacts.

Basis for Comment

The GRR does not discuss the relevance of the index points to the extent of flood plain inundation or land use/density. It is therefore unclear whether these index points provide a representative assessment of potential economic impacts. The GRR (and its supporting appendices) discusses the selection of index points used to calculate annual damages on the basis of hydraulic reaches defined by geotechnical conditions. The GRR (p. 3-31) states that index points "are located on the main flood sources, were chosen in order to be able to reasonably characterize the flood risk associated with each of the three main basins by accounting for the multiple sources of flooding in each basin." Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report) provides the cross-sectional detail of the selected index points, while the Hydraulic Appendix Executive Report provides hydraulic inputs to the various index points.

The Economics Appendix states (p. 24) that 25 reaches were identified and five were selected by the project team for use in economic modeling and the associated without-project damage and with-project benefit analyses; however, no explanation is provided for why the 25 reaches were reduced to five or how the five were selected. Three additional points were added at locations where there are no levees. An additional index point ARS B was added, but only used to "estimate damages associated with emergency cost losses." The Economics Appendix references Figure 7 relative to the location of the index points used in the economics analysis; however, ARS B is not shown on the figure.

In addition, Figure 8 from the Hydraulic Appendix Executive Report also does not include all index points that were considered, and the Geotechnical Report references Plate 2 as showing the index point location; however Plate 2 was not included in the review materials.

Significance – Medium/Low

A concise explanation of the basis for index point selection will add clarity to the report and provide additional justification for the economic analysis.

Recommendations for Resolution

1. Explain the rationale for index point selection.
2. Include Index Point ARS B on Figure 7 of the Economics Appendix.
3. Confirm that all the figures showing index points in the various appendices are consistently listed.

Final Panel Comment 10

The Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches.

Basis for Comment

As summarized in Section 8.0 of Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report), five index points were selected to represent the critical levee section throughout the project. While the sections are generally described, there are no interpretive cross-sections showing the surface and subsurface conditions, the water levels considered, proposed improvements, or failure mechanisms considered. The clarity of the geotechnical analysis would be greatly enhanced by the inclusion of interpretive cross-sections.

Significance – Medium/Low

Without cross-sections it is difficult to evaluate the reasonableness of the geotechnical analyses summarized in the appendix.

Recommendations for Resolution

1. Provide an illustrative, interpretive cross-section of each of the five index points where geotechnical analysis was conducted
2. Show topography, subsurface conditions, water levels, phreatic surfaces, and the failure modes considered.

Final Panel Comment 11

The seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified.

Basis for Comment

The GRR does not address the seismic vulnerability of the project levees. However, Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report) indicates that the liquefaction potential is high at all of the reaches for Natomas Basin, Reach A of the American River, and Reaches C to G of the American River southern Basin. Furthermore, the Geotechnical Report (p. 21) states that post-earthquake deformation as a result of liquefaction is a "global or structural failure mode that is very likely to compromise the ability to provide flood protection at these critical locations."

While neither USACE (USACE, 2011) nor the local sponsor under California Department of Water Resources (DWR) guidance (URS, 2012) commonly undertakes levee improvements to address seismic stability, the typical practice is to evaluate the range of deformations that could be sustained during a 200-year earthquake. Once a range of deformations has been evaluated, a post-earthquake remediation plan is developed that addresses emergency preparations, mobilization, data gathering, actions, interim repairs, long-term repairs, and public notification. Costs will be associated with planning and post-earthquake response; however, the Panel cannot determine if these costs have been considered.

Significance – Medium/Low

USACE and the local sponsor will be responsible for earthquake preparedness and post-earthquake remediation; whether costs have been allocated to these activities cannot be determined.

Recommendations for Resolution

1. Describe seismic vulnerability and post-earthquake remediation strategies in the GRR.
2. Consider the cost of post-earthquake remediation in the economic analysis and allocate the cost among Federal and non-Federal interests.

Literature Cited:

USACE (2011). Guidelines for Seismic Stability Evaluation of USACE Levees. U.S. Army Corps of Engineers Sacramento District. December 2.

URS (2012). Development of a 200-year Return Period Seismic Hazard Map for the Urban Levee Evaluation Program. URS Corporation, California DWR Urban Levee Evaluation Program. February 24.

Final Panel Comment 12

It is not clear in the GRR whether a water control plan has been developed and will be adopted when construction of the Joint Federal Project auxiliary spillway at Folsom Dam is complete.

Basis for Comment

The GRR states that a new water control manual will be adopted when the Folsom Dam Joint Federal Project (JFP) is complete. This water control plan will specify an operating strategy that will govern future discharges from the dam, allowing larger discharges to be made when lake stages are at lower levels. The rate and frequency of discharges from Folsom Dam are important factors affecting the risk of flooding in the study area.

Although the water control plan is adequately defined in the Hydrology Appendix to the GRR, it is not clear in the GRR itself whether the plan defined in the Hydrology Appendix has been developed and will be adopted when the JFP is complete or whether the plan is under development. The likelihood that the operating strategy for the water control plan assumed in the GRR could change in the future is not made clear in the GRR.

Significance – Low

A description of the water control plan that is assumed to be in place for the future without- and with-project conditions will provide a better understanding of how the alternative plans were evaluated.

Recommendation for Resolution

1. Add a brief description to the GRR defining the Folsom Dam water control plan that is assumed in the GRR for the future without- and with-project conditions.

Final Panel Comment 13

Several of the proposed non-structural management measures are already in place and should not be considered management measures in the GRR.

Basis for Comment

The GRR is evaluating the feasibility of modifying an existing flood risk management project that is being operated in accordance with laws, executive orders, policies, and regulations that are applicable to USACE flood risk management projects.

Executive Order 11988 (1977) directs Federal agencies to "… avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." Accordingly, the terms of local cooperation for USACE flood risk management projects (including the existing American River Project) require non-Federal sponsors to (among other things):

- Prepare and implement a floodplain management plan designed to reduce the impact of future flood events in the project area (ER 1105-2-100; USACE, 2000).
- Not less than once each year, inform affected interests of the extent of protection afforded by the project.

The terms of local cooperation for USACE flood risk management projects require that the non-Federal sponsors implement several measures that are included as non-structural management measures considered for the GRR. Non-structural management measures identified in the GRR that are currently requirements of local cooperation are floodplain management, providing floodplain information to regulatory agencies, local building codes, annual publication of residual risks, and a Federal flood insurance program (USACE, Project Partnership Agreements website). Since these measures should be in place now and in the future, it is not appropriate to include them as management measures for consideration in the GRR. Including these non-structural management measures in the GRR implies that they are not currently in place or will not be in place in the future. Since these measures should be in place now and in the future, they should be part of the FWOP condition.

Significance – Low

Elimination of non-structural management measures that are currently in place as requirements of local cooperation for the existing flood risk management project will reduce the potential for confusion and improve the overall understanding of the proposed versus existing non-structural management measures for the project.

Recommendation for Resolution

1. Review the proposed set of non-structural management measures and eliminate those that are currently in place.

Literature Cited:

E.O. 11988 (1977). Executive Order 11988 – Flood Plain Management. 42 FR 26951, 3 CFR, 1977 Comp. Issued May 24, 1977. Available online at: https://www.fema.gov/executive-order-11988-floodplain-management.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. U.S. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

USACE. Project Partnership Agreements. U.S. Army Corps of Engineers Headquarters website. Online at: http://www.usace.army.mil/Missions/CivilWorks/ProjectPartnershipAgreements.aspx

Final Panel Comment 14

The critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand.

Basis for Comment

Section A-3 (p. B2-2) of the Hydrology Executive Report (Appendix C, Attachment A of the GRR) first refers to Figure A-1 when discussing inflow hydrographs into the Folsom Reservoir. Figure A-1 appears to show flood waves composed of 4-day volumes. This section then notes that "The 3-day duration is considered the most critical within the American River Basin." The connection between the text and the figure is unclear.

Significance – Low

The discrepancy between Figure A-1 and the text of Section A-3 is confusing; if the analysis is based on the incorrect critical duration, the results of the hydrologic analyses may be different than documented.

Recommendations for Resolution

1. Verify the critical volume durations in the text vs. Figure A-1 and modify text or graph, as necessary.
2. If text and graph are correct, add text to Section A-3 to clarify the relationship between the stated 3-day critical duration and Figure A-1.

Final Panel Comment 15

The reason for updating the flow record with additional data for Arcade Creek but not Dry Creek is unclear.

Basis for Comment

Sections 5.2 (p. B3-11) and 6.2 (p. B3-14) of the Hydrology Executive Report (Appendix C, Attachment A of the GRR) both state that updating the flow record with additional data did not seem to make much difference in the frequency curves. However, while the data for Dry Creek were not updated (Section 5.2), the data for Arcade Creek were updated with Peer Review statistics (Section 6.2). The Panel did not find any explanation for these decisions.

Significance – Low

The two different responses to updating the flow record without a rationale for the decisions is confusing and/or may suggest bias in the frequency curves.

Recommendation for Resolution

1. Provide additional text in Section 6.2 or both sections (Sections 5.2 and 6.2), as needed, to clarify the decision to update one set of data and not the other.

Final Panel Comment 16

The use of the 1-year event stage data has not been described in sufficient detail to understand how it was derived.

Basis for Comment

Section 6.2 of the Hydraulic Appendix Executive Report (Appendix C, Attachment B of the GRR) states (p. 24) that "1-year and 2-year event stage data was derived via a different process using gage data." A "1-year event" is a statistical impossibility, indicating that it has a 100% chance of being equaled or exceeded in any given year.

The Panel also noted that Section 5 of the Memorandum for the Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) Inputs (USACE, 2013) references use of the 99% event. It may be that this is what is meant by a "1-year event." Plates 2 through 9 of the same memorandum indicate that "1yr = .999" (or 99.9% ACE)

Significance – Low

The reference to a "1-year event" is confusing and affects the understanding of how stage data were derived.

Recommendation for Resolution

1. Add a brief description of the meaning of "1-year event" for clarification, since a 1-year event cannot be statistically quantified.

Literature Cited:

USACE (2013). Memorandum for File: American River Common Features GRR Feasibility Study. HEC-FDA Inputs. U.S. Army Corps of Engineers, Hydraulic Analysis Section, Sacramento District, Sacramento, CA. 15 May.

Final Panel Comment 17

The level of significance of impacts on biological resources after mitigation is not presented in sufficient detail.

Basis for Comment

In the Draft EIS/EIR, Table ES-3 summarizes environmental effects, mitigation, and levels of significance for each alternative. Under the "Vegetation and Wildlife" category (p. ES-11), the effects are listed as "significant" (with mitigation incorporated). At the mid-review of the IEPR, the Panel asked USACE if that means the conclusion is "significant and unavoidable," even with mitigation incorporated; and, if so, whether that was because permanent loss of riparian vegetation is assumed despite compensatory mitigation. In response, USACE clarified that long-term effects on vegetation would be less than significant with the compensatory mitigation; however, the short-term effect would be significant and unavoidable due to the temporal loss of habitat (because of the amount of time it takes for the new habitat to reach the same quality). The Panel agrees with USACE that addressing both short- and long-term effects of project implementation on vegetation is a good approach for this project. However, if separate significance findings are concluded and presented for short- and long-term effects, then those should be clarified and stated in the appropriate sections of the EIS/EIR (i.e., Executive Summary and Section 3.6) for clarity. Clarifying this would make the link between the specific impact and proposed mitigation more transparent.

For biological resources impacts discussed in Sections 3.6 (Vegetation and Wildlife), 3.7 (Fisheries), and 3.8 (Special-Status Species), the level of significance after mitigation is not clearly presented. These sections lack a conclusion about which potentially significant effects have been reduced to a less-than-significant level and why, and which have not.

Significance – Low

The biological rationale and evidence to support the conclusions of the analysis of impacts on biological resources are not consistent or clearly presented, which limits the completeness and technical quality of the Draft EIS/EIR. The nexus between the context, intensity, and significance (per NEPA and CEQA requirements) is important for supporting the analysis, conclusions, and whether proposed mitigation is adequate.

Recommendations for Resolution

1. For the biological resources impact discussions presented in Sections 3.6, 3.7, and 3.8 of the Draft EIS/EIR, add a conclusion statement about which potentially significant effects have been reduced to a less-than-significant level and why, and which (if any) have not. (For consistency, this revision could be made to all of the resource sections.)
2. Review and, if needed, revise Table ES-3 to make it consistent with the analysis conclusions for biological resources.

5. REFERENCES

E.O. 11988 (1977). Executive Order 11988 – Flood Plain Management. 42 FR 26951, 3 CFR, 1977 Comp. Issued May 24, 1977. Available online at: https://www.fema.gov/executive-order-11988-floodplain-management.

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OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

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URS (2012). Development of a 200-year Return Period Seismic Hazard Map for the Urban Levee Evaluation Program. URS Corporation, California DWR Urban Levee Evaluation Program. February 24.

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APPENDIX A

IEPR Process for the ARCF GRR Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule followed in executing the American River Common Features General Re-evaluation Report Independent External Peer Review (hereinafter: ARCF GRR IEPR). Due dates for milestones and deliverables are based on the award/effective date of June 16, 2014. The review documents were on hold from June 2014 to March 2015. The schedule in Table A-1 reflects this gap. The review documents were provided by USACE on March 13, 2015. Note that the work items listed under Task 6 occur after the submission of this report.

Battelle will enter the 17 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. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

Table A-1. ARCF GRR Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	6/16/2014
	Review documents available	3/13/2015
	Public Comments Provided	5/21/2015
	Battelle submits draft Work Plan[a]	6/24/2014
	USACE provides comments on draft Work Plan	6/27/2014
	Battelle submits final Work Plan[a]	3/27/2015
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	6/25/2014
	USACE provides comments on COI questionnaire	6/27/2014
	Battelle submits list of selected panel members[a]	2/12/2015
	USACE confirms the panel members have no COI	2/13/2015
	Battelle completes subcontracts for panel members	2/18/2015
3	Battelle convenes kick-off meeting with USACE	6/19/2014
	Battelle sends review documents to panel members	3/16/2015
	Battelle convenes kick-off meeting with panel members	3/25/2015
	Battelle convenes kick-off meeting with USACE and panel members	3/25/2015
4	Panel members complete their individual reviews	4/22/2015
	Battelle provides panel members with talking points for Panel Review Teleconference	5/5/2015

Table A-1. ARCF GRR Complete IEPR Schedule (continued)

Task	Action	Due Date
4	Battelle convenes Panel Review Teleconference	5/5/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	5/11/2015
	Panel members provide draft Final Panel Comments to Battelle	5/14/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	5/14/2015 – 5/30/2015
	Panel finalizes Final Panel Comments	6/1/2015
	Battelle receives the public comments from USACE	5/21/2015
	Battelle sends public comments to Panel	5/21/2015
	Panel completes their review of the public comments	5/28/2015
	Battelle and Panel review Panel's responses to public comments, and confirms no new Final Panel Comment will be generated	5/28/2015
5	Battelle provides Final IEPR Report to panel members for review	6/2/2015
	Panel members provide comments on Final IEPR Report	6/2/2015
	Battelle submits Final IEPR Report to USACE[a]	6/3/2015
	USACE Planning Center of Expertise (PCX) Provides Decision on Final IEPR Report Acceptance	6/5/2015
6[b]	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	6/9/2015
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	6/9/2015
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	6/10/2015
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	6/23/2015
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	6/29/2015
	USACE PCX provides draft PDT Evaluator Responses to Battelle	6/30/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	7/1/2015
	Panel members provide Battelle with draft BackCheck Responses	7/7/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	7/9/2015
	Battelle convenes Comment-Response Teleconference with panel members and USACE	7/10/2015

Table A-1. ARCF GRR Complete IEPR Schedule (continued)

6[b]	USACE inputs final PDT Evaluator Responses to DrChecks	7/17/2015
	Battelle provides final PDT Evaluator Responses to panel members	7/20/2015
	Panel members provide Battelle with final BackCheck Responses	7/22/2015
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	7/23/2015
	Battelle submits pdf printout of DrChecks project file[a]	7/24/2015
	Agency Decision Milestone Meeting (Estimated Date)	7/17/2015
	CWRB Meeting (Estimated Date)[c]	12/8/2015
	Contract End/Delivery Date[d]	10/26/2015

a Deliverable.

b Task 6 occurs after the submission of this report

c The CWRB meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.

d A time extension will be needed to account for the CWRB Meeting being held after the Contract End/Delivery Date.

At the beginning of the Period of Performance for the ARCF GRR IEPR, 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). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 16 charge questions provided by USACE, two overview questions added by Battelle, and one public comment question (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review (and once they were under subcontract), all the 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. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the ARCF GRR review documents and reference materials listed below. The documents and files in **bold font** were provided for review; the other documents were provided for reference or supplemental information only.

- **Feasibility Report (231 pages)**
- **Appendix A: Plan Formulation (8 pages)**
- **Appendix C: Engineering (57 pages)**
- **Appendix C, Attachment A: Hydrology Executive Report (181 pages)**
- **Appendix C, Attachment B: Hydraulic Appendix Executive Report (134 pages)**
- **Appendix C, Attachment C: Geotechnical Report (54 pages)**
- **Appendix C, Attachment E: Erosion Protection Analysis (93 pages)**
- **Appendix E: Economics (111 pages)**
- **Appendix F: Public and Agency Comments (i.e., public review comments) (230 pages)**

- **Environmental Impact Statement and Alternative Plates (371 pages)**
- **Appendix A: Coordination Act Report (30 pages)**
- **Appendix B: Special Status Species Lists (12 pages)**
- **Appendix C: Cultural Resources Appendix (240 pages)**
- **Appendix D: Air Quality (186 pages)**
- **Appendix E: Draft 404(b)(1) Analysis (45 pages)**
- **Appendix F: Public Involvement (22 pages)**
- **Appendix G: Draft Biological Assessment (197 pages)**
- **Appendix H: Environmental Site Assessment (43 pages)**
- **Final IEPR Report for the Engineering and Economic Reevaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, American River Common Features (107 pages)**
- **Revised Final IEPR Report for the Engineering and Economic Reevaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, American River Common Features – Optional Increment – Draft Natomas Post-Authorization Change Report and Draft Environmental Impact Statement (105 pages)**
- Appendix B: Review Documentation (183 pages)
- Appendix C: Engineering – Attachment D: Cost Engineering (43 pages)
- Appendix D: Real Estate (68 pages)
- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review,* December 16, 2004.

About halfway through the review of the ARCF GRR IEPR documents, the Panel gave Battelle 12 questions regarding the project. USACE answered the questions via email. Based on a review of the information provided in the email, Battelle and the Panel determined that a mid-review teleconference with USACE was not necessary.

In addition, throughout the review period, USACE provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review. The following additional documents were requested by the Panel:

- Encl 4 - ARCF-WS-Bridging-Doc 18Feb15.pdf (bridging document described in kick-off meeting)
- ANSI_E_Portrait_Orientation.pdf (map of the study area)
- FDA_Inputs_15May2013_w_plates.pdf (originally titled “Technical Memorandum 9 on Hydraulic Uncertainty” listed in the Hydraulic Appendix).

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response table provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to

identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments in a preliminary list of 25 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

A.3 IEPR Panel Teleconference

Battelle facilitated a three-hour teleconference with the Panel so that the panel members 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 should 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 significant importance to the findings, and merged any related individual comments. Battelle confirmed there were no conflicting panel comments to any of the charge questions. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

At the end of these discussions, the Panel identified 17 comments and discussion points that should be brought forward as Final Panel Comments.

A.4 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 ARCF GRR 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 the other panel member 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/high, medium, medium/low, and 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 issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a "showstopper" issue.

  2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the SMART Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the SMART Planning process and has determined that if the issue is not addressed, it could lead to a "showstopper" issue.

  3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the SMART Planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.

  4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.

  5. **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 that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.

- Guidelines 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 determined that two of the Final Panel Comments could be either dropped or merged into other Final Panel Comments; therefore, the total Final Panel Comment count was reduced to 15; however, an additional two Final Panel Comments were submitted for consideration after the panel review teleconference, bringing the total from 15 back to 17 Final Panel Comments. 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. At the end of this process, 17 Final Panel Comments were prepared and assembled. 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 the main report.

A.5 Conduct of the Public Comment Review

On April 29, 2015, USACE notified Battelle the public comment period had been extended by two weeks and would close on May 18, 2015 instead of on/around May 6, 2015. Battelle received a pdf file containing 230 pages of public comments on the ARCF from USACE on May 21, 2015. USACE also provided Battelle annotated guidance on reviewing the 230 pages of public comments. Battelle then sent the public comments and annotated guidance to the panel members on May 21, 2015 in addition to the following charge question:

1. **Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?**

The panel members were charged with responding to the charge question above.

The Panel produced individual comments in response to the charge question. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, Battelle determined and the Panel confirmed that no issues or concerns were identified other than those already covered in the Final Panel Comments.

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APPENDIX B

Identification and Selection of IEPR Panel Members for the ARCF GRR Project

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B.1 Panel Identification

The candidates for the American River Common Features General Re-evaluation Report IEPR (hereinafter: ARCF GRR IEPR) Panel were evaluated based on their technical expertise in the following key areas: geotechnical engineering, hydrologic and hydraulic engineering, economics/Civil Works Planning, and biology/ecology. These areas correspond to the technical content of the ARCF GRR IEPR review documents and overall scope of the ARCF GRR project.

The ARCF GRR award stated that Battelle shall recruit to the extent possible, the previous review panelists for this project. This information was considered in recruiting panel members for this task. Battelle recruited two of the previous review panelists from the Engineering and Economic Re-Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, American River Common Features IEPR (hereinafter: Common Features), which was conducted between 2009 and 2010 under the Army Research Office, Scientific Services Program contract (TCN09036). To identify other 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 evaluated all candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts 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.

The candidates were screened for the following potential exclusion criteria or COIs.[1] These COI questions 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.

- Involvement in any part of the American River Common Features Project, including but not limited to producing the American River Common Features General Re-evaluation Report, supporting appendices, related technical data, and models pertaining to the GRR.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Current or previous employee or affiliation with other project sponsors, including the State of California Central Valley Flood Protection Board (CVFPB – formerly known as The Reclamation Board) and the Sacramento Area Flood Control Agency (SAFCA).

[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."

- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to this project.
- Current personal or firm[2] involvement with other USACE projects, notably if those projects/contracts are with the Sacramento District or South Pacific Division. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by USACE as a direct employee, notably if employment was with the Sacramento District or South Pacific Division. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role.
- Any previous employment by USACE as a contractor (either as an individual or through your firm[2]) within the last 10 years, notably if those projects/contracts were with the Sacramento District or South Pacific Division. 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, provide client/agency and duration of review (approximate dates).
- A significant portion (i.e., greater than 50%) of personal or firm[2] revenues within the last 3 years from USACE contracts.
- Any publicly documented statement made advocating for or against the subject project.
- Participation in relevant prior studies discussed in the detailed project history:
    - American River Watershed Investigation, California, Feasibility Report, December 1991.
    - American River Watershed Investigation, California, Chief of Engineers' report, dated 29 June 1992.
    - American River Watershed Project, California, Supplemental Information Report, March 1996.
    - American River Watershed, California, Chief of Engineers' Report dated 27 June 1996.
    - Supplemental Information Report, American River Watershed Project, California, Main Report and SEIS/EIR Addendum, 18 August 1997.
    - Project Cooperation Agreement between the Department of the Army and the State of California for Construction of the American River Watershed (Common Features), California Project, 13 July 1998.
    - American River Watershed Project, California (Common Features), Information Paper, 16 August 2000.
    - American River Watershed Project (Common Features), California, Second Addendum to the Supplemental Information Report, March 2002.

[2] Includes any joint ventures in which a panel member's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

  - American River (Common Features) Project, California, Project Cooperation Agreement (Contract 460000065 I), Amendment No. 1, 13 June 2003.
  - Memorandum, CESPK-PM-C, Subject: American River Watershed (Common Features), California Project, Pocket and Pioneer Reservoir Levee Improvement Areas- Information Paper, 07 April 2007.
  - Memorandum for Record, CESPK-OC, Inclusion of Levee Repair within the Sacramento Pocket and Pioneer Sites under the American River CF Project, 17 April 2006.
  - American River Watershed Project, Folsom Modification and Folsom Dam Raise Post Authorization Report and Engineering Documentation Report, March 2007.
  - American River Watershed Project, Folsom Modification and Folsom Dam Raise Economic Reevaluation Report, Draft June 2007.
- Participation in major flood risk management initiatives active in Northern California and in the Sacramento Watershed: (All of these efforts are directly influencing the American River Common Features Project.)
  - American River Watershed Program
  - Delta CALFED Program
  - Sacramento River Flood Control Project
  - Sacramento River Bank Protection Project
  - Sacramento and San Joaquin River Basins Comprehensive Study
  - FloodSAFE California
  - SAFCA Development Impact Fee
  - SAFCA Natomas Levee Improvement Project
  - Central Valley Flood Protection Plan
  - California's Public Law 84-99 Eligibility Retention and Flood System Improvement Framework
- Any other perceived COI not listed, such as:
  - Repeatedly served as USACE technical reviewer
  - Paid or unpaid participation in litigation related to the work of the USACE
  - Any other perceived COI not listed
- 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.

Other considerations:

- Participation in previous USACE technical review panels

- Other technical review panel experience.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Three of the four final reviewers are affiliated with consulting companies; the other is an independent consultant. 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 selected the final Panel.

Table B-1 presents an overview of the credentials of the four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information regarding each panel member and his area of technical expertise is given in Section B.3.

Table B-1. ARCF GRR IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Rudolph	Yung	Hornung	Henderson
Geotechnical Engineering				
Minimum 10 years of demonstrated experience in geotechnical studies	X			
Minimum 10 years demonstrated experience in design of flood control works such as dams, levees, floodwalls, and closure structures	X			
Experience in fluvial processes and geomorphology	X			
Expertise in geotechnical risk analysis, specifically the application of probabilistic methods to geotechnical aspects of levees	X			
Experience in site investigation planning	X			
Experience in aspects of flood risk management projects, including				
Minimization of environmental impacts	X			
Static and dynamic slope stability evaluation	X			
Evaluation of the seepage through earthen embankments	X			
Evaluation of the underseepage through the foundation of flood control structures, including dam and levee embankments, floodwalls, closure structures, and other pertinent features	X			
Settlement evaluation of flood control structures	X			
Familiarity with geotechnical practices in California	X			
Experience in seismic characterization of soil analysis with experience in liquefaction evaluations of sites and earth structures, particularly flood control structures	X			
Ability to address the USACE Safety Assurance Review (SAR) aspects of all projects	X			
Active participation in related professional societies	X			
M.S. degree or higher in engineering	X			
Hydrologic and Hydraulic Engineering				
Minimum 10 years of experience in hydraulic engineering with an emphasis on large public works projects		X		
Experience in the application of risk and uncertainty in defining project performance and assurance		X		
Familiarity with standard USACE hydrologic and hydraulic computer models including Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) and Hydrologic Engineering Center's River Analysis System (HEC-RAS) and FLO-2D		X		
Active participation in related professional societies		X		
Registered professional engineer		X		
M.S. degree or higher in engineering		W[3]		
Economics/Civil Works				
Minimum 10 years of demonstrated experience in public works planning			X	
Familiarity with USACE plan formulation process, procedures, and standards			X	

W[3] USACE accepted a waiver of this panel member's educational requirements as part of the Task 2 deliverable.

Technical Criterion	Rudolph	Yung	Hornung	Henderson
Familiarity with USACE structural flood risk management projects			X	
Minimum of five years of experience directly dealing with the USACE six-step planning process, which is governed by ER 1105-2-100, Planning Guidance Notebook			X	
Familiarity with the USACE flood risk management analysis and benefit calculations, including use of the USACE Hydrologic Engineering Center's Flood Damage Analysis (HEC-FDA) computer program			X	
Experience with the national economic development analysis procedures, particularly as they relate to flood risk management			X	
Biology/Ecology				
Minimum 10 years of demonstrated experience in evaluation and conducting National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses, for complex multi-objective, large, public works projects.				X
Extensive background experience and working knowledge with the implementation of the NEPA compliance process				X
Experience in riverine ecosystems in Northern California in particular				X
M.S. degree of higher in an appropriate field of study				X

B.3 Panel Member Qualifications

R. William Rudolph, P.E., G.E.

Role: Geotechnical engineering expert.
Affiliation: Independent Consultant

Mr. Rudolph has been serving as Principal Engineer and Project Manager on a wide variety of geotechnical engineering projects throughout California and the West for the past 35 years. He holds an M.S. in civil engineering (with a specialization in geotechnical engineering) from the University of California, Berkeley. A registered geotechnical engineer and registered civil engineer in California, he specializes in port and harbor facilities, flood control, earth-fill dams and levees, geotechnical earthquake engineering, water resources, dredging and environmental restoration projects, and mass transit, bridge, and highway improvements.

Mr. Rudolph has experience in the design of levees and flood control works in both estuarine and riverine environments. Estuarine levee projects include the Galbraith Upland Dredge Material Disposal Facility in Oakland, Hamilton Wetlands Restoration Project in Novato, California, and flood protection levees in Redwood City, San Mateo, and San Rafael, California. He has also provided consulting work on the Oakland International Airport levee project, which included the seismic stabilization of the airport levee and the use of ground improvement for levee strengthening, seepage, and liquefaction mitigation. These projects included geologic and probabilistic seismic hazard assessment and evaluation of material sources and design alternatives. Riverine projects include both rural and urban levees along the Sacramento, Yuba, and San Joaquin river systems. These projects include consulting on 100- and 200-year flood protection levees for RD-17 and the River Islands project in Lathrup, the Yuba Goldfields project in Marysville, and modification to the Bethel Island levees in Bethel Island, California. Mr. Rudolph has also reviewed the geotechnical aspects of levee projects on the Mississippi River in East St. Louis, Illinois and in New Orleans, Louisiana.

Mr. Rudolph supervised the construction management of many levee projects. His relevant experience includes providing engineering analysis of seepage, slope stability (static and seismic), erosion, seismic-induced slope deformation, and remedial design. He has also conducted geotechnical investigations for design of levees, dams, and dredge disposal facilities. Investigations included extensive in-situ testing supplemented by laboratory testing, in accordance with USACE guidelines. 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. Through his involvement with USACE peer reviews, he is knowledgeable in USACE SAR procedures, Risk Based Analysis of Flood Damage Reduction Studies (ER 1110-2-1619), and Reporting Evidence of Distress of Civil Works.

Mr. Rudolph has participated in several IEPRs for USACE projects, including the initial IEPR for the American River Common Features Project GRR and subsequently the Optional Increment – Draft Natomas Post-Authorization Change Report and Draft EIS. In addition, he has also participated as the geotechnical engineering expert reviewing the Dam Safety Modification Report for Isabella Lake Dam and the Success Dam Seismic Remediation Project. For these IEPRs, he was responsible for reviewing site exploration and characterization, geotechnical engineering analysis of seepage and piping, liquefaction assessment seismic slope deformation modeling, levee/dam remediation alternatives, risk-based analyses in geotechnical engineering in support of the planning studies, and geotechnical model results

including FLAC analysis of embankment seismic deformation. He is knowledgeable in the USACE "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures", ETL 1110-2-571, and has collaborated with Dr. Michelle Shriro on her research and thesis regarding the impact of roots and woody vegetation on levee performance. He is affiliated with the American Society of Civil Engineers and the Coasts, Oceans, Ports, and Rivers Institute.

Andrew Yung, P.E., C.F.M.

Role: H&H engineering expert.
Affiliation: Walter P. Moore and Associates, Inc.

Mr. Yung is a Principal and the Chief Hydrologist at Walter P. Moore and Associates, Inc. He has 27 years of experience as an engineer, planner, and hydrologist, and holds a Bachelor of Civil Engineering degree from the Georgia Institute of Technology. He is a registered professional engineer in Georgia, Texas, and Louisiana and is a certified floodplain manager (C.F.M.). In his 19 years with Walter P. Moore, Mr. Yung has managed a wide range of engineering projects involving hydrology, hydraulics, master drainage studies, channel modification and hydraulic structure designs, watershed impact analyses, detention facility designs, and dam safety analyses. He has also served as the team leader for the Independent Technical Review of several Federal flood damage reduction studies in Houston, Texas, personally reviewing the hydrology, hydraulics, and alternative formulation for the Brays Bayou, Hunting Bayou, and White Oak Bayou projects, and has also provided review and support services on the Buffalo Bayou and Halls Bayou Federal projects. While serving as the ITR for the Federal Flood Damage Reduction studies in Houston, Mr. Yung's involvement with the alternative formulation review for three of the riverine systems (Brays Bayou, White Oak Bayou, and Hunting Bayou) included the review of the risk and uncertainty analysis parameters required for input into the HEC-FDA models. As the lead reviewer for H&H, Mr. Yung's review centered mainly on the discharge uncertainty and stage uncertainty, using EM 1110-2-1619 (Risk-Based Analysis for Flood Damage Reduction Studies) to guide the review. Mr. Yung worked closely with the team member responsible for economic review to coordinate the review of damage uncertainty. These uncertainty parameters affected the relationships of discharge vs. probability, stage vs. discharge, and stage vs. damage, which ultimately create uncertainty in the damage vs. probability relationship.

His experience with large public works projects includes managing the hydrologic and hydraulic analysis of the Federal Flood Damage Reduction Project along Sims Bayou in (Houston, Texas) as part of the local sponsor's RiskMAP floodplain remapping efforts, and planning and preliminary design efforts to identify regional detention mitigation sites associated with capital improvement projects across the City of Houston. He also conducted spillway mapping analysis for the Addicks and Barker Reservoirs (Texas) on behalf of the Harris County Flood Control District. He has conducted master drainage planning for Missouri City and Rosenberg, Texas. Mr. Yung has provided engineering design support for numerous public and private water resource/stormwater facilities and provided review support for the National Flood Insurance Program. He also participated in the IEPR panel for the previous American River Common Features Project and reviewed the engineering reevaluation of the H&H aspects of the GRR. The GRR included analyses of seepage under and through the levee system that provides flood protection to the City of Sacramento, including the Natomas Basin. Prior to joining Walter P. Moore, Mr. Yung was employed as a senior engineer with the Harris County Flood Control District (HCFCD), Planning

Department in Houston, and served as the HCFCD's Project Manager for the USACE Federal flood damage reduction study on Cypress Creek.

Mr. Yung has experience in the review of FLO-2D and he is very familiar with many HEC models, including HEC-1, HEC-2, HEC-HMS, HEC-RAS, HEC-DSS, and HEC-SSP. Mr. Yung has taught continuing education classes on the use of HEC-HMS and HEC-RAS unsteady flow (including the use of HEC-RAS for breach analyses). Mr. Yung is a member of the Association of State Flood Plain Managers, Texas Floodplain Managers Association, the Association of State Dam Safety Officials, and the National Hydrologic Warning Council.

Lewis Hornung

Role: Economics/Civil Works planning expert.
Affiliation: DR Reed & Associates, Inc.

Mr. Hornung is a planning expert with DR Reed & Associates in Jupiter, Florida specializing in the planning, economics, design phase, and operation of water resources and public works projects. He earned his B.S. in civil engineering from the University of Houston in 1977. His 37-year career includes 19 years with USACE, seven years with the South Florida Water Management District, and 11 years with architectural/engineering consulting firms. His primary experience has been planning and project management. He has played lead roles in a large number of planning projects, including studies for environmental restoration, flood damage reduction, and water supply. He is also familiar with USACE's 2011 Planning Modernization initiative, has served as project manager for the development of a planning modernization implementation plan for USACE Headquarters, and has taken part in previous IEPR panels for Battelle as an economist/Civil Works planning expert.

Mr. Hornung has direct experience in USACE plan formulation process, procedures, and standards. His career at USACE included more than 12 years in the Planning Divisions of the Galveston and Jacksonville Districts (SAJ). He has applied the USACE six-step planning process, governed by ER 1105-2-100 (Planning Guidance Notebook), for reconnaissance studies, feasibility studies, limited reevaluation reports, GRRs, major rehabilitation reports, and continuing authority studies. Relevant studies include the C-111 GRR (SAJ), the C-51 West GRR (SAJ), the Lake Okeechobee Watershed Feasibility Study (SAJ), Herbert Hoover Dike Major Rehabilitation Report (SAJ), and the Alexandria to the Gulf of Mexico Flood Control Feasibility Study, New Orleans District (MVN).

For the past 11 years in the private sector, Mr. Hornung has worked on a variety of planning projects for government and private-sector clientele. His planning experience includes structural and non-structural flood risk management projects, water quality, and water supply studies. The majority of the USACE studies that he has been involved with have been for multi-purpose projects that addressed flood risk management, water supply, water quality, and/or ecosystem restoration. Demonstrable projects include Modified Water Deliveries to Everglades National Park (SAJ), Calcasieu Lock Navigation Feasibility Study (MVN), and Alexandria to the Gulf of Mexico Flood Control Feasibility Study (MVN).

Mr. Hornung is familiar working with the USACE HEC-FDA on many USACE studies. Each of the studies listed above has required calculation of flood risk management benefits and several have involved use of HEC-FDA. For the Alexandria to the Gulf project, while working at HDR Engineering, he served as study

manager and used HEC-RAS to simulate the complex system of primary and secondary flood control canals in the town of Alexandria and downstream areas and then applied an innovative application for automating data input to HEC-FDA. HEC-FDA was used to calculate flood damages for the without- and with-project alternatives. The application was so successful that he later managed a contract with HEC to modify the application for broader use.

Mr. Hornung has more than 20 years of experience conducting traditional National Economic Development (NED) plan benefits associated with flood risk management projects, all of which required the evaluation of NED benefits. NED benefit calculations have been a part of the vast majority of USACE planning studies he has been involved with, and flood risk management benefits have been the primary source of NED benefits for the projects described above. In addition, he served on the West Sacramento GRR IEPR Panel to evaluate the NED analysis that was performed by the Sacramento District using HEC-RAS.

Steven Henderson

Role: Biology/ecology expert.
Affiliation: Ascent Environmental, Inc.

Mr. Henderson 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 more than 16 years of professional experience. He 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, 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 central and northern California, and has extensive project experience in several regions of California and Nevada.

Mr. Henderson has extensive background experience and working knowledge of the implementation of the NEPA compliance process and is experienced in performing analyses of direct, indirect, and cumulative impacts for biological resources and has prepared numerous documents in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). His experience includes such projects as the Biological Studies for the Upper San Joaquin River Basin Storage Investigation Project for the U.S. Bureau of Reclamation; the Upper Truckee River Restoration and Golf Course Relocation Project Environmental Impact Report/Environmental Impact Statement for California State Parks, Sierra District; and Willow Flycatcher Studies in Support of ESA Compliance for Operation of Isabella Dam and Reservoir for USACE. He is familiar with USACE calculation of evaluation of environmental benefits via Habitat Evaluation Procedure (HEP) models and is knowledgeable in the development, application, and interpretation of HEP models. He has also peer-reviewed a Habitat Suitability Index (HSI) model, a component of HEP, for the Federally endangered southwestern willow flycatcher, and developed quantitative habitat association models (to be implemented similar to an HSI model) for that species to evaluate relative habitat suitability of different riparian areas being evaluated for protection and restoration.

Mr. Henderson has extensive experience working in riverine and riparian ecosystems in Northern California, including studies involving watershed assessment, river restoration, impact analysis and mitigation for NEPA and CEQA compliance, and riparian wildlife surveys. Relevant projects include the Gray Creek Watershed Assessment and Restoration Plan, Lower Blackwood Creek Restoration Project, Upper Truckee River and Marsh Restoration Project Planning and EIR/EIS/EIS, Upper Truckee River Restoration and Golf Course Relocation Project EIR/EIS, and Biological Studies for the Upper San Joaquin River Basin Storage Investigation Project.

Mr. Henderson is familiar with species from the west coast, including salmon, along with their habitat requirements; he has focused on the wildlife species and habitats throughout California, particularly central and northern California. He attended the University of California Davis for his undergraduate degree, and the majority of his professional career has been focused on the west coast (central and northern California, including the Sacramento region). Mr. Henderson recently served as the biology/ecology expert on the IEPR panels for the Orestimba Creek Flood Risk Management Project Feasibility Study, West Stanislaus County, California, and the West Sacramento GRR. He is also a member of The Society for Conservation Biology and The Wildlife Society, served as a peer reviewer of manuscripts submitted for publication to the journals Conservation Biology (Society for Conservation Biology) and The Condor (Cooper Ornithological Society), and has presented at the Tahoe Science Conference, Incline Village, Nevada.

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APPENDIX C

Final Charge to the IEPR Panel as Submitted to USACE on March 27, 2015 for the ARCF GRR Project

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CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE IEPR OF THE AMERICAN RIVER COMMON FEATURES GENERAL RE-EVALUATION REPORT

BACKGROUND

Increased understanding of under seepage and through seepage problems that jeopardize levee stability has drastically increased American River Common Features project cost. Consequently, a general engineering and economic re-evaluation is necessary to determine if the alternative proposed is still viable and justified and if there is another alternative that may be more effective. The Common Features Project General Re-evaluation Report (GRR) includes flood risk management to the City of Sacramento on the north and south sides of the American River, and to the Natomas Basin. This GRR will consider the existing flood control project together as a system, with the purpose of developing analysis tools that truly consider the flood protection system as a whole and identify a comprehensive plan that will lower the risk of flooding in and around the City of Sacramento. The objective of the study is to identify flood-related issues in the American River Watershed, California study area. The GRR presents planning, engineering, and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the recommended plan. The project in total is a GRR undertaken to evaluate structural and non-structural flood risk management measures including in-basin storage, re-operation of existing reservoirs, improvements to existing levees, construction of new levees, and other storage, conveyance and non-structural options.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the American River Common Features General Re-evaluation Report (GRR) (hereinafter ARCF GRR IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (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 1165-2-214; p. D-4) for the ARCF GRR 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 geotechnical engineering, hydrologic and hydraulic engineering, economics/Civil Works Planning, and biology/ecology issues relevant to the project. They will also have experience applying their subject matter expertise to flood risk management.

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 1165-2-214, 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.

Title	Actual No. of Pages	Required Disciplines
Review Documents		
Feasibility Report	231	All Disciplines
Appendix A: Plan Formulation		
A.1 Decision Management Plan	5	All Disciplines
A.2 Decision Log	2	All Disciplines
A.3 Risk Register	1	All Disciplines
Appendix C: Engineering	57	Geotechnical engineer, H&H engineer
Appendix C, Attachment A: Hydrology Executive Report	181	H&H engineer
Appendix C, Attachment B: Hydraulic Appendix Executive Report	134	Geotechnical engineer, H&H engineer
Appendix C, Attachment C: Geotechnical Report	54	Geotechnical engineer
Appendix C, Attachment E: Erosion Protection Analysis	93	Geotechnical engineer, H&H engineer, biologist/ecologist
Appendix E: Economics	111	Economics/Civil Works Planning
Appendix F: Public and Agency Comments (i.e., public review comments) (anticipated 35 pages)	Comments to be provided in May 2015	All Disciplines
Environmental Impact Statement and Alternative Plates	371	All Disciplines
Appendix A: Coordination Act Report	30	All Disciplines

Title	Actual No. of Pages	Required Disciplines
Appendix B: Special Status Species Lists	12	Biologist/Ecologist
Appendix C: Cultural Resources Appendix	240	All Disciplines
Appendix D: Air Quality	186	Economics/Civil Works Planning, Biologist/Ecologist
Appendix E: Draft 404(b)(1) Analysis	45	All Disciplines
Appendix F: Public Involvement	22	All Disciplines
Appendix G: Draft Biological Assessment	197	Biologist/Ecologist
Appendix H: Environmental Site Assessment	43	Biologist/Ecologist
Final IEPR Report for the Engineering and Economic Reevaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, American River Common Features	107	All Disciplines
Total Review Document Page Count	**2,122**	
Supporting Documents		
Appendix B: Review Documentation	183	All Disciplines
Appendix C: Engineering – Attachment D: Cost Engineering	43	Geotechnical engineer, H&H engineer
Appendix D: Real Estate	68	Economics/Civil Works Planning
Total Supporting Document Page Count	**294**	

Documents for Reference

- USACE guidance *Civil Works Review,* (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004).

SCHEDULE

This schedule is based on the March 13, 2015 receipt of review documents. Note that dates presented in the schedule below could change due to panel member and USACE availability.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	3/16/2015
	Battelle convenes kick-off meeting with panel members	3/25/2015
	Battelle convenes kick-off meeting with USACE and panel members	3/25/2015
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	4/8/2015
	Panel members complete their individual reviews	4/22/2015
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	4/27/2015
	Battelle convenes Panel Review Teleconference	4/28/2015
	Battelle provides Final Panel Comment templates and instructions to panel members	4/29/2015
	Panel members provide draft Final Panel Comments to Battelle	5/6/2015
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	5/7/2015 - 5/14/2015
	Battelle finalizes Final Panel Comments	5/15/2015
	Battelle provides Final IEPR Report to panel members for review	5/19/2015
	Panel members provide comments on Final IEPR Report	5/20/2015
	USACE provides public comments	5/6/2015
	Battelle provides public comment to Panel	5/7/2015
	Panel completes their review of the public comments	5/12/2015
	Panel drafts Final Panel Comment, if necessary	5/14/2015
	Panel finalizes Final Panel Comment regarding public comments	5/15/2015
	*Battelle submits Final IEPR Report to USACE	5/22/2015
Comment/ Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	5/26/2015
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	5/26/2015
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	6/16/2015
	Battelle provides the panel members the draft PDT Evaluator Responses	6/18/2015
	Panel members provide Battelle with draft BackCheck Responses	6/23/2015
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	6/24/2015
	Battelle convenes Comment-Response Teleconference with panel members and USACE	6/25/2015

Task	Action	Due Date
	USACE inputs final PDT Evaluator Responses to DrChecks	7/2/2015
	Battelle provides final PDT Evaluator Responses to panel members	7/6/2015
	Panel members provide Battelle with final BackCheck Responses	7/8/2015
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	7/9/2015
	*Battelle submits pdf printout of DrChecks project file	7/10/2015
Agency Decision Milestone (ADM) Meeting	Agency Decision Milestone (ADM) meeting	~ 7/17/2015
Civil Works Review Board (CWRB) Meeting	Panel prepares and/or reviews slides for CWRB	To be determined
	Civil Works Review Board meeting	To be determined

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the ARCF GRR review documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and 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 ARCF GRR review 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 1165-2-214; 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 Agency Technical Review (ATR).

2. Please contact the Battelle Project Manager (Rachel Sell, sellr@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 Rachel Sell, sellr@battelle.org, no later than April 22, 2015, 10 pm ET.

IEPR of the American River Common Features General Re-evaluation Report (GRR)

CHARGE QUESTIONS AND RELEVANT SECTIONS AS SUPPLIED BY USACE

The following Charge to Reviewers outlines the objective of the Independent External Peer Review (IEPR) for the subject study and the specific advice sought from the IEPR panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the charge. The panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the charge.

The Panel review is to focus on scientific and technical matters, leaving policy determinations for USACE and the Army. The panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances the panel may have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the panel’s intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment. The IEPR Performance Work Statement provides additional details on how comments should be structured.

Broad Evaluation Charge Questions

1. Is the need for and intent of the decision document clearly stated?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical information?
3. Given the need for and intent of the decision document, assess the adequacy and acceptability of the project evaluation data used in the study analyses.
4. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering assumptions that underlie the study analyses.
5. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering methodologies, analyses, and projections.
6. Given the need for and intent of the decision document, assess the adequacy and acceptability of the models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives.
7. Given the need for and intent of the decision document, assess the adequacy and acceptability of the methods for integrating risk and uncertainty.

8. Given the need for and intent of the decision document, assess the adequacy and acceptability of the formulation of alternative plans and the range of alternative plans considered.
9. Given the need for and intent of the decision document, assess the adequacy and acceptability of the quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans.
10. Given the need for and intent of the decision document, assess the adequacy and acceptability of the overall assessment of significant environmental impacts and any biological analyses.
11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.
13. For the tentatively selected plan, assess whether the models used to assess life safety hazards are appropriate.
14. For the tentatively selected plan, assess whether the assumptions made for the life safety hazards are appropriate,
15. For the tentatively selected plan, assess whether the quality and quantity of the surveys, investigations, and engineering are sufficient for a concept design considering the life safety hazards and to support the models and assumptions made for determining the hazards.
16. For the tentatively selected plan, assess whether the analysis adequately address the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.

Overview Questions as Supplied by Battelle

17. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
18. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

19. Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?

APPENDIX D

Conflict of Interest Form

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Conflicts of Interest Questionnaire

[Independent External Peer Review]

[American River IEPR]

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: _____**Battelle Memorial Institute**_____
REPRESENTATIVE'S NAME: _____**Gina M. Crabtree**_____
TELEPHONE: ___**614-424-5097**_____
ADDRESS: ____**505 King Avenue, Columbus, OH 43201**_____
EMAIL ADDRESS: ____**crabtreeg@battelle.org**_____

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) No **X** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? No **X** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No Yes **X** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? No **X** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information. **No additional information to report.**

Gina Crabtree

Gina Crabtree, Battelle

6/3/14

DATE

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