

# Final Independent External Peer Review Report Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report

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

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## Executive Summary

### PROJECT BACKGROUND AND PURPOSE

Leon Creek originates seven miles northeast of Leon Springs in northwestern Bexar County, Texas and runs southeast for 57 miles through Leon Valley and the western portion of San Antonio to its mouth on the Medina River, just west of Cassin. The study area encompasses the entire watershed, as shown in Figure 1-1. The total drainage area of this watershed is approximately 152,320 acres (238 square miles). The Leon Creek Watershed Feasibility Study investigated flood risk management (FRM) structural measures such as upstream detention, levees, and channel modifications, and nonstructural measures such as evacuation of the floodplain. Multipurpose measures that included recreation were also explored to fully utilize project lands. The study initially considered the potential for ecosystem restoration. However, as the study progressed, the results indicated that opportunities to address ecosystem restoration in conjunction with FRM would be limited.

There are over 4,600 structures located within the 500-year floodplain in the study area. Many of these structures are located between the 250-year and 500-year floodplains and are therefore not at risk during more frequent events. Flooding in the area, however, is associated with infrequent, high-intensity rainfall events with short durations with short warning times. The risk associated with flooding is due to structure damage, but there have been losses of life in the Leon Creek watershed due to flooding. Most have been from people attempting to cross low water crossings in their vehicles and not as a result of flood inundation in their homes.

The Recommended Plan consists of a 100-year Levee with Hydraulic Mitigation in one of the areas of interest in combination with the buyout in another area of interest. The Plan includes mitigation for aquatic impacts associated with the channelization work and would use Natural Channel Design (NCD) concepts to “self-mitigate” impacts on waters of the United States. The estimated total project first costs are \$28.966 million.

### Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report (hereinafter Leon Creek IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, is 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 Leon Creek Watershed Draft Feasibility Report (DFR) and Integrated Environmental Assessment (EA), including its appendices. 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 Leon Creek review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: economics/Civil Works planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, and geotechnical/civil engineering. Four panel members were selected for the IEPR. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received an electronic version of the 623 pages of Leon Creek review documents, along with a charge that solicited comments on specific sections of the documents to be reviewed. USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004), which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review 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 Leon Creek 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, 14 Final Panel Comments were identified and documented. Of these, one was identified as having high significance, five were identified as having medium/high significance, three had a medium significance, three had medium/low significance, and two had low significance.

## 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 Leon Creek 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 Leon Creek DFR/EA and appendices are well-written and concise. The DFR/EA addresses most of the important technical project issues in a practical, easily understood, and logical manner. In general, the models and assumptions used in the analyses are sound and applied in an appropriate manner to support the conclusions drawn from them. While the Panel believes that many technical aspects of the plan formulation, economics, engineering, and environmental issues of the Leon Creek project are reasonable and presented clearly, the Panel identified several elements of the DFR/EA where additional documentation and clarification is warranted.

**Economics/Civil Works Planning:** The Main Report and Economics Appendix are well-written, well-organized and easy to review. The key issues of the study are plainly discussed and the Panel acknowledges that the Recommended Plan appears reasonable and effective. The Panel's primary concern is the limited number of management measures identified during the plan formulation process that could impact the array of alternatives, and ultimately the selection of the Recommended Plan. Because of the limited number of management measures, a broad enough range of alternative plans may not have been considered for the Leon Creek watershed. Evaluation of a larger number of management measures could produce a broader array of alternative plans, which in turn could affect the alternative that ultimately emerges from the process as the Recommended Plan. The Panel believes that this can be addressed by having USACE develop a broader array of management measures, particularly for those Areas of Interest (AOI) identified as having high flood risk. If this is not feasible or practical, USACE should describe what conditions exist in the various AOIs that prevent identification of a broader array of management measures.

In addition, using 2035 as the future condition year introduces uncertainty that forecast patterns and trends for the without-project condition will continue for 25 years. The Panel recognizes that it is difficult to predict the level of floodplain development and institutional, social, geotechnical engineering, and hydrologic and hydraulic (H&H) conditions that far ahead without considerable uncertainty. The Panel, however, believes USACE may need to explain what conditions or trends exist in the watershed that contribute to long-range, dynamic conditions that will result in a 25-year horizon between the base year and expected future condition year, and consider how using a more near-term future year might affect the calculation of future without-project conditions and how that could affect the feasibility of the Recommended Plan.

**Engineering:** The engineering aspects of the Leon Creek DFR/EA and its appendices are easily understood and logical. The DFR/EA describes the developmental stages of the project, explaining its assumptions, data collection, and public input. Of primary concern to the Panel, relative to AOI-2 (Jet Engine Test Cell facility), is that the impact of poor ground conditions on the design and stability of the levee is not fully addressed in the conceptual design, which may result in an underestimation of project costs. Variations in excavation depths may affect earthwork quantities, dewatering requirements, and the protection of adjacent existing improvements due to the lateral extent of excavation slopes. Increased quantities, protection of adjacent facilities, and groundwater handling and treatment could potentially affect project costs. The Panel believes this issue could be addressed by providing additional details on the proposed over-excavation of existing fill and unsuitable foundation soils and by addressing the potential need for, and assumption regarding, temporary dewatering to achieve the required excavation limits, including the handling and treatment of potentially contaminated groundwater. In addition, the Panel suggests that consideration be given to carrying forward a flood wall alternative in Preconstruction Engineering and Design (PED) to address possible constructability, construction impact, and cost issues associated with the levee alternative.

The Panel is also concerned that the Helotes Creek Quarry Pond alternative (AOI-12) has not been described or analyzed in sufficient detail to assess the potential benefits, impacts, and costs associated with its use as a stormwater detention facility. Although the determination that benefits are "in place" for Helotes Quarry Pond is noted, uncertainties in the hydrogeology of the pond have not been considered and may affect the project's costs and assessment of structural alternatives. The Panel believes this can be addressed by assessing the potential impacts of impounding water within the quarry on regional hydrogeology, including groundwater levels and water quality, providing additional details regarding

reclamation of the quarry, per Texas Water Code requirements, addressing long-term silt management within the quarry detention pond, and by providing conceptual design details and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) requirements.

Finally, the potential impacts of soil, stream sediment, and groundwater contamination have not been fully addressed in the DFR/EA. The appendix does not provide specific data regarding the potential for onsite soil contamination associated with the Jet Engine Test Cell Facility’s current or past use, the type or concentration of contaminants in the onsite groundwater extraction wells, or contaminants in the creek sediments recently analyzed by the USGS. The Panel believes this concern could be addressed by updating the DFR/EA to include discussion of potential soil contamination, assessing the potential cost and schedule impacts associated with contaminated soil management, providing additional information regarding the nature of the groundwater contamination at the project site, and by addressing the potential National Pollutant Discharge Elimination System (NPDES) water quality discharge requirements for the design, monitoring, and operation of the sump and discharge sluice gates.

**Environmental:** The Panel finds the Habitat Evaluation Procedure (HEP) and Environmental Protection Agency (EPA) Rapid Bioassessment modeling was conducted in a reasonable fashion and was applied sufficiently to discriminate between the alternatives, however, the assumptions made in the models need to be defined in greater detail. From a National Environmental Policy Act (NEPA) standpoint, the DFR/EA is qualitative in nature with respect to describing many of the resources within the study area. Because of this, there are gaps and deficiencies for particular constraints that do not appear to be adequately described. Of key concern to the Panel is the reliance on 2008 data to describe the affected environment and associated potential effects on the Recommended Plan. This reliance lends uncertainty to potential changes to the future without- and future with-project conditions. The Panel cannot determine whether the impacts from the Recommended Plan would be less using 2008 data versus more up-to-date data, and whether the structural and non-structural elements of the Recommended Plan would change as a result of using more current data. This important issue could be addressed by updating the DFR/EA to reflect the most current data available to document existing conditions/affected environmental constraints within the project study area and determining whether the updated/revised data would affect the selected structural and non-structural alternatives.

**Table ES-1. Overview of 14 Final Panel Comments Identified by the Leon Creek IEPR Panel**

No.	Final Panel Comment
<b>High Priority</b>	
1	The limited number of management measures impacts the array of alternatives and ultimately the selection of the Recommended Plan.
<b>Medium/High Priority</b>	
2	The reliance on 2008 data to describe the affected environment and associated potential effects on the Recommended Plan lends uncertainty to potential changes to the future without- and future with-project conditions.



**Table ES-1. Overview of 14 Final Panel Comments Identified by the Leon Creek IEPR Panel (continued)**

No.	Final Panel Comment
3	Using 2035 as the future condition year introduces uncertainty that forecast patterns and trends for the future without-project condition will continue for 25 years.
4	The Helotes Creek Quarry Pond alternative has not been described or analyzed in sufficient detail to assess the potential benefits, impacts, and costs associated with its use as a stormwater detention facility.
5	The impact of poor ground conditions on the design and stability of the levee is not fully addressed in the conceptual design and may result in an underestimation of project costs.
6	The potential impacts of soil, stream sediment, and groundwater contamination have not been fully addressed in the DFR/EA.
<b>Medium Priority</b>	
7	The Jet Engine Test Cell Facility and Helotes Quarry Pond structural alternatives connection with the surface water flows and groundwater is not discussed or documented.
8	Resources that affect Pearsall Park, such as recreation, noise, lighting, and aesthetics, are not addressed in sufficient detail to meet NEPA requirements.
9	The use of multiple discount rates, price levels, and development levels from different years in the Leon Creek DFR/EA and Economics Appendix makes it difficult to compare the cost and benefits of the Recommended Plan.
<b>Medium/Low Priority</b>	
10	The methodologies and processes used for hydraulic model development and modeling at stream and tributary junctions (confluence) can have an impact on model results that lead to the selection of alternatives to be evaluated.
11	Although climate change is qualitatively addressed, its impact on hydrologic parameters and the environment under future project conditions to 2035 is not fully addressed for the alternative analysis.
12	Assumptions associated with the Habitat Evaluation Procedure (HEP) and Environmental Protection Agency (EPA) Rapid Bioassessment models are not fully explained or documented, preventing a thorough understanding of the degradation to habitat over time.
<b>Low Priority</b>	
13	Several inconsistencies in how environmental constraints identified within the study area are presented prevent a complete understanding of project effects and benefits.
14	The selection of either a flood wall or a levee alternative at the Jet Engine Test Cell Facility property has not been addressed in detail.

# Table of Contents

	Page
Executive Summary .....	iii
1. INTRODUCTION .....	1
2. PURPOSE OF THE IEPR.....	2
3. METHODS FOR CONDUCTING THE IEPR .....	2
4. RESULTS OF THE IEPR.....	3
4.1 Summary of Final Panel Comments .....	3
4.2 Final Panel Comments.....	6
5. REFERENCES .....	27
Appendix A. IEPR Process for the Leon Creek Project	
Appendix B. Identification and Selection of IEPR Panel Members for the Leon Creek Project	
Appendix C. Final Charge to the IEPR Panel as Submitted to USACE on January 8, 2014, for the Leon Creek Project	

## List of Tables

	Page
Table ES-1. Overview of 14 Final Panel Comments Identified by the Leon Creek IEPR Panel.....	vi
Table 1. Major Milestones and Deliverables of the Leon Creek IEPR.....	2

## LIST OF ACRONYMS

<b>AEP</b>	annual exceedance probability
<b>AOI</b>	Areas of Interest
<b>ATR</b>	Agency Technical Review
<b>COI</b>	Conflict of Interest
<b>CWRB</b>	Civil Works Review Board
<b>DFR</b>	Draft Feasibility Report
<b>DrChecks</b>	Design Review and Checking System
<b>EA</b>	Environmental Assessment
<b>EAC</b>	Early Action Compact
<b>EC</b>	Engineer Circular
<b>EPA</b>	Environmental Protection Agency
<b>ER</b>	Engineer Regulation
<b>ERDC</b>	Engineer Research and Development Center
<b>FEMA</b>	Federal Emergency Management Agency
<b>FPC</b>	Final Panel Comment
<b>FRM</b>	Flood Risk Management
<b>H&amp;H</b>	hydraulics and hydrology
<b>HEC</b>	Hydraulic Engineering Center
<b>HECFDA</b>	Hydrologic Engineering Center's Flood Damage Reduction Analysis
<b>HEP</b>	Habitat Evaluation Procedure
<b>HHS</b>	Health and Human Services
<b>HMS</b>	Hydrologic Modeling System
<b>HTRW</b>	Hazardous, Toxic and Radioactive Waste
<b>IEPR</b>	Independent External Peer Review
<b>IFS</b>	Interim Feasibility Study
<b>NCD</b>	Natural Channel Design
<b>NED</b>	National Economic Development
<b>NEPA</b>	National Environmental Policy Act
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>OEO</b>	Outside Eligible Organization
<b>OMB</b>	Office of Management and Budget
<b>OMRR&amp;R</b>	operation, maintenance, repair, rehabilitation, and replacement
<b>PDT</b>	Project Delivery Team

<b>PED</b>	Preconstruction Engineering and Design
<b>RAS</b>	River Analysis System
<b>SAR</b>	Safety Assurance Review
<b>TCEQ</b>	Texas Commission on Environmental Quality
<b>UDV</b>	Unit Day Value
<b>USACE</b>	United States Army Corps of Engineers
<b>USFWS</b>	United States Fish and Wildlife Services
<b>WRDA</b>	Water Resources Development Act

## 1. INTRODUCTION

Leon Creek originates seven miles northeast of Leon Springs in northwestern Bexar County, Texas and runs southeast for 57 miles through Leon Valley and the western portion of San Antonio to its mouth on the Medina River, just west of Cassin. The study area encompasses the entire watershed, as shown in Figure 1-1. The total drainage area of this watershed is approximately 152,320 acres (238 square miles). The Leon Creek Watershed Feasibility Study investigated flood risk management (FRM) structural measures such as upstream detention, levees, and channel modifications and nonstructural measures such as evacuation of the floodplain. Multipurpose measures that included recreation were also explored to fully utilize project lands. The study initially considered the potential for ecosystem restoration. However, as the study progressed, the results indicated that opportunities to address ecosystem restoration in conjunction with FRM would be limited.

There are over 4,600 structures located within the 500-year floodplain in the study area. Many of these structures are located between the 250-year and 500-year floodplains and are therefore not at risk during more frequent events. Flooding in the area, however, is associated with infrequent, high-intensity rainfall events with short durations with short warning times. The risk associated with flooding is due to structure damage, but there have been losses of life in the Leon Creek watershed due to flooding. Most have been from people attempting to cross low water crossings in their vehicles and not as a result of flood inundation in their homes.

The Recommended Plan consists of a 100-year Levee with Hydraulic Mitigation in one of the areas of interest in combination with the buyout in another area of interest. The Plan includes mitigation for aquatic impacts associated with the channelization work and would use Natural Channel Design (NCD) concepts to “self-mitigate” impacts on waters of the United States. The estimated total project first costs are \$28.966 million.

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 Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report (hereinafter Leon Creek 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) bulletin *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, and environmental analyses contained in the Leon Creek 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 January 8, 2014.

## 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, and environmental 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 Leon Creek 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 Leon Creek IEPR. Due dates for milestones and deliverables are based on the award/effective date of December 20, 2013. In mid-January, the Planning Center of Expertise (PCX) notified Battelle of the need to accelerate the review process to meet the new project milestones established by the project delivery team (PDT). The schedule was revised based on Panel and PDT availability to meet the new deadlines. Battelle will be able to deliver the final pdf printout of the Design Review and Checking System (DrChecks) project file to USACE almost two weeks earlier than originally agreed upon in the Final Work Plan. Note that the work items listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of USACE's DrChecks project file (the final deliverable) on March 14, 2014. The actual date for contract end will depend on the date that all activities for this IEPR, including Civil Works Review Board (CWRB) preparation and participation, are conducted.

**Table 1. Major Milestones and Deliverables of the Leon Creek IEPR**

Task	Action	Due Date
1	Award/Effective Date	12/20/2013
	Review documents available	12/23/2013
2	Battelle submits list of selected panel members	12/31/2013
	USACE confirms the panel members have no COI	01/03/2013
3	Battelle convenes kick-off meeting with USACE	01/07/2014
	Battelle convenes kick-off meeting with USACE and panel members	01/13/2014
4	Panel members complete their individual reviews	01/23/2014
	Panel members provide draft Final Panel Comments to Battelle	02/03/2014

**Table 1. Major Milestones and Deliverables of the Leon Creek IEPR (continued)**

Task	Action	Due Date
5	Battelle submits Final IEPR Report to USACE	02/14/2014
6 <sup>a</sup>	Battelle convenes Comment-Response Teleconference with panel members and USACE	02/24/2014
	Battelle submits pdf printout of DrChecks project file to USACE	03/3/2014
	CWRB Meeting (Estimated Date) <sup>b</sup>	03/27/2014
	Contract End/Delivery Date	10/31/2014

<sup>a</sup> Task 6 occurs after the submission of this report.

<sup>b</sup> The CWRB meeting was listed in the Statement of Work under Task 3 but was relocated in this schedule to reflect the chronological order of activities.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: economics/Civil Works planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, and geotechnical/civil engineering. The Panel reviewed the Leon Creek documents and produced 16 Final Panel Comments in response to 44 charge questions provided by USACE for the review. The charge included two additional questions from Battelle that sought summary information from the IEPR Panel. 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 Leon Creek IEPR review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the Leon Creek DFR/EA and appendices are well-written and concise. The DFR/EA addresses most of the important technical project issues in a practical, easily understood, and logical manner. In general, the models and assumptions used in the analyses are sound and applied in an appropriate manner to support the conclusions drawn from them. While the Panel believes that many technical aspects of the plan formulation, economics, engineering, and environmental issues of the Leon Creek project are reasonable and presented clearly, the Panel identified several elements of the DFR/EA where additional documentation and clarification is warranted.

**Economics/Civil Works Planning:** The Main Report and Economics Appendix are well-written, well-organized and easy to review. The key issues of the study are plainly discussed and the Panel acknowledges that the Recommended Plan appears reasonable and effective. The Panel's primary concern is the limited number of management measures identified during the plan formulation process that could impact the array of alternatives, and ultimately the selection of the Recommended Plan. Because of the limited number of management measures, a broad enough range of alternative plans may not have been considered for the Leon Creek watershed. Evaluation of a larger number of management measures could produce a broader array of alternative plans, which in turn could affect the alternative that ultimately emerges from the process as the Recommended Plan. The Panel believes that this can be addressed by having USACE develop a broader array of management measures, particularly for those Areas of Interest (AOI) identified as having high flood risk. If this is not feasible or practical, USACE should describe what conditions exist in the various AOIs that prevent identification of a broader array of management measures.

In addition, using 2035 as the future condition year introduces uncertainty that forecast patterns and trends for the without-project condition will continue for 25 years. The Panel recognizes that it is difficult to predict the level of floodplain development and institutional, social, geotechnical engineering, and hydrologic and hydraulic (H&H) conditions that far ahead without considerable uncertainty. The Panel, however, believes USACE may need to explain what conditions or trends exist in the watershed that contribute to long-range, dynamic conditions that will result in a 25-year horizon between the base year and expected future condition year, and consider how using a more near-term future year might affect the calculation of future without-project conditions and how that could affect the feasibility of the Recommended Plan.

**Engineering:** The engineering aspects of the Leon Creek DFR/EA and its appendices are easily understood and logical. The DFR/EA describes the developmental stages of the project, explaining its assumptions, data collection, and public input. Of primary concern to the Panel, relative to AOI-2 (Jet Engine Test Cell facility), is that the impact of poor ground conditions on the design and stability of the levee is not fully addressed in the conceptual design, which may result in an underestimation of project costs. Variations in excavation depths may affect earthwork quantities, dewatering requirements, and the protection of adjacent existing improvements due to the lateral extent of excavation slopes. Increased quantities, protection of adjacent facilities, and groundwater handling and treatment could potentially affect project costs. The Panel believes this issue could be addressed by providing additional details on the proposed over-excavation of existing fill and unsuitable foundation soils and by addressing the potential need for, and assumption regarding, temporary dewatering to achieve the required excavation limits, including the handling and treatment of potentially contaminated groundwater. In addition, the Panel suggests that consideration be given to carrying forward a flood wall alternative in Preconstruction Engineering and Design (PED) to address possible constructability, construction impact, and cost issues associated with the levee alternative.



The Panel is also concerned that the Helotes Creek Quarry Pond alternative (AOI-12) has not been described or analyzed in sufficient detail to assess the potential benefits, impacts, and costs associated with its use as a stormwater detention facility. Although the determination that benefits are “in place” for Helotes Quarry Pond is noted, uncertainties in the hydrogeology of the pond have not been considered and may affect the project’s costs and assessment of structural alternatives. The Panel believes this can be addressed by assessing the potential impacts of impounding water within the quarry on regional hydrogeology, including groundwater levels and water quality, providing additional details regarding reclamation of the quarry, per Texas Water Code requirements, addressing long-term silt management within the quarry detention pond, and by providing conceptual design details and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) requirements.

Finally, the potential impacts of soil, stream sediment, and groundwater contamination have not been fully addressed in the DFR/EA. The appendix does not provide specific data regarding the potential for onsite soil contamination associated with the Jet Engine Test Cell Facility’s current or past use, the type or concentration of contaminants in the onsite groundwater extraction wells, or contaminants in the creek sediments recently analyzed by the USGS. The Panel believes this concern could be addressed by updating the DFR/EA to include discussion of potential soil contamination, assessing the potential cost and schedule impacts associated with contaminated soil management, providing additional information regarding the nature of the groundwater contamination at the project site, and by addressing the potential National Pollutant Discharge Elimination System (NPDES) water quality discharge requirements for the design, monitoring, and operation of the sump and discharge sluice gates.

**Environmental:** The Panel finds the Habitat Evaluation Procedure (HEP) and Environmental Protection Agency (EPA) Rapid Bioassessment modeling was conducted in a reasonable fashion and was applied sufficiently to discriminate between the alternatives, however, the assumptions made in the models need to be defined in greater detail. From a National Environmental Policy Act (NEPA) standpoint, the DFR/EA is qualitative in nature with respect to describing many of the resources within the study area. Because of this, there are gaps and deficiencies for particular constraints that do not appear to be adequately described. Of key concern to the Panel is the reliance on 2008 data to describe the affected environment and associated potential effects on the Recommended Plan. This reliance lends uncertainty to potential changes to the future without- and future with-project conditions. The Panel cannot determine whether the impacts from the Recommended Plan would be less using 2008 data versus more up-to-date data, and whether the structural and non-structural elements of the Recommended Plan would change as a result of using more current data. This important issue could be addressed by updating the DFR/EA to reflect the most current data available to document existing conditions/affected environmental constraints within the project study area and determining whether the updated/revised data would affect the selected structural and non-structural alternatives.

## 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

**The limited number of management measures impacts the array of alternatives and ultimately the selection of the Recommended Plan.**

#### Basis for Comment

The Leon Creek DFR/EA does an excellent job following the Six-Step Planning Process until Step 3 – formulation of alternative plans. The Six-Step Process (USACE, 2000) was developed and has been refined into a structured approach for addressing water resource problems and opportunities. The six steps, though typically presented and discussed sequentially, actually occur concurrently and repetitively as plans are refined and re-evaluated. As more information is acquired and developed, the refinements often make it necessary to reiterate some of the steps that had already been completed.

In Step 3, USACE (2000) calls for the development of the broadest practical array of management measures, both structural and non-structural. These measures are screened and assembled into a set of alternative plans, which may consist of one or more of the management measures emerging from the initial screening for the various AOIs. Then, in Steps 4 and 5, through an iterative process of evaluation, refining, and re-evaluation, the alternative plans are compared to the future without-project condition as well as compared amongst themselves. In this process, the without-project condition is treated as a viable alternative.

In the Hunting Bayou GRR/EA in Harris County, in the Upper White Oak Bayou study in Harris County, and in the Village Creek Watershed Study in Birmingham, Alabama, many dozens of structural, non-structural, and institutional management measures were proposed and evaluated before the final suites of measures emerged. This resulted in broad arrays of alternative plans that were iteratively evaluated, refined, and compared.

The 23 structural and two non-structural management measures for the Leon Creek project result in a limited number of alternative plans that can be assembled from them. This, in turn, results in limited application of Steps 4 and 5, which call for iteratively evaluating and comparing alternative plans, respectively, until a plan can be recommended in Step 6.

When comparing alternative plans, the without-project condition must be considered as a viable alternative to the others. The Recommended Plan for Leon Creek reduces total study area without-project damages by less than 20%. (DFR/EA, p. 100). This raises the question of taking any action at all, when so much residual risk remains after full implementation. The DFR/EA states (p. 101) that “[i]mplementation of the Recommended Plan will substantially reduce monetary flood damages in the Leon Creek watershed but will do relatively little to modify the fundamental nature of the flood hazard in the watershed.”

In addition, some AOIs have only one or a few management measures proposed, and the DFR/EA does not provide detail on what other measures were considered. If the conditions in these AOIs are such that there are a limited number of measures, the review documents do not describe in detail what conditions prevent identification of more measures. The broader the range of measures, the more robust the evaluation and comparison of alternative plans in Steps 3 through 5 of the Six-Step Process.

Because of the limited number of management measures, the Panel is concerned that a broad enough range of alternative plans was not considered for the Leon Creek watershed.

## **Significance – High**

Evaluation of a larger number of management measures could produce a broader array of alternative plans, which in turn could affect the alternative that ultimately emerges from the process as the Recommended Plan.

## **Recommendations for Resolution**

1. Develop a broader array of management measures, particularly for those AOIs identified as having high flood risk.
2. Describe what conditions exist in the various AOIs that prevent identification of a broader array of management measures.

## Final Panel Comment 2

**The reliance on 2008 data to describe the affected environment and associated potential effects on the Recommended Plan lends uncertainty to potential changes to the future without- and future with-project conditions.**

### Basis for Comment

The Leon Creek DFR/EA provides quantitative and qualitative data for various environmental constraints, including, but not limited to, land use, vegetative cover, water quality, biological resources, and economic data such as structure values. Generally these data are based on information collected in 2008 versus more current years, i.e., 2012 to present.

- The 2008 303(d) List was used in the Water Quality part of Section 2 of the DFR/EA to describe potential water quality concerns within the project study area. The 303(d) List has since been updated and Segment 1907 (Upper Leon Creek) is no longer identified on the List (TCEQ, 2012). The Texas Commission on Environmental Quality (TCEQ) may also have identified additional stream segments not described in the DFR/EA, and this information should be updated accordingly, especially if these segments are now on the most recent 303(d) List.
- Section 2 of the DFR/EA uses 2008 data for GIS analysis such as land use and land cover. Changes in land use and land cover could result in changes in the effects documented in the DFR/EA.
- It is unclear whether census data provided in the DFR/EA are from 2000 or 2010. The poverty threshold data in the DFR/EA (p. 37) indicate that the poverty threshold for a household of three is \$13,738. The 2014 Department of Health and Human Services (HHS) guideline is \$19,790 (HHS, 2014). The U.S. Census Bureau preliminary poverty threshold for 2013 is \$18,552 for a household of three people (Census Bureau, 2014). These guidelines and thresholds are considerably higher than those reported in the DFR/EA.
- Appendix B is based on data collected by USACE and other agency staff in 2008. Site conditions that were used to make the assessments for existing conditions in the HEP and EPA Rapid Bioassessment models could have changed in five years, and thus the amount of lift could have changed, positively or negatively. Decisions regarding potential mitigation required for the Recommended Plan could change with this updated information.
- 40 CFR § 1502.22 of NEPA allows for incomplete data and/or gaps of information as part of an analysis for two reasons: (1) the effects would not be determined as significant and/or (2) the costs to provide updated information would be considered “exorbitant.” The Panel is uncertain whether the updated data would result in a determination that the impacts proposed would be considered “significant” or “exorbitant” and thus require an analysis of whether additional documentation is needed to stay in compliance with NEPA.

There is uncertainty whether the impacts from the Recommended Plan would be less using 2008 data than if using updated data. In particular, it is unclear whether the structural and non-structural elements of the Recommended Plan would change as a result of using more current data.

### Significance – Medium/High

The use of 2008 project data could affect the analysis and selection of the future with- and without-project structural and non-structural alternatives cost estimates and calculated project benefits.

### Recommendations for Resolution

1. Update the DFR/EA to reflect the most current data available to document existing

conditions/affected environmental constraints within the project study area. This includes water quality, land use, land cover, and other environmental constraints.

2. Use 2010 and 2014 Census data or most current poverty thresholds for the socio-economic analysis in the DFR/EA.
3. Update the DFR/EA to include the latest site condition information in the HEP and EPA Rapid Bioassessment models.
4. Consider whether the updated/revised data in recommendations 1-3 above would affect the selected structural and non-structural alternatives.

### **Literature Cited:**

TCEQ (2012). Texas Integrated Report of Surface Water Quality (Formerly Texas Water Quality Inventory and 303(d) List). Texas Commission on Environmental Quality.

[http://www.tceq.texas.gov/waterquality/assessment/305\\_303.html](http://www.tceq.texas.gov/waterquality/assessment/305_303.html)

HHS (2014). 2014 Poverty Guidelines. Federal Register Notice, January 24, 2014. U.S. Department of Health & Human Services, Washington, D.C.

<http://aspe.hhs.gov/poverty/14poverty.cfm>

Census Bureau (2014). Poverty Thresholds. Preliminary Estimate of Weighted Average Poverty Thresholds for 2013. U.S. Census Bureau.

<http://www.census.gov/hhes/www/poverty/data/threshld/index.html>

### Final Panel Comment 3

**Using 2035 as the future condition year introduces uncertainty that forecast patterns and trends for the future without-project condition will continue for 25 years.**

#### Basis for Comment

Predicting 25 years into the future from the base year of 2010 is challenging. The Panel recognizes that it is difficult to predict the level of floodplain development and institutional, social, geotechnical engineering, and H&H conditions that far ahead without considerable uncertainty. The DFR/EA does not explain what factors contribute to expected dynamic conditions going forward 25 years from the base year.

The Leon Creek DFR/EA (p. 101) states:

“Floodplain management is highly effective in controlling future development of the floodplain and assuring that existing flood risks do not increase. The City of San Antonio and Bexar County presently participate in the National Flood Insurance Program and enforce zoning regulations for development in the floodplain. Best Management Practices for stormwater and Low Impact Development (LID) are encouraged and incentivized. However, floodplain management cannot, by itself, significantly reduce existing flooding conditions within a highly urbanized floodplain. San Antonio’s floodplain management program can be expected to complement the Leon Creek flood risk reduction projects by stabilizing future damage conditions and preventing significant future increases in residual risk.”

If future development is expected to be managed using city and county institutional controls that are known to be effective, it is difficult for the Panel to confirm that economic development in an already highly urbanized floodplain will contribute to persistent, long-range changes in impermeable surface area and increased runoff.

Some other factors must be contributing to expected changes in future without-project conditions. The most likely factor is expected changes in future H&H conditions. However, the H&H analysis indicates that the future without-project discharge rates were adjusted downward and used a straight line projection to have model results revised downward. There is no justification presented for this approach, nor are there details on what other projection methods were considered and why the straight line method is the most reasonable one.

The outcome of using such a distant future year could result in both different without-project condition damages and higher benefits attributable to the Recommended Plan, or other potential plans that might have previously been seen as infeasible.

#### Significance – Medium/High

Discounting without-project condition damages so far into the future affects the implications of those damages, which then affects the understanding of the benefits attributable to the Recommended Plan.

#### Recommendations for Resolution

1. Develop a narrative explaining why 2035 is the most reasonable and most likely expected future year for comparing future without-project condition damages.
2. Explain what conditions or trends exist in the watershed that contribute to long-range, dynamic conditions that will result in a 25-year horizon between the base year and expected future condition year.
3. Explain how using a more near-term future year might affect the calculation of future without-project conditions and how that could affect the feasibility of the Recommended Plan.

## Final Panel Comment 4

**The Helotes Creek Quarry Pond alternative has not been described or analyzed in sufficient detail to assess the potential benefits, impacts, and costs associated with its use as a stormwater detention facility.**

### Basis for Comment

The Leon Creek DFR/EA identifies Alternative 12, Helotes Quarry Pond, as a cost-efficient alternative with far-reaching effects within the watershed. The DFR/EA recommends implementation of a three-component alternative: (1) 100-year levee in AOI-2 with hydraulic mitigation and environmental mitigation, (2) Helotes Creek Quarry, and (3) buyout (permanent floodplain evacuation) of four single-family homes and 32 townhomes in Non-Structural (NS) AOI-4.

The DFR/EA indicates that the approximately 50-acre quarry has been excavated to 100 feet below natural grade and is soon to be abandoned. The DFR/EA also specifies that a weir structure will be needed to divert flood waters into the quarry and a pump station will be required to evacuate stored waters from the detention site following an event. Finally, the DFR/EA states that since the quarry is located in an active mining area, Helotes Creek has been diverted and is naturally spilling into some of the quarry areas today.

The DFR states that during a site visit in August 2013, USACE Fort Worth District, Southwest Division, staff noted that flood flows along Helotes Creek are already spilling into the quarry and concluded that the benefits are already in place today. Based on this observation, further analysis associated with the Helotes Creek Quarry Pond was not recommended at the time. The determination that benefits are “in place” for Helotes Quarry Pond is noted; however, uncertainties in the hydrogeology of the pond have not been considered and may affect the project’s costs and assessment of structural alternatives.

The following issues do not appear to have been considered:

- The potential impact of impounding water in the 100-foot deep quarry on regional hydrogeology has not been evaluated relative to future groundwater levels and groundwater quality.
- Texas Water Code Section 26.553, Regulation of Quarries within Water Quality Protection Areas, requires assessment of the quarry and development of a quarry reclamation plan. The Panel is not aware of such an assessment or plan being developed, based on its review of the DFR/EA.
- It is unclear if the future use of the quarry as a stormwater detention basin is consistent with the Texas Water Code. In addition, use of the Helotes Quarry Pond will require design, construction, and operation/maintenance issues to be considered. In particular, typical quarry reclamation requires stabilization and vegetation of permanent slopes and drainage measures to limit erosion.
- Over time, silt will accumulate within the quarry due to its use as a detention basin. The DFR/EA does not address the impacts of long-term silt management and cost implications within the basin.
- No detail is provided as to the conceptual design of the weir structure and pumping system that would be associated with the use of the quarry as a detention basin. There is no description of the over-slope drainage system that may be necessary to convey water down the quarry slope without long-term erosion and impact on slope stability.
- The DFR/EA does not describe the pumping station, its capacity, or design, or the pump station operation, maintenance, repair, rehabilitation, and replacement (OMRRR).

## Significance – Medium/High

The Helotes Quarry Pond detention basin has potential impacts and cost implications that have not been considered in the assessment of structural alternatives.

## Recommendations for Resolution

1. Assess the potential impacts of impounding water within the quarry on regional hydrogeology, including groundwater levels and water quality.
2. Provide additional details regarding reclamation of the quarry, per Texas Water Code requirements, as it relates to the proposed use as a detention basin.
3. Address long-term silt management within the quarry detention pond.
4. Provide conceptual design details of the weir, over-slope conveyance system, and pumping system.
5. Provide detail on the pump station and OMRRR requirements.

### Literature Cited:

Texas Water Code. Section 26.553 - Regulation of Quarries within Water Quality Protection Areas  
[http://www.weblaws.org/texas/laws/tex\\_water\\_code\\_section\\_26.553\\_regulation\\_of\\_quarries\\_within\\_water\\_quality\\_protection\\_area](http://www.weblaws.org/texas/laws/tex_water_code_section_26.553_regulation_of_quarries_within_water_quality_protection_area)



## Final Panel Comment 5

**The impact of poor ground conditions on the design and stability of the levee is not fully addressed in the conceptual design and may result in an underestimation of project costs.**

### Basis for Comment

Appendix G.2 recommends an earthen levee to mitigate flood risk at the Jet Engine Test Cell Facility. The appendix indicates that a conceptual design was completed to develop construction quantities for USACE so that a cost estimate could be prepared and a risk and uncertainty assessment could be performed based on that estimate. However, the conceptual design does not include any additional geotechnical, hydraulic, or field survey analyses. The conceptual design is based upon information in the Interim Feasibility Study (IFS), aerial photographs, LiDAR topographic data, utility locator maps, and previous geotechnical/engineering reports prepared by others. Appendix G.2 includes a geotechnical report conducted by HVJ Associates in support of a Test Cell Facility Feasibility Analysis conducted for HDR Engineering. The geotechnical report indicates that the existing levee is in extremely poor condition and recommends its complete removal and reconstruction. In addition, the report states the soils at the groundwater table (15 feet below grade) are very compressible and have essentially no undrained shear strength.

The description of levee construction indicates that the existing levee fill would be completely removed prior to construction of the new levee. However, there is no discussion on the removal of the underlying soft soils or their impact on the stability of the levee if they are to remain in place. Sheet C1.01 (Test Cell Levee Alt Plan and Profile Leon Creek IFS), which is included as part of Appendix G.2, shows a typical section that lacks detail on the extent of over-excavation of unsuitable soils. The extent of over-excavation is not indicated on the levee profiles shown on Sheets C1.01 through C1.04 (Appendix G.2).

The DFR/EA recommends additional geotechnical analysis to address these issues and indicates that they have assumed some variation in soil quantities. However, variations in excavation depths may affect earthwork quantities, dewatering requirements, and the protection of adjacent existing improvements due to the lateral extent of excavation slopes. Increased quantities, protection of adjacent facilities, and groundwater handling and treatment could potentially affect project costs.

### Significance – Medium/High

Without identifying the assumed extent of excavation, including temporary construction slopes and the treatment of the soft foundation soils, it is difficult to assess the cost of, and impacts on, levee construction.

### Recommendations for Resolution

1. Provide additional detail in Appendix G.2 regarding the proposed over-excavation of existing fill and unsuitable foundation soils.
2. Address the potential need for, and assumption regarding, temporary dewatering to achieve the required excavation limits, including the handling and treatment of potentially contaminated groundwater.
3. Show the assumed excavation limits on the Test Cell Levee Alt Plan and Profile Sheets C1.01 through C1.04

## Final Panel Comment 6

**The potential impacts of soil, stream sediment, and groundwater contamination have not been fully addressed in the DFR/EA.**

### Basis for Comment

The Leon Creek DFR/EA and its supporting appendices indicate that there are numerous sources of potential soil, stream sediment, and groundwater contamination that have not been fully addressed. Appendix F lists sites in the vicinity where hazardous substances or petroleum products may have been released to soil, groundwater, or surface water. Many of these sites are located in and around the former Lackland Air Force Base site and associated industrial area, including the Jet Engine Test Cell Facility. However, the appendix does not provide specific data regarding potential for onsite soil contamination associated with the Jet Engine Test Cell Facility's current or past use, the type or concentration of contaminants in the onsite groundwater extraction wells, or contaminants in the creek sediments recently analyzed by the USGS.

Appendix F identifies numerous sites of concern either occupied by holding tanks or which may have been spill sites. In addition, Sheet C1.01 (Appendix G.2) indicates that levee foundation and sump excavation will occur within a buried sludge dewatering basin and Sheet C1.04 (Appendix G.2) indicates levee construction within a fuel farm area. The presence of contaminated soil in these areas could require offsite disposal, importation of clean soil, and additional health and safety measures during construction. Mitigation of onsite contaminated soil could have a significant impact on the project schedule and cost.

The USGS recently completed a study of contaminants within stream bed and suspended sediment in Bexar County, Texas. The study included sampling sites within Leon Creek near the Jet Engine Test Cell Facility. Numerous contaminants were found, including heavy metals, pesticides, and polychlorinated biphenyls, as well as other polycyclic aromatic hydrocarbons. The 404(b)(1) analysis presented in Appendix J indicates that there may be residual contamination in the soils in and around Leon Creek. The narrative in Appendix J states that the soil excavated from the channel should be tested for contaminants before being used in levee or bank reconstruction. For the purposes of the 404(b)(1) analysis, the potential presence of contaminants within soils to be excavated for creek channel improvements appears to be sufficiently addressed. However, for the purpose of the DFR/EA, the presence of potentially contaminated sediments requires more detail.

Although Appendix G.2 provides a general description of the groundwater extraction and treatment system at the Jet Engine Test Cell Facility, no data are provided regarding the contaminants, their concentrations, and hydrogeologic conditions. There is no discussion of the range of natural and controlled groundwater levels, or whether the contaminants are present within a shallow water table aquifer or a deep aquifer. The proposed unlined drainage sump may extend to or below the local groundwater level, resulting in the potential mixing of surface and ground water. The potential impacts of the groundwater contamination, including the treatment and disposal of water collected in the sump and/or generated by construction dewatering, have not been discussed. The impact of the proposed cutoff wall on groundwater drawdown capture zones and pumping rates, as well as the potential for soil contamination associated with groundwater contaminants when excavating near the past or present water level, need to be discussed in the DFR/EA. Of primary importance, mitigation of onsite groundwater and associated soil contamination could also have a significant impact on project schedule and cost.

The DFR/EA does not address National Pollutant Discharge Elimination System (NPDES) requirements for the design and operation of the proposed sump and sluice gate. Given that the sump will collect stormwater from an industrial facility and an area of potential surface soil contamination, site-specific requirements for its collection, testing, treatment, and discharge should be addressed. A lined sump, an operable gate on the discharge sluices to hold storm water until testing is completed, and/or other features

may be required. The addition of these features, if required, will also increase project costs.

### **Significance – Medium/High**

Handling, treatment, and disposal of contaminated soil, sediment, and groundwater could significantly affect project costs if not addressed prior to conceptual design. The location, duration, and severity of the contamination also poses potential threats to public safety, health, and welfare, including impacts on the surrounding landscape.

### **Recommendations for Resolution**

1. Update DFR (pp. 34–35 and 110–111), Appendix F- HTRW and Appendix G.2 (pp. 11–14) to include discussion of potential soil contamination.
2. Assess the potential cost impacts associated with offsite disposal of contaminated soils as hazardous waste and importation of clean soil.
3. Assess the potential cost and schedule impacts associated with health and safety, contaminated soil management, and testing associated with mitigation of contaminated soils/sediments during construction.
4. Provide additional information regarding the nature of the groundwater contamination at the Jet Engine Test Cell Facility levee and potential impacts on construction dewatering, contaminated soil handling/disposal, and extraction system operation.
5. Address the potential NPDES water quality discharge requirements for the design, monitoring, and operation of the sump and discharge sluice gates.
6. Provide documentation in the Main Report DFR/EA describing how alternative selections, including the Recommended Plan, demonstrate avoidance of contamination at the Jet Engine Test Cell Facility.

## Final Panel Comment 7

The Jet Engine Test Cell Facility and Helotes Quarry Pond structural alternatives connection with the surface water flows and groundwater is not discussed or documented.

### Basis for Comment

Understanding if possible connections exist between surface water flows from Leon Creek and groundwater is important to understand and document, especially for areas that could have possible impacts on water quality. Two possible locations are:

- Alternative 2, Jet Engine Test Cell Facility, structural alternative consists of a flood protection levee with channel improvements. The Panel was concerned about the possibility of contamination, but could not find assessment documentation of impacts due to contaminated groundwater mixing with the Leon Creek surface water flows.
- Alternative 12, Helotes Quarry Pond, is stated in the DFR/EA as an effective alternative with no further improvements required. The discussion also states that onsite observations have found the site is currently accepting flood flows into the quarry and that benefits are already realized for this site. The Panel could not find documentation this site was evaluated to determine if groundwater and surface water from Leon Creek are connected and if the impound water affects the quality of surrounding groundwater and surface water.

### Significance – Medium

A clear understanding of possible connections between groundwater and surface water from Leon Creek is necessary to fully understand and evaluate the potential negative impacts downstream and on overall water quality.

### Recommendations for Resolution

1. Provide discussion in the DFR/EA, documenting the evaluation of the connection between surface water flows and groundwater at Alternative 2 and 12 locations.
2. Provide discussion and evaluation on the need to incorporate potential changes to the alternative analysis and design of Alternative 2, Jet Engine Test Cell Facility to meet state and Federal requirements for NPDES rules and criteria.
3. Provide discussion in the DFR/EA evaluating possible pollutant impacts and recommended solutions to prevent violation of NPDES rules and criteria for Alternative 12, Helotes Quarry Pond.

## Final Panel Comment 8

**Resources that affect Pearsall Park, such as recreation, noise, lighting, and aesthetics, are not addressed in sufficient detail to meet NEPA requirements.**

### Basis for Comment

Pearsall Park is located adjacent to, and within the boundaries of, the Structural Element (1% annual exceedance probability [AEP] Levee + Hydraulic Mitigation) of the Recommended Plan. The park is owned and managed by the City of San Antonio (City) and part of its boundaries appears to be within the Leon Creek watershed, according to the Pearsall Park Master Plan (Google Earth, 2014 and City of San Antonio, 2013).

Appendix C of the DFR/EA does not include any correspondence between USACE or the San Antonio River Authority (SARA) with the City regarding Pearsall Park and how it may be affected by the Recommended Plan. The Panel cannot confirm if there has been any coordination with the City. If coordination has not been conducted with the City, public outreach and interaction with interested stakeholders and governmental agencies would be inconsistent with NEPA practices.

NEPA requires that EAs describe and document environmental constraints that would have potential effects within the project study area. Some of these constraints include, but are not limited to, recreation values, noise, lighting, and aesthetics.

**Recreation.** Enhancing recreation benefits is a stated objective in the DFR/EA, yet these benefits have not been discussed. The DFR/EA does not state that the Recommended Plan enhances recreation benefits, which introduces some uncertainty as to whether this alternative meets the objectives of the project as outlined in the DFR/EA (p. 47). In addition, the DFR/EA does not address impacts on recreation at Pearsall Park, which could be either beneficial or detrimental. Table 3-15 (DFR/EA, p. 93) indicates that for both AOI-2 (1% AEP Levee + Hydraulic Mitigation) and NS AOI-4 (proposed buyout area) that zero dollars of Annual Benefits, both separately and combined, are provided by these structural and non-structural elements of the Recommended Plan.

**Noise.** The DFR/EA describes the noise characteristics in the study area and potential effects from construction of the Recommended Plan qualitatively, but without specific focus on Pearsall Park. Facilities such as Pearsall Park are commonly created and designed to help reduce noise levels, especially in areas that are relatively speaking “natural.” The DFR/EA does not address how the increase in height from the 1% AEP Levee may exacerbate ambient noise levels near Pearsall Park, potentially decreasing its value and functioning.

**Lighting.** The DFR/EA does not discuss lighting characteristics in the study area. It describes potential effects from construction of the Recommended Plan qualitatively, but without specific focus on Pearsall Park. Facilities such as Pearsall Park are commonly created and designed to provide natural landscape buffers to urban encroachment, including lighting. The DFR/EA does not address how light would be dissipated or concentrated as a result of the creation of the levee surrounding the Jet Engine Test Cell Facility, and how this may affect the functioning and value of Pearsall Park.

**Aesthetics.** The DFR/EA does not describe aesthetic values in Pearsall Park or how the Recommended Plan would affect these values. Facilities such as Pearsall Park are commonly created and designed to provide specific goals for aesthetics, especially in urban environments. It is unclear how the Recommended Plan avoids impacts on these values or incorporates design features to mitigate and/or enhance aesthetic characteristics

## Significance – Medium

Documentation and description of the potential effects of the Recommended Plan on Pearsall Park are essential for meeting NEPA requirements, and for a complete understanding of the selection of the structural and non-structural elements of the Recommended Plan.

## Recommendations for Resolution

1. Revise the DFR/EA to document effects of the Recommended Plan (1% AEP Levee + Hydraulic Mitigation and Channelization) on Pearsall Park, including recreation, noise, lighting, and aesthetics.
2. Revise the DFR/EA to describe Pearsall Park and document all the active and passive recreational resources it provides.
3. Conduct a Unit Day Value (UDV) analysis on the recreation impacts associated with the Recommended Plan. If these impacts are negative, include them in the National Economic Development (NED) costs associated with implementing the Recommended Plan. If these impacts are positive, include them in the NED benefits associated with the Recommended Plan.

## Literature Cited:

Google Earth™ (2014). Review of aerial photography with park boundaries on January 20, 2014. David Young.

City of San Antonio, Office of the City Council (2013). Pearsall Park Master Plan. Obtained from <http://www.sanantonio.gov/Council/d4/PearsallParkMasterPlan.aspx> on January 20, 2014.

## Final Panel Comment 9

**The use of multiple discount rates, price levels, and development levels from different years in the Leon Creek DFR/EA and Economics Appendix makes it difficult to compare the cost and benefits of the Recommended Plan.**

### Basis for Comment

The Leon Creek DFR/EA and Economics Appendix A use different discount rates, levels of development, and price levels to describe project benefits and project costs.

Without figures that represent the most current dollars, development levels, and discount rates available, it is difficult to compare the values and conclude that they are reasonable and represent the most recent data available. The Panel appreciates that other figures – such as those shown in the early screening process – are shown in the year they were developed, which preserves the integrity of the study's process and shows how and why USACE arrived at the conclusions they did based on the best available data at the time the data were generated. However, once a plan or plans have been identified, economic and financial data that are outdated preclude comparison and conclusion that the data presented are accurate and up-to-date.

The most recent data should be used and project benefits and costs should represent most recent conditions. The DFR/EA and appendices state that Bexar County Appraisal District data were used to establish structure values within the watershed, but do not give the year the data were obtained. In many urban areas of Texas and the United States, the 2008 recession significantly reduced structure values, causing reevaluations of floodplain inventories. This could result in changes to the future without- and future with-project condition damages, costs, and project benefits.

ER 1105-2-100, Appendix D (USACE, 2000), and current planning practice and guidance call for use of the most recent data available to express project costs and benefits: “(3) Plan for Economic Updates. Feasibility reports, General Reevaluation reports and other project decision (formulation) documents, shall include a plan for updating project benefits for future reporting and decision making. The economic update plan shall likewise be included in all Project Management Plans. The actions in the plan may be limited in that no major new analyses need be conducted but rather previous assumptions reviewed and updated with techniques such as surveys and sampling employed to develop a reasonable estimate of current project benefits provided no significant changes in without and/or with project conditions have occurred. However, in no event will simple indexing of overall benefits be acceptable. The plan shall include discussions of the data that will be required and the procedures that will be employed. Any rational set of procedures that result in a current analysis of benefits may be acceptable except procedures which amount solely to indexing of benefits....”

### Significance – Medium

Use of multiple economic data sources from different years makes it difficult to establish whether the most recent data available were used to quantitatively compare alternatives and compare alternatives to the without-project condition.

### Recommendations for Resolution

1. Clarify that discount rates, price levels, and property values used in the most recent version of the economic and plan formulation investigations are the most current data available.
2. If possible, use the most recent data for watershed development, economic conditions, price levels, and discount rates to facilitate comparison between plans and the without-project condition.

**Literature Cited:**

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



## Final Panel Comment 10

**The methodologies and processes used for hydraulic model development and modeling at stream and tributary junctions (confluence) can have an impact on model results that lead to the selection of alternatives to be evaluated.**

### Basis for Comment

The methodology and process used for hydraulic model development can have an impact on the accuracy of the model results for water surface profiles, flow rates, velocities and other parameters. Results from the hydraulic model also affect the selection of alternatives to be analyzed leading to the selection of alternatives for the recommended plan. EM 1110-2-1419 (USACE, 1995) provides the basic technical procedures for flood reduction studies.

In addition, the methodology and process used to combine flows at main stem stream and tributary junctions (confluence) can have an impact on the hydraulic model upstream and downstream results for surface water elevations and flow rates. Similarly, the future with-out project hydraulic model results will also have an impact on the selection and evaluation of project alternatives leading to the recommended plan. The methodology and process for combining flows at stream junctions is described in USACE (1993 and 1994). Appendix G.1 states that the existing and future without-project conditions for each tributary of Leon Creek were modeled separately (pp. 63 and 68) with no discussion of methodology and process used for combining flows.

Appendix G.1 is not clear describing the methodology and process used for the development of the existing, future without-project, and alternative analysis hydraulic models. The Panel assumes the hydraulic models were developed and evaluated as recommended by USACE (1995) and that the alternative analysis is consistent with the existing and future without-project hydraulic model methodology.

The impact each alternative has upon other alternatives also needs to be evaluated thoroughly during alternative analysis, next added increment, through to the recommended plan. Section B-8, Alternative Evaluations, of USACE (1995) recommends: "For the alternatives jointly developed with the members of the inter disciplinary planning team, modify the hydrologic and/or hydraulic models to develop the effects of each alternative (individually and in combination) on flood levels."

Appendix G.1 does not clearly state if the alternative analysis leading up to the recommended plan and next added increment analysis also evaluated the effects of each alternative has upon each other. The Panel assumes the alternative analysis does follow the recommended procedure outlined by Section B-8 of USACE (1995).

The Panel assumes the methodology used to combine flows at the main stem stream and tributary junctions (confluence) is consistent with the procedures in USACE (1993).

### Significance – Medium/Low

Using results from sound hydraulic methodologies and models is important for the identification of alternatives leading to selection of the recommended plan.

## Recommendations for Resolution

1. Clarify in Appendix G.1 that the methodology used is consistent with USACE (1995).
2. Clarify in Appendix G.1 that the alternative analysis evaluation is consistent with the methodology and process outlined by Section B-8 of USACE (1995).
3. Discuss in Appendix G.1 the model methodology for future conditions backwater analysis and procedures used for model evaluation at stream and tributary junctions (confluences). Clearly document that the hydraulic analysis is consistent with the procedures in USACE (1993 and 1994).

### Literature Cited:

USACE (1995). Engineering and Design: Hydrologic Engineering Requirements for Flood Damage Reduction Studies. EM 1110-2-1419. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 31 January.

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USACE (1993). Engineering and Design: River Hydraulics. Engineer Manual (EM) 1110-2-1416. 15 October.

## Final Panel Comment 11

**Although climate change is qualitatively addressed, its impact on hydrologic parameters and the environment under future project conditions to 2035 is not fully addressed for the alternative analysis.**

### Basis for Comment

The Leon Creek DFR/EA (p. 37) briefly summarizes the effects of climate change within the project area, and Texas in general, stating that average temperatures are increasing and precipitation is decreasing in Texas. The DFR/EA also states that the accuracy of climate change models at a state level are highly uncertain and unreliable for predicting future precipitation and temperatures. The DFR/EA does not provide a discussion on how climate change affected the values for the future hydrologic parameters such as reduced precipitation, change in land use, within the project area. Appendix G.1 does not clearly describe the future conditions that the hydrological model is based on extending out to 2035.

Additionally, the DFR/EA and Appendix G.1 do not include a discussion developing hydrologic model parameter values due to climate change for land use, precipitation, or change in rainfall distribution for the future conditions.

The discussion on climate change does not address the effects on the environment and water quality within the project area or include countermeasures for mitigation sustainability during the project life to 2035. These measures could have an impact on the performance of the Recommended Plan.

### Significance – Medium/Low

Analyzing the effects of climate change is critical to the alternatives analysis and accurately understanding and determining the future hydrological and environmental impacts.

### Recommendations for Resolution

1. Provide a more detailed assessment of future climate change impacts in the context of the future conditions out to 2035 and clarify if the hydrologic parameters are extended to the future project conditions to 2035.
2. Provide a more thorough discussion of how climate change could affect environmental mitigation, land use, and future development.
3. Provide a more detailed discussion of climate change impacts on environmental and future hydrologic conditions to 2035 to ascertain the robustness/validity of climate change hydrologic model parameters and impact on the alternatives.

## Final Panel Comment 12

**Assumptions associated with the Habitat Evaluation Procedure (HEP) and Environmental Protection Agency (EPA) Rapid Bioassessment models are not fully explained or documented, preventing a thorough understanding of the degradation to habitat over time.**

### Basis for Comment

The HEP and EPA Rapid Bioassessment models use several assumptions to formulate calculations of habitat functions and values during the current, one-year, and other future conditions for the entire 50-year evaluation period. Specifically, a percentage was used in many of the environmental segment analysis areas, such as 60%, to calculate reductions in habitat functions and values to the end of the 50-year period. This percentage is not consistent with the percentage of land use/cover change assumed in the Future Without-Project Conditions analysis, e.g. 39% existing and 56% ultimate for the Upper Leon Creek segment (p. B-33), nor is it explained in Appendix B. It is unclear whether this particular assumption was coordinated with the USFWS and Texas Parks and Wildlife Department during development of the HEP and EPA Rapid Bioassessment models for this project.

The non-structural element of the Recommended Plan (i.e., the buyout of floodplain property), includes a qualitative assumption that degradation of the quality of habitats in this area would occur over time given changes in land use and land cover. While this assumption is understandable, it is unclear whether the buyout property would be placed in perpetual conservation and/or enhanced. This conservation and/or enhancement would be expected to provide long-term benefits for habitat values/functions. It has been the experience of the Panel that these properties are usually allowed to return to a natural state, which could provide beneficial versus detrimental habitat values/functions over time. These benefits are not considered in the assumptions made in either model.

### Significance – Medium/Low

The inclusion of the assumptions on calculations for degradation of habitats over time within the 50-year evaluation period would enhance the completeness of the DFR/EA and provide further support for the Recommended Plan.

### Recommendations for Resolution

1. Provide further information about the assumptions made in the HEP and EPA Rapid Bioassessment models in Appendix B and any coordination with resource agencies in Appendix C.

## Final Panel Comment 13

**Several inconsistencies in how environmental constraints identified within the study area are presented prevents a complete understanding of project effects and benefits.**

### Basis for Comment

The Leon Creek DFR/EA does not include several environmental resources in the affected environment and/or impact evaluation sections. This is inconsistent with generally accepted National Environmental Policy Act (NEPA) guidelines and practices. Environmental constraints that are not fully described include, but are not limited to, air quality, public facility, and light.

- There are inconsistencies in how certain environmental constraints are documented. For instance, air quality is documented in the DFR/EA as being in full attainment. According to the TCEQ, particular matter (PM<sub>2.5</sub>) is currently listed as “pending,” thus the statement in the DFR/EA is not entirely correct (TCEQ, 2014).
- The Early Action Compact (EAC) Plan is listed as a justification for why air quality is not a concern within the San Antonio Metropolitan Statistical Area. It is the Panel’s understanding that the EAC can only be applied to the former EPA ozone standard. It does not apply to the current EPA ozone standard, and it is anticipated that the current standard will likely become more stringent. The 50-year future evaluation assumes that there will be no change in air quality status. In the Panel’s opinion, this assumption is suspect, as air quality forecasts are very complicated.
- The DFR/EA describes certain environmental constraints within the entire watershed project area, but others only within the 500% floodplain of the watershed. This differentiation creates some confusion in the understanding of all environmental constraints within the entire watershed.
- The DFR/EA states that the black-capped vireo is not present within the Government Canyon State Natural Area. This is inconsistent with information available from several searches on-line.
- Public facility and service and lighting are not described in the Section 2 of the DFR/EA.

Since these constraints are not fully described, the Panel does not have a complete understanding as to how the Recommended Plan affects these resources and whether these impacts are significant.

### Significance – Low

An incomplete description of environmental constraints and an inconsistent application of the project study area result in an incomplete understanding of the impact of the proposed project.

### Recommendations for Resolution

1. Revise the DFR/EA to clarify the limits of the project study area between the Leon Creek watershed and the 500-year floodplains within the watershed, and provide revised supporting documentation based on this change.
2. Revise the DFR/EA to provide documentation regarding aesthetics, recreation, light, and public facility and service.
3. Revise the Main Report/EA to document air quality conditions in the affected environment and the evaluation of impacts accordingly.
4. Revise the Main Report/EA and Appendix B to include the presence within the study area of the black-capped vireo.

### Literature Cited:

TCEQ (2014). San Antonio: Current Attainment Status. Texas Commission on Environmental Quality <http://www.tceq.texas.gov/airquality/sip/san/san-status>.

## Final Panel Comment 14

**The selection of either a flood wall or a levee alternative at the Jet Engine Test Cell Facility property has not been addressed in detail.**

### Basis for Comment

The Leon Creek DFR/EA indicates that the layout and operations of the existing Jet Engine Test Cell Facility will be affected, during both construction and long-term site operations. Levee construction will require demolition of existing structures, modification of the groundwater treatment facilities, and relocation of utilities serving the facility, and will limit access to the Fuel Farm Facility, possibly requiring the need for relocation or adjustment of existing infrastructure. During construction, there may be restricted access around the facility, utility disruption, as well as other typical construction impacts. The DFR/EA does not address the short-term levee construction impacts on facility operations or the long-term impacts due to demolition of structures. Appendix G.2 indicates that a flood wall alternative, with a smaller footprint, was also considered. The floodwall was eliminated from consideration due to uncertainties associated with sheet pile constructability, vibration impacts, and cost.

Carrying forward a possible floodwall alternative in addition to the proposed AOI-2 levee improvements will allow the final selection to be based on a more detailed assessment during PED of constructability, costs, and construction impacts on Lockheed-Martin (tenant), Port of San Antonio (owner), and the U.S. Air Force (treatment system operator).

### Significance – Low

Further assessment of constructability, construction impacts, and costs may better inform the selection of either a flood wall or a levee alternative.

### Recommendations for Resolution

1. Consider both a flood wall and levee alternative during PED from a constructability, cost, and construction impact standpoint.
2. Assess the short-term and long-term impacts of the proposed improvements, during both the construction and long-term site operations at the Jet Engine Test Cell Facility, on the project stakeholders.

## 5. REFERENCES

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# APPENDIX A

IEPR Process for the Leon Creek 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 Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report (hereinafter: Leon Creek IEPR). Due dates for milestones and deliverables are based on the award/effective date of December 20, 2013. The review documents were provided by the U.S. Army Corps of Engineers (USACE) on December 23, 2013. Note that the work items listed under Task 6 occur after the submission of this report.

Battelle will enter the 14 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. Leon Creek Complete IEPR Schedule**

Task	Action	Due Date
1	Award/Effective Date	12/20/2013
	Review documents available	12/23/2013
	Battelle submits draft Work Plan <sup>a</sup>	12/30/2013
	USACE provides comments on draft Work Plan	01/03/2014
	Battelle submits final Work Plan <sup>a</sup>	01/08/2014
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	12/23/2013
	USACE provides comments on COI questionnaire	12/30/2013
	Battelle submits list of selected panel members <sup>a</sup>	12/31/2013
	USACE confirms the panel members have no COI	01/03/2014
	Battelle completes subcontracts for panel members	01/10/2014
3	Battelle convenes kick-off meeting with USACE	01/07/2014
	Battelle sends review documents to panel members	01/10/2014
	Battelle convenes kick-off meeting with panel members	01/13/2014
	Battelle convenes kick-off meeting with USACE and panel members	01/13/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	01/21/2014
4	Panel members complete their individual reviews	01/23/2014
	Battelle provides panel members with talking points for Panel Review Teleconference	01/27/2014
	Battelle convenes Panel Review Teleconference	01/28/2014

**Table A-1. Leon Creek Complete IEPR Schedule (continued)**

Task	Action	Due Date
4	Battelle provides Final Panel Comment templates and instructions to panel members	01/29/2014
	Panel members provide draft Final Panel Comments to Battelle	02/03/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	02/03 to 02/10/2014
	Panel finalizes Final Panel Comments	02/10/2014
5	Battelle provides working draft Final Panel Comments to USACE <sup>a</sup>	02/11/2014
	Battelle provides Final IEPR Report to panel members for review	02/12/2014
	Panel members provide comments on Final IEPR Report	02/12/2014
	Battelle submits Final IEPR Report to USACE <sup>b</sup>	02/14/2014
6 <sup>c</sup>	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	02/11/2014
	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	02/14/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	02/18/2014
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	02/18/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	02/18/2014
	Panel members provide Battelle with draft BackCheck Responses	02/21/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	02/24/2014
	Battelle convenes Comment-Response Teleconference with panel members and USACE	02/24/2014
	USACE inputs final PDT Evaluator Responses to DrChecks	02/26/2014
	Battelle provides final PDT Evaluator Responses to panel members	02/26/2014
	Panel members provide Battelle with final BackCheck Responses	02/28/2014
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	02/28/2014
	Battelle submits pdf printout of DrChecks project file <sup>b</sup>	03/3/2014
	CWRB Meeting (Estimated Date) <sup>d</sup>	03/27/2014
Contract End/Delivery Date	10/31/2014	

<sup>a</sup> Task added to process at the request of PDT

<sup>b</sup> Deliverable.

<sup>c</sup> Task 6 occurs after the submission of this report

<sup>d</sup> 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.

At the beginning of the Period of Performance for the Leon Creek 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. In addition, 44 charge questions were provided by USACE and included in the draft and final Work Plans. Battelle added two questions that sought summary information from the IEPR Panel. The final charge also included 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 within 3 days of their subcontracts being finalized, all four 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 Leon Creek IEPR 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.

- **Draft Feasibility Report (144 pages)**
- **Appendix A: Economics Analysis (152 pages)**
- **Appendix B: Ecosystem Evaluation (55 pages)**
- **Appendix C: Agency Coordination & Correspondence (29 pages)**
- **Appendix D: Cultural Resources (2 pages)**
- **Appendix E: Real Estate Plan (11 pages)**
- **Appendix F: Hazardous, Toxic, and Radioactive Waste (6 pages)**
- **Appendix G1: Hydrologic and Hydraulic Analyses (125 pages)**
- **Appendix G2: Civil Design and Geotech Analyses (87 pages)**
- **Appendix J: 404(B)(1) Analysis (12 pages)**
- USACE guidance Civil Works Review, (EC 1165-2-214) dated 15 December 2012
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

About halfway through the review of the Leon Creek IEPR documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted four panel member questions to USACE PDT on January 21, 2014. USACE was able to provide responses to all of the questions via email on January 22, 2014.

## 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 18 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 3.5 -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 would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. 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.

The Panel also discussed responses to a specific charge question where there appeared to be disagreement among panel members. The conflicting comments were resolved based on the professional judgment of the Panel, and all sets of comments were determined not to be conflicting.

At the end of these discussions, the Panel identified 16 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 Leon Creek IEPR:

- **Lead Responsibility:** For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- **Directive to the Lead:** Each lead was encouraged to communicate directly with 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 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 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 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).

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. During the Final Panel Comment development process, the Panel determined that one FPC was not applicable because the information was identified in the review documents and another was merged with another FPC with a common basis. At the end of this process, 14 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.

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# APPENDIX B

Identification and Selection of IEPR Panel Members  
for the Leon Creek Project

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## B.1 Panel Identification

The candidates for the Leon Creek Watershed Feasibility Study San Antonio, Bexar County, Texas, Feasibility Report (hereinafter Leon Creek IEPR) Panel were evaluated based on their technical expertise in the following key areas: economics/Civil Works Planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, and geotechnical/civil engineering. These areas correspond to the technical content of the Leon Creek IEPR review documents and overall scope of the Leon Creek project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these 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 four selected reviewers constituted 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.<sup>1</sup> These COI questions were intended to serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Previous and/or current involvement by you or your firm<sup>2</sup> in the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report.
- Previous and /or current involvement by you or your firm<sup>2</sup> in flood control studies in Leon Valley or San Antonio, Texas.
- Previous and/or current involvement by you or your firm<sup>2</sup> in the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report related projects.
- Previous and/or current involvement by you or your firm<sup>2</sup> in the conceptual or actual design, construction, or O&M of any projects in the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report related projects.

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<sup>1</sup> 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."

<sup>2</sup> 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.

- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report.
- Previous and/or current employment or affiliation with San Antonio River Authority, Texas Water Development Board, Texas Commission on Environmental Quality, City of San Antonio, USFWS, EPA (for pay or pro bono).
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to Leon Valley or San Antonio, Texas.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Fort Worth District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report.
- Current firm<sup>2</sup> involvement with other USACE projects, specifically those projects/contracts that are with the Fort Worth District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Fort Worth District. Please explain.
- Any previous employment by USACE as a direct employee, notably if employment was with the Fort Worth District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by USACE as a contractor (either as an individual or through your firm<sup>2</sup>) within the last 10 years, notably if those projects/contracts are with the Fort Worth District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning, flood risk management and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm<sup>2</sup> revenues within the last 3 years came from USACE contracts.
- A significant portion (i.e., greater than 50%) of personal or firm<sup>2</sup> revenues within the last 3 years from contracts with the non-Federal sponsor (San Antonio River Authority).
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report
- Participation in relevant prior and/or current Federal studies relevant to this project and/or Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report

- Previous and/or current participation in prior non-Federal studies relevant to this project and/or Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report
- 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. The four final reviewers were either affiliated with consulting companies or were independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

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

**Table B-1. Leon Creek IEPR Panel: Technical Criteria and Areas of Expertise**

Technical Criterion	Luckie	Young	Fluty	Rudolph
<b>Economics/Civil Works Planning</b>				
Minimum 15 years of experience in economics	X			
Familiarity with large, complex Civil Works projects with high public and interagency interests	X			
Minimum 10 years of experience in flood risk management	X			
Familiarity with the USACE flood risk management analysis and economic benefit calculations, including use of standard USACE computer programs including Hydrologic Engineering Center's Flood Damage Reduction Analysis (HECFDA)	X			
Direct experience working for or with USACE	X			
Familiarity with USACE plan formulation process, procedures, and standards as they relate to flood risk management	X			
Minimum 5 years of experience directly dealing with the USACE six-step planning process, which is governed by ER 1105-2-100, Planning Guidance Notebook	X			
Familiar with watershed planning	X			
Experience relevant to both structural and nonstructural flood risk management plan formulation	X			
M.S. degree or higher in economics	W <sup>1</sup>			
Active participation in related professional societies	W <sup>1</sup>			
<b>Biological Resources and Environmental Law Compliance</b>				
Minimum 15 years of experience directly related to water resource environmental evaluation or review and National Environmental Policy Act (NEPA) compliance		X		
Familiar with large, complex Civil Works projects with high public and interagency interest		X		
Familiarity with the habitat, fish, and wildlife that may be affected by the project alternatives		X		
Familiarity with Texas riverine species and Texas environmental laws		X		
Familiarity with U.S. Fish and Wildlife Service Habitat Evaluation Procedure (HEP) (USFWS,1980)		X		
Familiarity with the EPA Habitat Assessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers		X		
M.S. degree or higher in related field		W <sup>1</sup>		

Technical Criterion	Luckie	Young	Fluty	Rudolph
<b>Hydrologic and Hydraulic Engineering</b>				
Minimum 15 years of experience in hydrology and hydraulic engineering, including:				
Urban hydrology and hydraulics			X	
Open channel systems			X	
Effects of management practices and low impact development on hydrology			X	
Design of earthen dams and detention ponds			X	
Use of non-structural systems as they apply to flood proofing warning systems, and evacuation			X	
Familiarity with large, complex Civil Works projects with high public and interagency interests			X	
Familiarity with Hydraulic Engineering Center (HEC) modeling computer software including:				
HEC River Analysis System (RAS)			X	
HEC Hydrologic Modeling System (HMS) 2.2.2.			X	
Ability to address the USACE Safety Assurance Review (SAR) aspects of all projects defined by (EC 1165-2-214, Appendix D, Para. 2.c(3))			X	
M.S. degree in related field			X	
Registered Professional Engineer			X	
<b>Geotechnical/Civil Engineering</b>				
Minimum 15 years of experience in geotechnical and civil engineering				X
Familiarity with large, complex Civil Works projects with high public and interagency interests				X
Demonstrated experience in performing structural engineering, cost engineering, and construction management, as well as geotechnical evaluation and geo-civil design for all phases of flood risk management projects.				X
Experience in:				
Levees				X
Culverts				X
Channel stability				X

Technical Criterion	Luckie	Young	Fluty	Rudolph
Design and construction				X
Bridge design and construction				X
Design and construction for detention\retention basins				X
Utility relocations				X
Positive closure requirements				X
Interior drainage requirements				X
Application of non-structural flood risk management measures.				X
Demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering.				X
Experience in:				
geotechnical risk analysis				X
fragility analysis				X
HTRW impacts				X
Ability to address the USACE Safety Assurance Review (SAR) aspects of all projects defined by (EC 1165-2-214, Appendix D, Para. 2.c(3))				X
M.S. degree in related field				X
Registered Professional Engineer				X

*W<sup>1</sup>-Waiver statement provided as part of Task 2 deliverable and approved by USACE*



## B.3 Panel Member Qualifications

### **David Luckie**

**Role:** Economics/Civil Works planning expertise

**Affiliation:** Independent Consultant

**Mr. Luckie** is an independent consultant with 25 years of professional experience in water resource economics, planning, plan formulation, benefit-cost analysis, and risk-based analysis. He earned his B.S. in economics and finance from the University of South Alabama in 1986 and his professional experience includes working with multidisciplinary teams to provide complex planning studies including flood control, water supply, water quality, and ecosystem restoration. Mr. Luckie has extensive experience in conducting, managing, and reviewing flood risk management (FRM) study projects, dating to the 1990 Choctawhatchee - Pea Rivers Watershed studies to address flood risk management issues in Southeast Alabama.

Mr. Luckie is familiar with large, complex Civil Works projects and has worked with large, multidisciplinary teams consisting of members from state and local agencies in addition to technically adept non-Federal sponsors of flood risk management projects. His experience also includes technical and policy review to ensure that planning studies comply with applicable guidance and current law. During his 17-year career with USACE, Mr. Luckie led or worked on numerous multidisciplinary teams to produce complex Federal water resource studies and was involved in various high-profile public works projects. He provided the economic analyses and plan formulation services for such studies as the Buffalo Bayou & Tributaries Studies in Houston, Texas.

Mr. Luckie's involvement in such studies as the White Oak Bayou FRM study in Houston, Texas reflects his extensive experience with USACE FRM analysis and economic benefit calculations, including use of standard USACE computer programs such as Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA). He is very familiar with the USACE six-step planning process governed by ER 1105-2-100, Planning Guidance Notebook, and has worked in close coordination with multidisciplinary teams to identify, formulate, and evaluate alternatives and identified cost-effective solutions to water resource problems and flood risk management throughout the Southeast and across the United States using the six-step planning process. He is also familiar with watershed planning; his leadership in the Village Creek Watershed Studies and ACT-ACF studies demonstrated a comprehensive understanding of complex watershed management and watershed planning. In addition, he is experienced in both structural and non-structural flood risk management plan formulation, with project experience including the Village Creek Watershed Study in Birmingham, Alabama and Buffalo Bayou & Tributaries Studies that incorporated a broad array of both structural and non-structural management measures.

### **David Young**

**Role:** Biological resources and environmental law compliance expertise.

**Affiliation:** DESCO Environmental Consultants, LP

**Mr. Young** is an environmental consultant with DESCO Environmental Consultants in Magnolia, Texas. He earned his B.S. in marine biology from Texas A&M University at Galveston in 1993. He has more than 20 years of experience in wetland delineation, environmental assessments, water quality, and NEPA, and has been directly involved in water resource evaluation and NEPA assessments for more than 10 years.

Mr. Young has advanced USACE Wetland Delineation/Management training and has attended training courses on various aspects of NEPA, including Section 106 coordination, and state department of transportation processes related to NEPA compliance (Texas, Florida, and Arizona). Mr. Young has experience with large, complex Civil Works projects with high public and interagency interests including flood control, dam safety, navigation channel improvement, and transportation projects. Some of these USACE project examples include the Addicks and Barker Dam Safety Program (USACE Galveston District) and Port Arthur Federal Hurricane Flood Damage Protection Project (USACE Galveston District). Mr. Young also served as the project manager and provided support for the preparation of an EA/FONSI for the Federal Emergency Management Agency (FEMA) and Harris County Flood Control District for a flood control and stormwater improvement project (FEMA-1791-DR-TX) in the White Oak Bayou Basin (Jersey Village, Texas).

Mr. Young is familiar with the evaluation of habitat, fish, and wildlife that are present in riverine systems and their associated floodplains and ecosystems. His experience was earned through various types of permit and compliance mechanisms such as USACE regulatory program (Section 404 CWA/Section 10 RHA) permits, or through NEPA compliance, as well as other mechanisms for documenting potential impacts on habitat, fish, and wildlife associated with riverine systems that include biological assessments and evaluations, habitat characterization efforts, and seine sampling. He is familiar with Texas riverine species and Texas environmental law, and has provided consulting services within Texas from 2001 to 2006, 2008 through the present. Duties included the collection, analysis, and documentation of potential impacts on Texas riverine species, along with knowledge of Texas rules and regulations with respect to impacts in these environments. He has led and managed finfish studies in Texas in association with seismic activities for various clients, taxonomically identifying those species affected by seismic activities, cataloging their measurements, numbers, and location. These finfish studies also involve coordination with the Texas Parks and Wildlife Department regarding mitigation measures needed to offset these impacts.

Mr. Young has experience in ecosystem/HSI modeling, in particular with the U.S. Fish and Wildlife Service Habitat Evaluation Procedure (USFWS HEP) and knows function and value assessment methodologies and modeling. Relevant studies include the HSC PA 14 and 15 project where he used the HEP with HSI modeling to quantify the quality of the habitat used by the great egret, Gulf menhaden, red drum, and white shrimp. He was also a peer reviewer for Battelle on the Chatfield Dam IEPR and the Hunting Bayou IEPR, which included extensive HEP analysis and HSI modeling. He was directly involved with the EPA method for rapid bioassessment in streams and wadeable waters while with the Florida Department of Environmental Protection from 1993 to 1995.

### **Larry Fluty, P.E., Ph.D.**

**Role:** Hydrology and hydraulics expertise

**Affiliation:** Cardno, Inc.

**Dr. Fluty** serves as Director of Watershed Management for Cardno and has more than 34 years of experience in water resources planning and design and construction management of water control facilities. He earned his Ph.D. in civil engineering/water resources from Grant University in 2012, is a registered professional engineer, Association of State Floodplain Managers – Certified Floodplain Manager, and American Academy of Water Resource Engineers – Diplomate, Water Resources Engineer. His experience includes complex H&H analysis, watershed studies, ecological impact

mitigation designs, FEMA flood hazard mapping, reservoir design, permitting, stream stabilization, GIS, dam and levee design and compliance reviews for dam safety and post-disaster assessments. He has worked on numerous projects for water management districts, USACE, EPA, and state agencies nationwide.

Dr. Fluty is familiar with the effects of management practices and low-impact development on hydrology and the use of nonstructural systems as they apply to flood proofing warning systems and evacuation. Relevant studies include the development of low-impact design techniques and non-structural alternatives to alleviate flooding in low-lying communities for the Hernando County and the Southwest Florida Water Management District. He is familiar with open channel systems and has worked on such studies as the Canal Conveyance Capacity Projects, USACE Jacksonville District, Florida and the South Florida Water Management District. The study included such elements as the assessment of erosion and sediment transport, hydraulic modeling of existing capacity, and recommendations for remedial construction to provide required capacity. His experience with urban hydrologic and hydraulic analyses includes studies such as Curlew Creek Restoration and Improvements, Pinellas County, Florida, where local community leaders complained of excessive creek erosion endangering residential structures and frequent flooding of the community. Dr. Fluty worked closely with the County during the initial investigation and developed a comprehensive Basis of Design Report outlining a program to investigate, model, design, permit, and prepare construction documents to resolve erosion issues, reduce flood impacts, and provide for water quality and environmental rehabilitation of Curlew Creek. Services included planning, watershed analysis, hydrology and hydraulic modeling, stream assessment and stability, survey, and preparation of design, plans, permits, and construction documents. The design allowed natural geomorphological processes to continue unimpeded and protects residents and infrastructure facilities from extreme flooding conditions.

Dr. Fluty is familiar with HEC modeling computer software including HEC RAS and HEC HMS. He has used these models on such studies as SH-130 Design and Drainage Improvements, Texas Department of Transportation, where he evaluated variable storm durations and critical storm determination for several watersheds along the entire project limits to ensure no impacts upstream and downstream of all conveyance crossings. He is capable of addressing the USACE SAR aspects of all projects defined by (EC 1165-2-214, Appendix D, Para. 2.c(3)) and provided support to the Broward County WPA Project with the Dam Inspection Program, USACE Huntington District, West Virginia. He provided support to the District's Dam Safety Program by performing investigations of existing embankment and concrete dams, lock structures, and powerhouses, preparing reports that included the documenting of safety analyses and hydrologic, hydraulic, and water resource engineering services.

### ***William Rudolph, P.E., G.E.***

**Role:** Geotechnical/civil engineering expertise.

**Affiliation:** Independent Consultant

**Mr. Rudolph** is an independent consultant with 34 years of experience as a principal engineer and project manager on a wide variety of geotechnical engineering and flood control projects including levees along the Mississippi, America, and Sacramento Rivers. He earned his M.S. degree in geotechnical engineering from the University of California at Berkeley in 1978 and is both a licensed professional engineer and a licensed geotechnical engineer. Mr. Rudolph is familiar with large, complex Civil Works projects with high public and interagency interest. He has served as a consultant on numerous large and complex Civil Works projects, such as large dams and levee projects in California's Central Valley and the

Oakland Harbor deepening project, which involved sediment characterization, geotechnical analysis of dredge slope stability, design of new waterfront embankments and bulkheads, beneficial reuse of dredge sediments including a constructed shallow water habitat area, and significant portions of the Hamilton wetlands restoration site.

He has demonstrated experience in performing structural engineering, cost engineering, and construction management, as well as geotechnical evaluation and geo-civil design for all phases of flood risk management projects. These projects have included levees, small earth fill dams, lined and unlined canals, weirs, pump stations, pipelines, culverts, bridge replacements, and flood walls. He has extensive civil and geotechnical engineering experience on flood control projects that incorporated design and construction of levees, culverts, channel stability assessments, and improvements. He has participated in the design and construction of new and retrofit of bridges ranging from the retrofit of the Golden Gate Bridge to small local bridge replacements. He has conducted and reviewed the design and construction of detention/retention basins including control structures, embankment design, and seepage evaluation. Flood control projects have included utility relocation and design of positive levee closures. He has experience in the assessment of interior drainage requirements and has evaluated alternative non-structural flood risk management measures for projects in California's Central Valley and along the Mississippi River.

Through his design consultant work and peer review roles, Mr. Rudolph has demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering. He has conducted and reviewed geotechnical risk analyses for dam and levee systems including Natomas Basin levees, Success Dam, and Isabella Lake Dam in the USACE Sacramento District and has experience in levee fragility analysis through incorporation of hydrologic and geotechnical seepage/stability inputs. Additionally, he has extensive experience with Hazardous, Toxic and Radioactive Waste (HTRW) evaluations relative to flood control and levee projects including impact and mitigation of both soil and groundwater.

Mr. Rudolph, through his involvement with USACE peer reviews (including peer reviews of the USACE Hurricane and Storm Damage Risk Reduction System projects in greater New Orleans), is able to address the USACE SAR aspects of all projects defined by EC 1165-2-214 (Appendix D, Para. 2. c (3)). Mr. Rudolph is an active member of the American Society of Civil Engineers, including the Coasts, Oceans, Ports and Rivers Institute, and is a corresponding member of the ASCE 7-10 Seismic Subcommittee. He recently participated in an earthquake damage reconnaissance of waterfront facilities in Japan following the Honshu Earthquake and tsunami as part of a COPRI team.

# APPENDIX C

Final Charge to the IEPR Panel  
as Submitted to USACE on January 8, 2014  
for the Leon Creek Project

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# CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE IEPR OF THE LEON CREEK WATERSHED FEASIBILITY STUDY, SAN ANTONIO, BEXAR COUNTY, TEXAS, FEASIBILITY REPORT

## BACKGROUND

Leon Creek originates seven miles northeast of Leon Springs in northwestern Bexar County and runs southeast for 57 miles through Leon Valley and the western portion of San Antonio to its mouth on the Medina River, just west of Cassin. The study area encompasses the entire watershed, as shown in Figure 1-1. The total drainage area of this watershed is approximately 152,320 acres (238 square miles). The Leon Creek Watershed Feasibility Study investigated flood risk management (FRM) structural measures such as upstream detention, levees, and channel modifications and nonstructural measures such as evacuation of the floodplain. Multipurpose measures that included recreation were also explored to fully utilize project lands. However, as the study progressed, opportunities to address ecosystem restoration in conjunction with FRM would be limited.

There are over 4,600 structures located within the 500-year floodplain in the study area. Many of these structures are located between the 250-year and 500-year floodplains and are therefore not at risk during more frequent events. Flooding in the area, however, is associated with infrequent, high-intensity rainfall events with short durations with short warning times. The risk associated with flooding is due to structure damage, but there have been losses of life in the Leon Creek watershed due to flooding. Most have been from people attempting to cross low water crossings in their vehicles and not as a result of flood inundation in their homes.

The Recommended Plan consists of a 100-year Levee with Hydraulic Mitigation in one of the areas of interest in combination with the buyout in another area of interest. The Plan includes mitigation for aquatic impacts associated with the channelization work and would use Natural Channel Design (NCD) concepts to “self-mitigate” impacts on waters of the United States. The estimated total project first costs are \$28.966 million.

## OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report (hereinafter: Leon Creek IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), *Water Resources Policies and Authorities’ Civil Works Review* (EC 1165-2-214, 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 Leon Creek documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in economics, Civil Works planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, and geotechnical/civil engineering 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.

### Documents for Review

The following documents are to be reviewed by designated discipline:

Review Documents	
Title	No. of Pages
<b>Draft Feasibility Report</b>	<b>144</b>
Appendix A: Economics Analysis	152
Appendix B: Ecosystem Evaluation	55
Appendix C: Agency Coordination & Correspondence	29
Appendix D: Cultural Resources	2
Appendix E: Real Estate Plan	11
Appendix F: Hazardous, Toxic, and Radioactive Waste	6
Appendix G1: Hydrologic and Hydraulic Analyses	125
Appendix G2: Civil Design and Geotech Analyses	87
Appendix J: 404(B)(1) Analysis	12
<b>Total Pages</b>	<b>623</b>



## Documents for Reference

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

## SCHEDULE

This final schedule is based on the December 23, 2013, receipt of the final review documents.

Task	Action	Due Date
<b>Conduct Peer Review</b>	Battelle sends review documents to panel members	1/10/2014
	Battelle convenes kick-off meeting with panel members	1/13/2014
	Battelle convenes kick-off meeting with USACE and panel members	1/13/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	1/21/2014
	Panel members complete their individual reviews	1/23/2014
<b>Prepare Final Panel Comments and Final IEPR Report</b>	Battelle provides panel members with talking points for Panel Review Teleconference	1/27/2014
	Battelle convenes Panel Review Teleconference	1/28/2014
	Battelle provides Final Panel Comment templates and instructions to panel members	1/29/2014
	Panel members provide draft Final Panel Comments to Battelle	2/3/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	2/3 to 2/10/2014
	Panel finalizes Final Panel Comments	2/10/2014
	Battelle provides Final IEPR Report to panel members for review	2/11/2014
	Panel members provide comments on Final IEPR Report	2/13/2014
	Battelle submits Final IEPR Report to USACE	2/14/2014
<b>Comment/Response Process</b>	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	2/18/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process (if necessary)	2/18/2014
	USACE provides draft PDT Evaluator Responses to Battelle	2/21/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	2/24/2014
	Panel members provide Battelle with draft BackCheck Responses	2/27/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	2/28/2014

Task	Action	Due Date
	Battelle convenes Comment-Response Teleconference with panel members and USACE	3/4/2014
	USACE inputs final PDT Evaluator Responses to DrChecks	3/7/2014
	Battelle provides PDT Evaluator Responses to panel members	3/10/2014
	Panel members provide Battelle with final BackCheck Responses	3/12/2014
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	3/13/2014
	Battelle submits pdf printout of DrChecks project file	3/14/2014
<b>Civil Works Review Board (CWRB)</b>	Panel Prepares and/or reviews slides for CWRB	TBD
	Civil Works Review Board meets	3/27/2014

## CHARGE FOR PEER REVIEW

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

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

### General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Leon Creek 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 (Richard Uhler, [uhlerr@battelle.org](mailto:uhlerr@battelle.org)) or Program Manager (Karen Johnson-Young ([johnson-youngk@battelle.org](mailto: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](mailto: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.
- 5.

**Please submit your comments in electronic form to Richard Uhler, [uhlerr@battelle.org](mailto:uhlerr@battelle.org), no later than January 23, 2014, 10 pm ET.**

# IEPR of the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, Texas, Feasibility Report

## CHARGE QUESTIONS AND RELEVANT SECTIONS AS SUPPLIED BY USACE

1. Were all models used in the analyses, including the models assessing the hazards, used in an appropriate manner?
2. Are the models used sufficiently discriminatory to support the conclusions drawn from them (i.e. identify meaningful differences between alternatives)?
3. Are the assumptions that underlie the various analyses sound?
4. Have risks and uncertainties been sufficiently considered?
5. Are potential life safety issues accurately and adequately described under existing, future without-project, and future with-project conditions?
6. In accordance with ER 1110-2-1150, is the quality and quantity of the surveys, investigations, and engineering sufficient for a concept design?
7. Are the models used to assess hazards appropriate?
8. Are the assumptions made for the hazards appropriate?
9. Does 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?
10. In your opinion, are there sufficient analyses upon which to base the recommendation?

## Problem, Opportunities, Objectives, and Constraints

11. Are the problems, opportunities, objectives, and constraints adequately and correctly defined? Are there any gaps or overstatements?
12. Do the identified problems, opportunities, objectives, and constraints reflect a systems, watershed, and/or ecosystem approach, addressing a geographic area large enough to ensure that plans address the cause and effect relationships among affected resources and activities that are pertinent to achieving the study objectives; i.e., evaluate the resources and related demands as a system?
13. In describing the criteria, goals, and objectives of the study, were the resources and issues important to the decision-making process clearly identified? Did the study address those resources and issues?

## Existing and Future without Project Resources

14. Has the character and scope of the study area been adequately described and is the identified study area appropriate in terms of undertaking a watershed based investigation?

15. Do you agree with the general analyses of the existing social, financial, and natural resources within the study area?
16. For your particular area of expertise, provide an in-depth review of whether the analyses of the existing social, financial, and natural resources within the project area are sufficient to support the estimation of impacts of the array of alternatives.
17. Given your area of expertise, does this section appropriately address the existing conditions of all resources pertinent to the study?
18. Were there surveys conducted to evaluate the existing social, financial, and natural resources adequate? If not, what types of surveys should have been conducted?
19. Were socioeconomic conditions adequately addressed? Were specific socioeconomic issues not addressed?
20. Was the hydrology discussion sufficient to characterize current baseline conditions and to allow for evaluation of how forecasted conditions (with and without proposed actions) are likely to affect hydrologic conditions. Is the discussion complete on the relationship between subsurface hydrology and the hydrodynamics of the project area?
21. Was the discussion of natural resources sufficient to characterize current baseline conditions and to allow for evaluation of forecasted conditions (with and without proposed actions)?
22. Were the assumptions used as the basis for developing the most probable future without-project conditions reasonable? Were adequate scenarios effectively considered (applied during analyses where relevant and/or reasonably investigated)? Were the potential effects of climate change addressed?
23. Are the future conditions expected to exist in the absence of a Federal project logical and adequately described and documented?
24. Please comment on the conclusion of the most probable future without-project condition. Do you envision other potential probable outcomes?
25. Please comment on the adequacy and reasonableness of the analyses of the condition of and effectiveness as a comprehensive system of existing flood control projects and of recommendations pertaining to them.

## **Plan Formulation / Alternative Development**

26. Was a reasonably complete array of possible measures considered in the development of alternatives?
27. Did the formulation process follow the requirement to avoid, minimize, and then mitigate adverse impacts to resources?
28. Does each alternative meet the formulation criteria of being effective, efficient, complete, and acceptable?
29. Were the assumptions made for use in developing the future with-project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?

30. Have system perspectives been considered in the formulation of alternatives?
31. Are the changes between the without- and with-project conditions adequately described for each alternative?
32. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses?
33. Are the uncertainties inherent in our evaluation of benefits, costs, and impacts, and any risk associated with those uncertainties, adequately addressed and described for each alternative?
34. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and are the estimated costs of those efforts reasonable for each alternative?
35. Please comment on the screening of the proposed alternatives. Are the screening criteria appropriate? In your professional opinion are the results of the screening acceptable? Were any measures or alternatives screened out too early?
36. Were the engineering, economic, and environmental analyses used for this study consistent with generally accepted methodologies? Was public safety adequately considered?
37. Does any alternative include identified separable elements (a portion of a project that is physically separable, and produces hydrologic effects or physical or economic benefits that are separately identifiable from those produced by other portions of the project)? If so, is each identified separable element independently justified and are the benefits, costs, and effects of the separable elements correctly divided?
38. Are cumulative impacts adequately described and discussed? If not, please explain.

### **Recommended Plan**

39. Comment on whether you agree or disagree with how the selected alternative was formulated and selected. Comment on the plan formulation. Does it meet the study objectives and avoid violating the study constraints? From a public safety perspective, is the proposed alternative reasonably appropriate?
40. Are there any unmitigated environmental impacts not identified and if so could they impact plan selection?
41. Please comment on the likelihood of the Recommended Plan to achieve the expected outputs.
42. Please comment on the completeness of the Recommended Plan, i.e. will any additional efforts, measures, or projects be needed to realize the expected benefits?
43. Please comment on the appropriateness of location, sizing, and design of plan features.
44. Are residual risk adequately described and is there a sufficient plan for communicating the residual risk to the affected populations?

### **Overview Questions**

45. Please identify the most critical concerns (up to five) you have with the project and/or review

documents.

46. Please provide positive feedback on the project and/or review documents

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