DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, MISSISSIPPI VALLEY DIVISION
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

15 APR 2019

CEMVD-ZA

MEMORANDUM FOR Commander, Vicksburg District

SUBJECT: Approval of Review Plan for a Request, Pursuant to 33 USC § 408, to Alter the Red River Backwater Project Tensas-Cocodrie Area Levee by Installing a Box Culvert to Allow Brushy Bayou to Drain into the Tensas River

1. References:

a. Memorandum, CEMVK-DE, 18 December 2018, subject: Request for approval of review plan for a request, pursuant to 33 USC § 408, to alter the Red River Backwater Project Tensas-Cocodrie Area levee by installing a box culvert to allow Brushy Bayou to drain into the Tensas River (encl).

b. EC 1165-2-217, Review Policy for Civil Works, 20 February 2018.

2. The 18 December 2018 transmittal memo from MVK states that there is a letter of endorsement from the Risk Management Center (RMC) attached. There is no endorsement letter; however, the RMC's concurrence is signified by [redacted] signature on the Review Plan's cover page.

3. The enclosed Review Plan (RP) is an implementation review plan for the proposed modification to Red River Backwater Project Tensas-Cocodrie Area Levee by construction of a culvert that will allow Brushy Bayou to drain into the Tensas Basin. The RP has been prepared in accordance with EC 1165-2-217, and has been coordinated between the Risk Management Center, the Business Technical Division, and the Program Support Division.

4. I hereby approve this RP, which is subject to change as circumstances require, consistent with project development under the Project Delivery Business Process. Subsequent revisions to this RP or its execution will require new written approval from this office. Non-substantive changes to this RP do not require further approval. The district should post the approved RP to its web site.

5. The MVD point of contact is [redacted] CEMVD-PDM, [redacted]

[redacted]

Encl

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, VICKSBURG DISTRICT
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183

CEMVK-DE

18 Dec 2018

MEMORANDUM FOR Commander, Mississippi Valley Division (CEMVD-PD-[redacted]

SUBJECT: Request for approval of review plan for a request, pursuant to 33 USC § 408, to alter the Red River Backwater Project Tensas-Cocodrie Area levee by installing a box culvert to allow Brushy Bayou to drain into the Tensas River.

1. Subject Implementation Review Plan is enclosed for your review and approval.

2. The Risk Management Organization (RMO) for this project is the USACE Risk Management Center (RMC). The letter of endorsement is attached (enclosure 2).

3. Agency Technical Review (ATR) for this project is managed within USACE and will be conducted by the USACE team identified in the Review Plan.

4. An Independent External Peer Review (IEPR) has been performed for this project.

5. Questions should be directed to [redacted] Project Manager [redacted]

[redacted]

Encl

CF: (w/encls)
CEMVK-OD-M [redacted]

Encl

REVIEW PLAN for

Construction of Proposed Brushy Bayou Drainage Structure

Pursuant to 33 USC § 408

Vicksburg District

February 27, 2019

ENDORSED BY:

[redacted]

USACE, Risk Management Center

[redacted]

Chief, Business Technical Division

APPROVED BY:

[redacted]

Commander

IMPLEMENTATION REVIEW PLAN

Construction of Proposed Brushy Bayou Drainage Structure

TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS

1.1. **General.** This alteration-specific review plan defines the scope and level of review required by the Vicksburg District to determine if the alteration requested by the engineering firm [redacted] on behalf of [redacted] for permission to construct the Brushy Bayou Drainage Structure can be recommended for approval. This review plan was prepared in accordance with Engineer Circular (EC) 1165-2-216, "Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408" and Engineering Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 February 2018. The district reviews will result in a Summary of Findings document that will document and support the district's review decision. The district's Summary of Findings will be sent forward in the official Section 408 request.

1.2. **References**

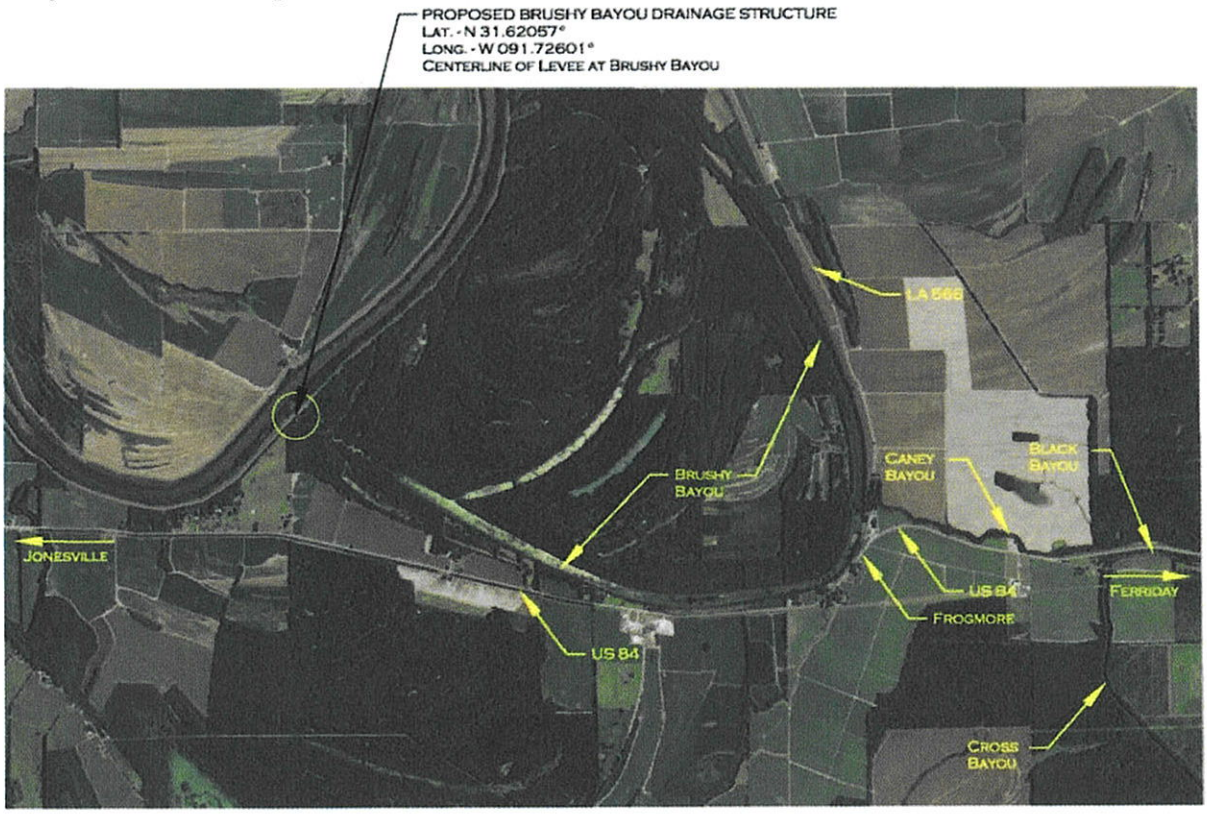
- OASA Delegation of Authority Pursuant to 33 USC 408, 18 Aug. 2017
- CECW-CE Interim Guidance on Section 408 Decision Level, 10 Nov. 2016
- Engineering Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 Feb 2018
- Engineering Regulation (ER) 1110-1-12, Quality Management, 31 Mar 2011
- EC 1165-2-216, Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408, 21 June 2016
- ER 1110-1-1807, Drilling in Earth Embankment Dams and Levees, 31 December 2014
- EM 1110-2-1913 Design, Construction, and Evaluation of Levees, 30 April 2000
- EM 1110-2-2000, Standard Practice for Concrete for Civil Works Structures, Mar 2001
- EM 1110-2-2906, Design of Pile Foundations, Jan 1991
- EM 1110-2-2504, Design of Sheet Pile Walls, Felix Smart Jr
- EM 1110-2-1902, Slope Stability, Oct 2003
- EM 1110-2-3400, Painting: New Construction and Maintenance, Apr 1995
- American Concrete Institute, Building Code and Commentary, ACI 318
- American Institute of Steel construction, Manual of Steel
- American Welding Society, AWS D1.1
- American Welding Society, AWS D1.5
- ASCE/SEI 7, Minimum Design Loads for Buildings and Other Structures
- Memorandum dated 10 Nov 2016, Interim Guidance on Section 408 Decision Level
- DR 1110-2-15, Quality Management, 22 September 1997

2. ALTERATION DESCRIPTION

The Concordia Parish Police Jury is proposing constructing a 196.5 foot long triple 16 foot x 8 foot concrete box culvert (Brushy Bayou Drainage Structure) in the location where Brushy Bayou was cut off by the existing Tensas-Cocodrie Area Levee. The proposed structure will allow drainage from Brushy Bayou to discharge into the Tensas River. The river side of this box culvert will have sluice gates to prevent high water on the Tensas River from flooding the protected side of the levee. The inlet side of this structure will have a 354 foot long concrete capped sheet pile weir with a minimum top elevation of 44 feet. This weir will maintain Brushy Bayou at its normal elevation during the dry season. For construction purposes, there will be a temporary barrier dam installed to allow dewatering of the work area.

The Tensas-Cocodrie Area levee is a segment of the Red River Backwater Project and is an element of the Mississippi River and Tributaries flood risk management project.

Project Location Map



3. DECISION LEVEL AND REVIEW MANAGEMENT

3.1. **Decision Level.** The Vicksburg District has determined that the required decision level for the Section 408 Alteration covered by this review plan is the Mississippi Valley

Division. The rationale for the review level determination is provided in Attachment 3.

3.2. **Review Management Organization (RMO)** The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for the peer review effort described in this Review Plan is the USACE Risk Management Center (RMC).

3.3. **Management of Quality Control / Quality Assurance (QA/QC) Review.** QA/QC for this Section 408 Alteration will be performed and managed by the Requestor. The Requestors QA/QC review plan has been reviewed and approved by the Vicksburg District and is included as Attachment 1 to this District Review Plan.

3.4. **Management of District-Led Agency Technical Review (ATR).** The ATR for this Section 408 Alteration will be performed and managed by the Vicksburg District. ATR will be performed in accordance with this alteration-specific review plan.

3.5. **Management of Type II Independent External Pier Review/Safety Assurance Review (Type II IEPR/SAR).** A Type II IEPR/SAR is required for this Section 408 Alteration and will be managed by the Requestor. The requestor has developed a review plan for the Type II IEPR/SAR which documents the Type II IEPR/SAR team, the charge questions, and the review schedule. The Type II IEPR/SAR review plan must be endorsed by the USACE Risk Management Center (RMC). The requestor's Type II IEPR/SAR review plan is included as Attachment 2 to this review plan.

3.6. **Levee Senior Oversite Group (LSOG) Review.** As the RMO, the Risk Management Center (RMC) has determined that proposed alteration will not be presented to the Levee Senior Oversight Group (LSOG).

4. DRILLING PROGRAM PLANS

Drilling Program Plans must be reviewed and approved by the District Dam Safety Officer (Dams) or Levee Safety Officer (Levees). If any drilling fluid or other stabilizing or circulating media is proposed, a technical review performed by the Geotechnical and Materials Community of Practice (G&M CoP) Standing Committee on Drilling and Instrumentation is required. The plan will then require approval from the District DSO/LSO pending satisfactory resolution of the technical review comments, see ER 1110-1-1807.

5. QUALITY CONTROL AND QUALITY ASSURANCE (QA/QC)

General. The requestor is responsible for the quality control and quality assurance for the design and construction of the proposed alteration. The district is responsible for ensuring that QA/QC has been adequately performed and documented by the requestor. For more information concerning the requestor's QA/QC, please see the requestor's review plan shown in Attachment 1.

QA/QC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Quality Control Plan (QCP) of the requester

see Attachment 1. QC will consist of Quality Checks and reviews as outlined in the QCP. QA/QC reviews will be accomplished by the requester. The requester should provide USACE with documentation regarding the quality control/quality assurance procedures followed in the development of the project design. This documentation should be in the form of a report that identifies:

i. Purpose and scope of the review.
ii. Description of the review team and a short statement on their qualifications.
iii. Summary of the review performed during design.
iv. Lessons learned and major changes made during the review.
v. All internal QC comments and resolutions.
vi. Supplemental studies or analyses performed during the design, e.g. geotechnical report.

6. DISTRICT-LED AGENCY TECHNICAL REVIEW (ATR)

6.1. **General.** The District-led ATR will serve as the district's review of the alteration request. The purpose of this review is to ensure the proper application of established criteria, regulations, laws, codes, principles and professional practices. For the purposes of Section 408, the ATR team will determine whether or not the project will:

6.1.1. Impair the Usefulness of the Federal Project. The objective of this determination is to ensure that the proposed alteration will not limit the ability of the federal project to function as authorized and will not compromise or change any authorized project conditions, purposes, or outputs.

6.1.2. Be Injurious to the Public. The objective of this determination is to ensure public safety by identifying any alteration impacts, including cumulative impacts, that may negatively affect the public interest and to determine whether the overall benefits are commensurate with risks.

6.1.3. Meet Legal and Policy Compliance. A determination will be made as to whether the proposed alteration meets all legal and policy requirements.

6.2. **Adequate Review.** The district-led ATR will ensure that QA/QC has been adequately performed and documented by the requestor.

6.3. **Decision Level.** The ATR team will also verify that the decision level for the alteration request has been appropriately determined and documented.

6.4. **Required Disciplines and Expertise of ATR members.**

ATR Lead: The ATR team lead is a senior engineer with extensive experience in reviewing Section 408 alteration requests and conducting ATRs. The ATR lead has the necessary skills and experience to lead a team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline.

Hydrologic and Hydraulics Engineering - The team member shall be a senior level hydrologic and hydraulics engineer versed in system performance analysis to determine the potential hydrologic and hydraulics impacts of the proposed alterations.

Geotechnical Engineer – The team member shall be a senior level geotechnical engineer with experience in the specific field of levee engineering in evaluating, designing, and constructing large levee embankments, flood walls, and river bank stabilization. Geotechnical reviewer experience shall be in soil compaction and earthwork construction; soil mechanics; seepage and piping; landslide and slope stability evaluations; bearing capacity and settlement; and foundation inspection and assessment. The Geotechnical reviewer shall also have knowledge of best practices regarding levee design and construction procedures and policies.

Structural Engineer - The team member shall be a senior level engineer with experience in structural engineering. Experience shall include the engineering and design of flood control structure project features.

Construction Engineer - The team member shall be a senior level engineer with experience in constructing levee embankment and drainage structure features.

ATR team members and their expertise are shown in Attachment 4.

6.5. **Summary of Findings.** After the final ATR, the ATR Lead will prepare a Summary of Findings to summarize the district's rationale and conclusions used in recommending approval or denial of the alteration request. The Summary of Findings will be sent to MVD for their use in determining whether or not the alteration request will be approved. The Summary of Findings will be prepared in accordance with EC 1165-2-216.

6.6. The ATR will ensure that the product is consistent with established criteria, guidance, procedures, and policy. It will consist of reviewing the plans, specifications, and design documentation report (DDR). ATR will occur during key stages in the development of the particular work product and be discussed at milestone meetings, briefings, and in-progress reviews. Each application of ATR will build upon any and all prior cycles of review for any product.

Reviews will be conducted in a manner that will be concise to enable timely resolution of the concern. ATR comments should be limited to those that are required to ensure adequacy of the product.

The four key parts of a review comment will normally include:

1) The review concern – identify the deficiency or incorrect application of policy, guidance, or procedures.

2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed.

3) The significance of the concern – indicate the importance of the concern

with regard to its potential impact on the district's ability to make a decision as to whether to approve or deny the Section 408 request.

4) The probable specific action needed to resolve the concern – identify the action(s) that the requester must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation must include the text of each ATR concern, a brief summary of the pertinent points in any discussion, including any vertical coordination, and the agreed upon resolution.

The ATR process will be conducted using the Vicksburg District's 408 review process. The ATR lead will provide a written summary of its actions and written specific concerns to the 408 applicant. Upon receipt of the ATR comments, the 408 applicant will develop responses to the specific concerns and coordinate those responses with the ATR lead. Technical responses will be made by the product author or by an individual experienced in that discipline area. Responses will acknowledge and specifically address the comments, indicating resolution steps taken or to be taken.

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

(1) Identify the document(s) reviewed and the purpose of the review;

(2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

(3) Include the charge to the reviewers;

(4) Describe the nature of their review and their findings and conclusions;

(5) Identify and summarize each unresolved issue (if any); and

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

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR lead will prepare a completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team).

The completion and certification should be completed based on the work reviewed to date for the project. A Sample Completion of ATR and Certification of ATR are included in Attachment 6.

7. TYPE II IEPR/SAR

7.1. The District Chief of Engineering has determined that this project poses a significant threat to life safety; due to this a Type II IEPR/SAR is required for this project. The requestor is responsible for the Type II IEPR/SAR for the design and construction of the proposed alteration. For more information concerning the requestor's Type II IEPR/SAR, please see the requestor's design quality control plan shown in Attachment 2.

A Safety Assurance Review, also known as a Type II IEPR, shall be conducted on design and construction activities for flood risk management projects, as well as other projects where potential hazards pose a significant threat to human life. External panels will review the design and construction activities prior to initiation of physical construction and periodically thereafter until construction activities are completed. The charges to the SAR panels complement the ATR process and do not duplicate it, the SAR will be accomplished by the requestor. A SAR is to be provided by an A/E firm contracted by the requestor or arranged with another government agency to manage external to USACE. For a SAR, the selection of the review panel members will use the National Academy of Science (NAS) Policy which sets the standard for "independence" in the review process. The Requester's Design of Record AE CANNOT procure the experts. A site visit will be scheduled for the SAR Team.

7.2. **Panel Expertise.** The following provides an estimate of the SAR panel members and the types of expertise that should be represented on the review panel. All panel members shall be "distinguished experts in engineering, hydrology, or other appropriate disciplines", WRDA 2007 The SAR Panel should contain a minimum of three members, with each member having one of the following experience requirements.

Geotechnical Engineer - The panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of levees. The panel member should have knowledge and experience in the forensic investigation and evaluation of seepage and piping, settlement, slope stability, and deformation problems associated with embankments constructed alluvial soils. The panel member should hold a degree in civil engineering and be a registered professional engineer.

Hydraulic Engineer – The panel member should be a senior-level engineer and have experience with hydraulic engineering analysis related to flood risk management projects. The Panel member will hold a degree in civil engineering, or hydrology and hydraulics engineering and be a registered professional engineer.

Structural Engineer – The panel member should be a senior-level engineer and have experience with structural engineering analysis related to flood risk management projects. The panel member will hold a degree in civil engineering and be a registered professional engineer.

7.3. **Completion and Certification of the IEPR.** The SAR will be managed by an AE firm which meets the criteria set forth in EC 1165-2-217. DrChecks review software may be used to document the SAR comments and aid in the preparation of the Review Report but is not required.

Comments should address the adequacy and acceptability of the engineering, models, and analyses used. SAR comments should generally include the same four key parts as described for ATR comments in Section 6.6.

No later than 60 days following each milestone, the SAR panel will prepare a Review Report that will accompany the publication of the final report for the project and shall:

(1) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

(2) Include the charge to the reviewers;

(3) Describe the nature of their review and their findings and conclusions; and

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

This review report, including reviewer comments and a recommendation letter will be provided to the RMC as soon as they become available. A suggested report outline is an introduction, the composition of the review team, a summary of the review during design, a summary of the review during construction, any lessons learned in both the process and/or design and construction, and appendices for conflict of disclosure forms, for comments to include any appendices for supporting analyses and assessments of the adequacy and acceptability of the methods, models, and analyses used. All comments in the report will be finalized by the panel prior to their release to USACE for each review plan milestone. Written responses to the IEPR Review Report will be prepared to explain the agreement or disagreement with the views expressed in the report, the actions undertaken or to be undertaken in response to the report, and the reasons those actions are believed to satisfy the key concerns stated in the report (if applicable). These comment responses will be provided to the RMC for concurrence. The requestor will prepare responses except that issue resolution will be a dual responsibility between the product provider and USACE, with USACE having the final authority. The revised submittal will be provided to the RMO with the USACE response and all other materials related to the review. After the MSC Commander's approval of the Vicksburg District's concurrence of the IEPR documents, the District will make the report and responses

available to the public on the District's website located at the following http://www.mvk.usace.army.mil/Missions/Civil-Works/Peer-Review-Plans/

8. REVIEW SCHEDULE

PROJECT PHASE/SUBMITTAL	REVIEW START DATE	REVIEW END DATE
ATR Coordination Meeting	11/28/17	11/28/17
100% Milestone Review (ATR)	12/4/17	1/8/19
IEPR Coordination Meeting	5/23/18	5/23/18
Type II IEPR (SAR) - Design	5/25/18	6/8/18
Type II IEPR (SAR) - Construction	TBD	TBD

9. REVIEW PLAN APPROVAL AND UPDATES

9.1. **Approval.** This review plan will be approved by the Commander of the Mississippi Valley Division. It will have the endorsement of the district, USACE Risk Management Center and the Mississippi Valley Division Chief of Regional Business Technical Division prior to being submitted to the Commander.

9.2. **Updates.** This review plan is a living document and will be revised as necessary throughout the design and construction phases. Minor revisions will not require approval and will be documented using the table in *Attachment 5*. If major revisions, such as a change in scope of the project or change in the review levels, are necessary, the review plan will be resubmitted for approval.

10. PUBLIC PARTICIPATION

10.1. As required by EC 1165-2-217, the approved Review Plan will be posted on the District public website http://www.mvk.usace.army.mil/Missions/Civil-Works/Peer-Review-Plans/ . The public will have 30 days to provide comments on the documents; after all comments have been submitted, the comments will be provided to the technical reviewers. This is not a formal comment period and there is no set timeframe for the opportunity for public comment. If and when comments are received, the district will consider them and decide if revisions to the review plan are necessary. This engagement will ensure that the peer review approach is responsive to the wide array of stakeholders and customers, both within and outside the federal government.

11. REVIEW PLAN POINTS-OF-CONTACT

The following are the points-of-contact for this review plan:

[redacted] Branch, [redacted]

[redacted] Mississippi Valley Division, [redacted]

DESIGN QUALITY CONTROL PLAN

BRUSHY BAYOU DRAINAGE STRUCTURE

[redacted]

Prepared for

[redacted]

Prepared by

[redacted]

DESIGN QUALITY CONTROL PLAN
FOR
BRUSHY BAYOU DRAINAGE STRUCTURE

1. Project Information:

   a) Project Name: Brushy Bayou Drainage Structure for [redacted]

   b) Project Location: The Proposed Drainage Structure is located at the intersection of the Eastern Red River Levee of the Tensas River and Brushy Bayou in Concordia Parish. Driving directions are: Travel West on US Hwy. 84 from the intersection of US 84 and LA 15 in Ferriday, Louisiana approximately 10.8 miles to an unnamed gravel road on the right (North Side), Then go approximately 0.7 miles on this unnamed road North to the Tensas River levee, Then go Northeast on the levee approximately 0.1 miles to the project site.

   c) Project Description: Concordia Parish is ringed by levees, the Mississippi River Levee on the eastern side and the Red River Basin Levee on the north, west and south sides. Cocodrie Bayou is located in the center of the parish and flows from the north central area of the parish to its discharge into the Red River on the southern end of the parish. It is the primary drainage artery for the parish with Black Bayou acting as the primary drainage tributary for Ferriday, Clayton, and the northern portion of the parish. Cocodrie Bayou is a narrow, heavily wooded bayou and is a major restriction on the drainage systems serving the northern portions of the parish, backing storm water up in the tributaries that drain them and resulting in flooding. Cocodrie Bayou is classified by the US Fish and Wildlife Department as a scenic river and therefore, no clearing, widening or dredging activities may occur. In order to reduce flooding in the upper reaches of the Parish due to the restriction of Cocodrie Bayou, it is being proposed to divert the entire flow being handled by Brushy Bayou, Caney Bayou, and Black Bayou into the Tensas River. This is where this flow went originally, prior to the construction of the Red River Levee system in the 1950's. The flow from the Brushy system would be discharged to the Tensas River via 3 – 16' x 8' gated box culverts through the Red River Levee System. This box culvert would have an invert elevation of 36 ft. MSL which is above the normal pool of the Tensas River approximately 90% of the time and which would allow drainage of Brushy Bayou to the Tensas River a majority of the time. In order to maintain the current water level in Brushy Bayou of approximately 44 ft. MSL, a broad crested weir with a width of 236 feet would be installed just upstream from the proposed box culvert The resulting flow from the Brushy, Caney, and Black Bayou watersheds is diverted toward the Tensas River and out of Cocodrie Bayou while still providing for the ability for flow to go to Cocodrie in the event that the Tensas River was higher than 43 feet (when the gates would be closed on the proposed box culvert) and a storm event occurs in the parish. A USACE Section 408 Permit will be required to install the gated box culvert.

d) Project Deliverables: The project requires submittal of the following documents to the agencies in brackets: Hydraulic and Hydrology Report (HH Report)[FEMA & GOHSEP], 30% design documents, initial subsurface investigation report[FEMA & GOHSEP], 60% design documents [FEMA & GOHSEP], 100% design documents (Includes Plans, Specifications, Design Calculations (As Applicable), Geotechnical Reports)[FEMA, GOHSEP, IEPR, LADOTD, & USACE], Phase 1 Independent External Peer Review and Report, Phase 2 Final IEPR Review and Report, USACE Section 404 Permit Request, and USACE Section 408 Permission Request.

e) Project Work: Project work will include site investigation to review existing conditions, preparation of surveys [redacted] geotechnical analysis by [redacted] IEPR Report by [redacted], cost estimating by [redacted] and general, civil, structural and project management by [redacted] All submittals will be reviewed by [redacted] The products will also be given an Internal Review by senior members of the AE's staff who are not involved in the design and all comments will be resolved.

2. Purpose and Scope of DQCP:

a) Purpose: This Design Quality Control Plan (DQCP) outlines the technical expertise, technical criteria, and technical review processes that will be used to produce a quality product satisfying technical, functional, legal, safety and environmental requirements.

b) Scope of Reviews: This project will provide for the installation of 3 – 16' x 8' gated box culverts with a 236' broad crested weir to re-establish storm water drainage relief to the flood prone areas of the existing drainage reaches in the northern portions of Concordia Parish. The greatest consequence of not completing the proposed project would be the continued economic loss due to these areas flooding. It is unlikely that loss of life would occur. All factors were considered in defining the scope of review effort. Detail checks of calculations will be performed to ensure that no computational errors are made and that standard practice is being used in performing the calculations. The detailed check of the plans and specifications will be used to eliminate obvious errors, check for proper references between drawings, ascertain whether adequate information was provided, and to review drawing standards. An Internal Review will be performed to ensure the quality of design and to substantiate that all services conform to contract requirements. A 100% review will be conducted and all comments generated from these reviews will be resolved.

3. Customer Involvement:

In addition to the U.S. Army Corps of Engineers (USACE) the following authorities will be given an opportunity to review and comment on this study. Involvement will include review, meetings, e-mails and discussions as needed.

1) FEMA
2) GOSHEP
3) LADOTD
4) Affected Utility Owners (if any).

4. Technical Criteria:

The following technical criteria will be used on this project:

a) EM 1110-2-1601 Hydraulic Design of Flood Control Channels
b) EM 1110-2-2104 Strength Design for Reinforced-Concrete Hydraulic Structures
c) EM 1110-2-2902 Engineering Design Conduits, Culverts, and Pipes
d) EM 1110-2-1913 Design and Construction of Levees
e) EM 1110-2-2502 Retaining and Flood Walls
f) ETL 1110-2-575, Evaluation of I-Walls

5. Project Delivery Team (PDT):

Project Delivery Team (PDT): The PDT will be led by an experienced team leader as shown in the table below. The other PDT members also have considerable experience as described in the table below. Should future requirements require the application of different skills appropriate personnel will be added to the PDT.

Project Role/Responsibility	Name/Registration	Company	Experience
Project Principal	[redacted]		30 + yrs.
PDT Leader			30 + yrs.
Civil/Structural			30 + yrs.
Hydraulics			30 + yrs.
Geotechnical			30 + yrs.
Geotechnical			4 + yrs.
Cost Engineering			30 + yrs.
Surveys			30 + yrs.
Internal Review Lead Civil/Structural			30 + yrs.
Internal Review Lead Geotechnical			35 + yrs.

6. Internal Review

Internal reviews will be conducted by [redacted] & Structural) and [redacted] (Geotechnical). [redacted] licensed professional engineer with over 25 years of experience in civil engineering. [redacted] reviews all engineering designs developed at [redacted] is a licensed professional engineer with over 35 years of experience in geotechnical engineering. [redacted] has considerable experience in geotechnical engineering for water resource projects in Louisiana and Mississippi. These Internal Reviews will evaluate the material requiring interpretation, and verify and validate assumptions, methodologies, and conclusions. The scope of the review is given in Section 2, above. Comments will be passed along to the design engineer with the response noted and differences discussed and resolved with the originator of the documents.

7. Independent External Peer Review (IEPR):

At the appropriate stage in the project, the plans, specifications and design calculations shall be submitted to the selected IEPR team for their review which will be per EC 1165-2-214, as applicable. The IEPR team will develop its own review plan independent of this plan.

8. Biddablility, Constructability, Operability, and Environmental (BCOE) Review:

This project will not require a BCOE review during this phase of the design. Prior to advertisement for construction a BCOE will be performed but is not part of this design contract.

9. Schedule Checklist:

The attached Quality Control Plan Checklist shows the submitted dates for critical checkpoints associated with this contract package. Internal reviews at these checkpoints were performed and their status was noted in the comments column.

10. Record Maintenance:

The following QC documentation will be provided.

- The Design Quality Control Plan.
- The completed DQCP checklist specific for this project.
- Records of calculations and Soils Report which includes the technical documentation of the design (i.e. criteria, load cases etc.).

11. Signatures.

Project Team Leader: [redacted]

Internal Review Lead

Internal Review Lead

BRUSHY BAYOU DRAINAGE STRUCTURE

CONCORDIA PARISH, LOUISIANA

DESIGN QUALITY CONTROL PLAN CHECKLIST

ITEM	DATE SUBMITTED	COMMENTS
Final H & H Report Submitted to FEMA & GOHSEP	12/31/2015	Civil Internal Review Completed
30% Design Documents Submitted to FEMA & GOHSEP	12/31/2015	Civil/Structural Internal Review Completed
Geotechnical Report Submitted to [redacted]	02/25/2016	Geotechnical Internal Review Completed
60% Design Documents Submitted to FEMA & GOHSEP	03/31/2016	Civil/Structural Internal Review Completed
100 % Design Documents for Phase 1 IEPR Submitted [redacted]	06/17/2016	Civil/Structural Internal Review Completed
100% Design Documents Submitted to FEMA & GOHSEP	08/02/2016	Civil/Structural Internal Review Completed
Geotechnical Report with Additional Analysis Submitted to [redacted]	01/17/2017	Geotechnical Internal Review Completed
Phase 1 IEPR Documents Completed & Comments Submitted [redacted]	03/01/2018	Civil/Structural Internal Review Completed
Final Geotechnical Report Submitted to [redacted]	01/24/2018	Geotechnical Internal Review Completed
Replies to Phase 1 IEPR Documents Comment Submitted [redacted]	04/18/2018	Civil/Structural Internal Review Completed
DQCP Submitted		

INDEPENDENT EXTERNAL PEER REVIEW REPORT
&
REVIEW PLAN

DESIGN AND CONSTRUCTION PHASE REVIEWS
BRUSHY BAYOU DRAINAGE STRUCTURE
CONCORDIA PARISH

Phase I & II Review | [redacted]

[redacted]

[redacted]

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APPENDICES

1.0 INTRODUCTION

1.1 Project Description

The Brushy Bayou Drainage Structure Project is located in Concordia Parish along the east bank of the Tensas River approximately 5 miles east of Jonesville, Louisiana. The project consists of a 3 barrel, box culvert with 6 manually operated sluice gates which are located on the riverside of the structure. Each cell of the box culvert is 8 feet high and 16 feet wide. The project also includes a sheet-pile weir located just upstream of the landside inlet to the culverts and a riverside elevated walkway for access to operate the sluice gates. The structure is to be built in what is referred to as the Red River Levee System and will allow drainage from Brushy Bayou to enter the Tensas River just above its confluence with the Ouachita River. This project is the primary element of an overall plan to reduce flooding in Concordia Parish by diverting the entire flow being handled by Brushy Bayou and Caney Bayou into the Tensas River. The invert of the culvert inlet is elevation 37.20, the outlet invert is elevation 36.60, and the top of the weir is elevation 44.0. The elevation of the Tensas River is controlled by Jonesville Lock and Dam which has a minimum upper pool of elevation 34.0. Jonesville Lock and Dam is located approximately 24 miles downstream of the site for the Brushy Bayou Drainage Structure. The top of the existing levee is approximately elevation 66.0. and the earthen levee is roughly 12 feet in height.

1.2 Purpose

The purpose of this report is to present the Review Plan for the Independent External Peer Review (IEPR) for Brushy Bayou Drainage Structure. This report also documents the entire review process and serves to archive the comments made during the review along with the final resolution of those comments.

1.3 Background

The local sponsor for the Brushy Bayou Project [redacted] firm located [redacted] o prepare the design and plans for construction of the project. Any alterations to the Red River Levee System falls under the jurisdiction of the U.S. Army Corps of Engineers. The Corps requires that any alterations or new structures added to the levee system be designed to meet their standards in order to maintain the safety of an overall levee system which protects significant property and lives in Concordia Parish. Also, to help ensure that safe standards are followed in the design and construction of the project the Corps requires that both the design and construction be given a review by engineers well experienced in this type of design. This review must be "independent and external" in the sense that the reviewers must not have been involved in the original project design and must not be affiliated with the project or the design company performing the work.

1.4 References

The following key references were used in the review and preparation of this document. In general EC 1165-2-214 covers the process that should be followed for review and defines the level of complexity required for the review depending on the level of risk associated with the project. EC 1165-2-216 covers the policy and procedures that should be followed when a public or private entity request approval to alter a project under the jurisdiction of the U.S. Army Corps of Engineers. Appendix D of EC 1165-2-216 covers the guidance to be used in the alteration of levees and is therefore specifically applicable to this project. Appendix D also contains a complete list of the technical design manuals many of which are applicable to this project. The documents considered most applicable are listed below.

a. EC 1165-2-214, Civil Works Review

b. EC 1165-2-216, Policy and Procedural Guidance for Processing Request to Alter USACE Projects
c. EM 1110-1-1804, Geotechnical Investigations
d. EM 1110-1-1904, Settlement Analysis
e. EM 1110-2-1418, Channel Stability Assessment for Flood Control Projects
f. EM 1110-2-1601, Hydraulic Design of Flood Control Channels
g. EM 1110-2-1902, Slope Stability
h. EM 1110-2-1906, Laboratory Soils Testing
i. EM 1110-2-1913, Design and Construction of Levees
j. EM 1110-2-2100, Stability Analysis of Concrete Structures
k. EM 1110-2-2104, Strength Design for Concrete Hydraulic Structures
l. EM 1110-2-2502, Retaining and Floodwalls
m. EM 1110-2-2902, Conduits, Culverts, and Pipes
n. EC 1110-2-6066, Design of I-Walls
o. ETL 1110-2-575, Evaluation of I-Walla

2.0 INDEPENDENT EXTERNAL PEER REVIEW PROCESS

2.1 Level of Review Required and Documents Reviewed

Based on guidance provided in EC 1110-2-214 a Type II IEPR was performed on the Brushy Bayou Project because it is considered a project where potential hazards pose a significant threat to public safety. Reference is also made to Appendix E of EC1110-2-214 containing guidance on the need for Type II IEPR's. The review team, after a brief examination of the documents to be reviewed, recommended that the review be conducted in 2 phases since there were significant areas of design needing further work. Most notable was the absence of specifications. The review was conducted on the existing documents and the first phase comments provided to the sponsor and to the design [redacted] The documents were revised [redacted] with consideration of the Phase 1 IEPR comments and the documents were reviewed again as a Phase 2 effort. Comments were then provided on the revised documents. These Phase 2 comments were resolved which concluded the Type II IEPR review and the report is considered complete and ready for consideration by the Corps. The following documents were reviewed:

Geotechnical Report

Hydraulics and Hydrology Report

Construction Plans (review of bridge design work excluded since it is not an integral part of levee alteration)

Hydraulic and Structural Calculations

2.2 General Qualifications Required for the External Peer Reviewers

All peer reviewers must meet the following minimum requirements:

- Registered professional engineer in their discipline
- College Degree in their discipline
- Level 3 Reviewer – minimum 15 years' experience and recognized experts in their fields of review
- Relevant water control structure and levee experience and experience in analysis and risk assessment of large complex systems with emphasis on flood control structures and levee safety issues
- No conflicts of interest regarding the Brushy Bayou Project either financially or professionally

Reviewers were selected in the fields of geotechnical, hydraulics and hydrology, and civil and structural. Specific experience requirements in each of these fields is listed below.

Geotechnical Reviewer

- Demonstrated senior experience in the geotechnical design of levees, drainage structures, sheet-pile weirs
- Experience in site investigations for subsurface drilling, laboratory testing, slope stability, seepage, and settlement analysis
- Levee and dam safety experience
- Recognized expert in USACE design criteria as it relates to geotechnical requirements for flood control projects

Hydraulics and Hydrology Reviewer

- Demonstrated senior experience in the hydraulics and hydrology design of levees, channels and flood control projects
- Experience in hydraulic design principles for Dam safety
- Experience in hydrology and hydraulics of multipurpose watershed projects for flood control and flood protection
- Recognized expert in USACE design criteria as it relates to hydraulic engineering requirements for flood control projects

Civil and Structural Reviewer

- Demonstrated senior experience in the civil layout and design of levees, channels and flood control projects
- Demonstrated experience in the structural design of medium to large flood control projects
- Experience in preparation of contract plans and specifications for complex levee and flood control structures
- Recognized expert in USACE design criteria as it relates to civil and structural engineering requirements for flood control projects

The selected peer reviewers meet or exceed all the requirements listed above. Names and a brief discussion of the experiences of each reviewer selected for this IEPR are listed in the following paragraph.

2.3 IEPR Review Team Members

The review team is identified below. A summary of the biography of each reviewer is also provided. More detailed resumes for each reviewer are included in Appendix A.

IEPR Review Team

Discipline	Name
Geotechnical	[redacted]
Hydraulics and Hydrology	
Civil and Structural (Chairman)	

Biography

[redacted]

2.4 The Charge

During the review process the following key issues were examined by each reviewer as their "Charge". Also, at the conclusion of the IEPR each reviewer was asked to answer the following "General Charge" questions considered critical to the successful and safe performance of the Brushy Bayou Project.

The Charge Questions for the Design Review Team and their answers are:

1. Does the overall project layout and design adequately address redundancy, resiliency, and robustness with proper emphasis on reducing flooding and protecting the public during a flood event?
   Civil Structural Reviewer: Yes
   H&H Reviewer: Yes
   Geotechnical Reviewer: Yes
2. Have sufficient geotechnical investigations been made relating to borings and laboratory testing?
   Geotechnical Reviewer: Yes
3. Are the steps (assumption, methods, analyses, etc.) for determining settlement, stability, foundation capacity, seepage and unwatering appropriate?
   Geotechnical Reviewer: Yes
4. Have appropriate assumptions and design methods been made to adequately predict the effects of the project on flooding?
   H&H Reviewer: Yes
5. Were appropriate design procedures used to determine the overall size and inverts of the drainage structure as needed to carry flows from Brushy Bayou?
   H&H Reviewer: Yes
6. Are the steps (assumptions, methods, analyses, etc.) for determining the structural and stability requirements of all components adequate?
   Civil Structural Reviewer: Yes
7. Does the overall layout of the project give appropriate consideration to the areas needed for construction and maintenance?
   Civil Structural Reviewer: Yes

The Charge Questions for the Construction Phase review are:

1. Do the assumptions made during design remain valid through construction as additional knowledge is gained?
   Civil Structural Reviewer:
   H&H Reviewer:
   Geotechnical Reviewer:
2. Will the project schedule for inspection adequately address any deviations from design assumptions made for performance?
   Civil Structural Reviewer:
   H&H Reviewer:
   Geotechnical Reviewer:

2.5 Execution of the Peer Review

The four documents listed in paragraph 2.1 above were given two reviews by the IEPR team and these "Phase 1 and Phase 2" comments are provided in Appendix C and D respectively. For convenience, the comments are separated by discipline, i.e. Civil/Structural, Geotechnical, Hydraulics and Hydrology. The responses to the comments are also

recorded in Appendix C and D. After all of the Phase 1 and 2 comments were resolved, a final recommendation and answers to the Charge Questions were provided by the IEPR Team and the IEPR considered complete.

3.0 SUMMARY

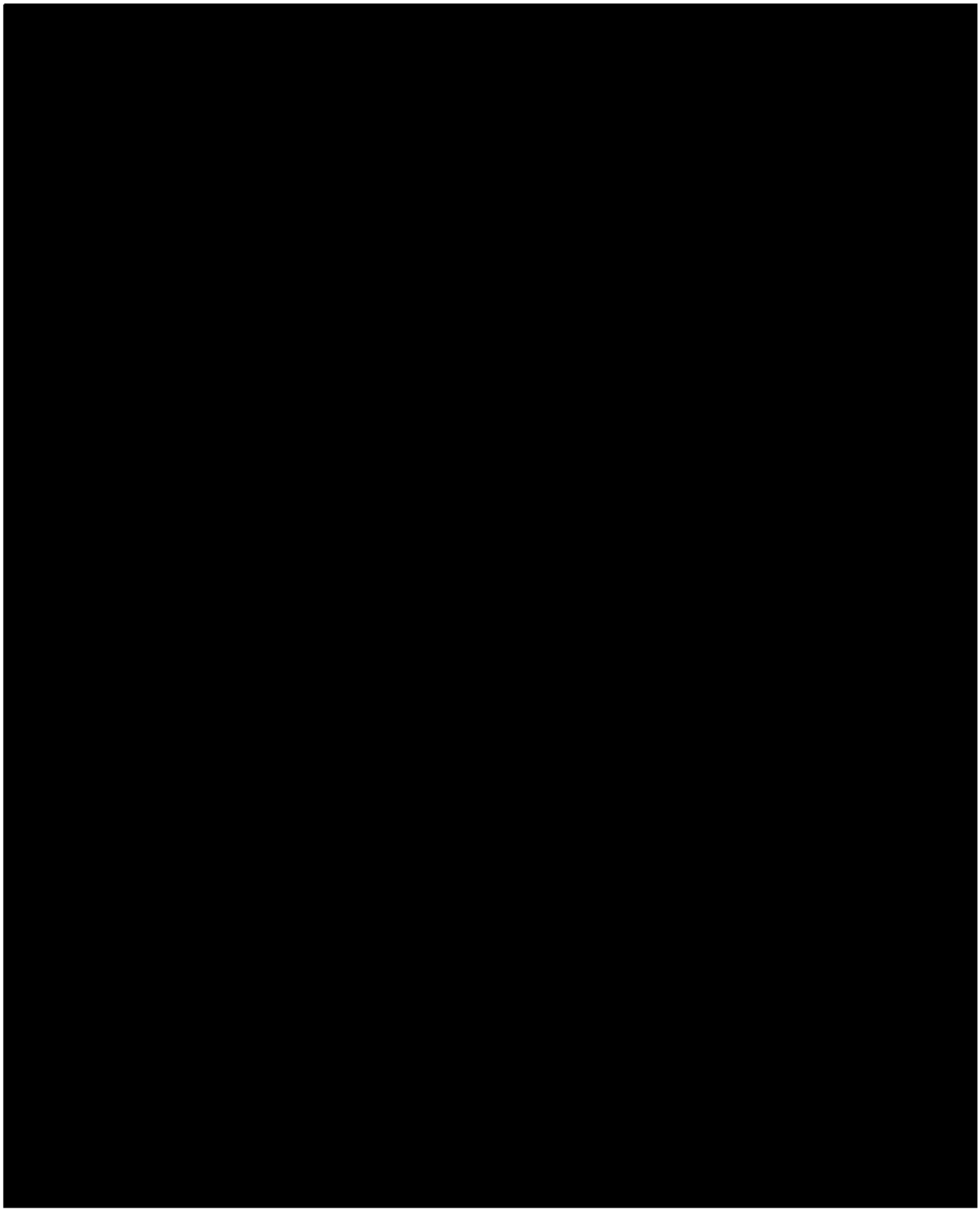
3.1 Findings

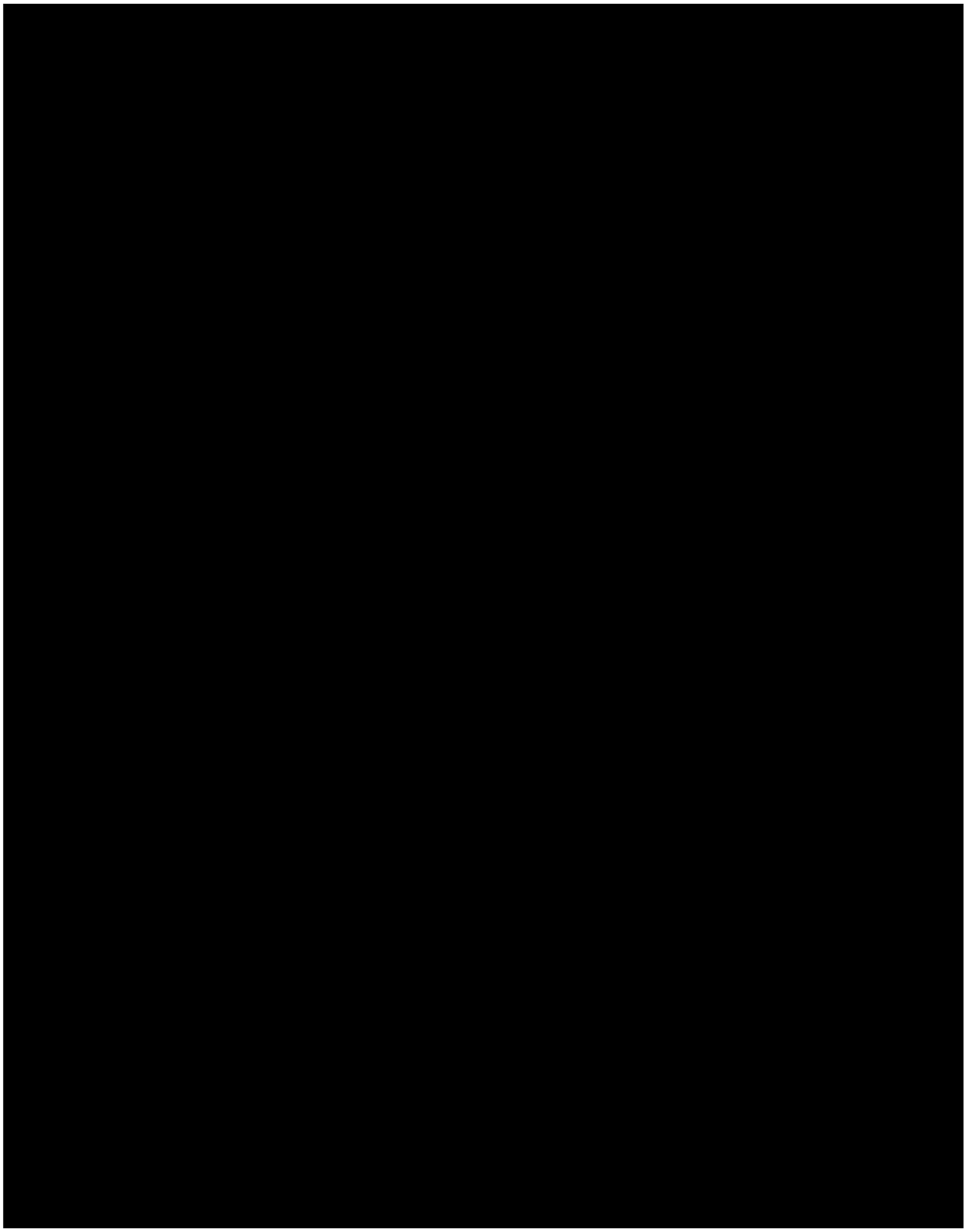
The IEPR Team completed a lengthy and extensive review process on the Brushy Bayou Project in September 2018. All the comments and resolutions are documented in Appendix C and D of this report. Although there were many comments all issues were addressed in a satisfactory manner and ultimately resulted in an improved project that meets the "Charge" requirements.

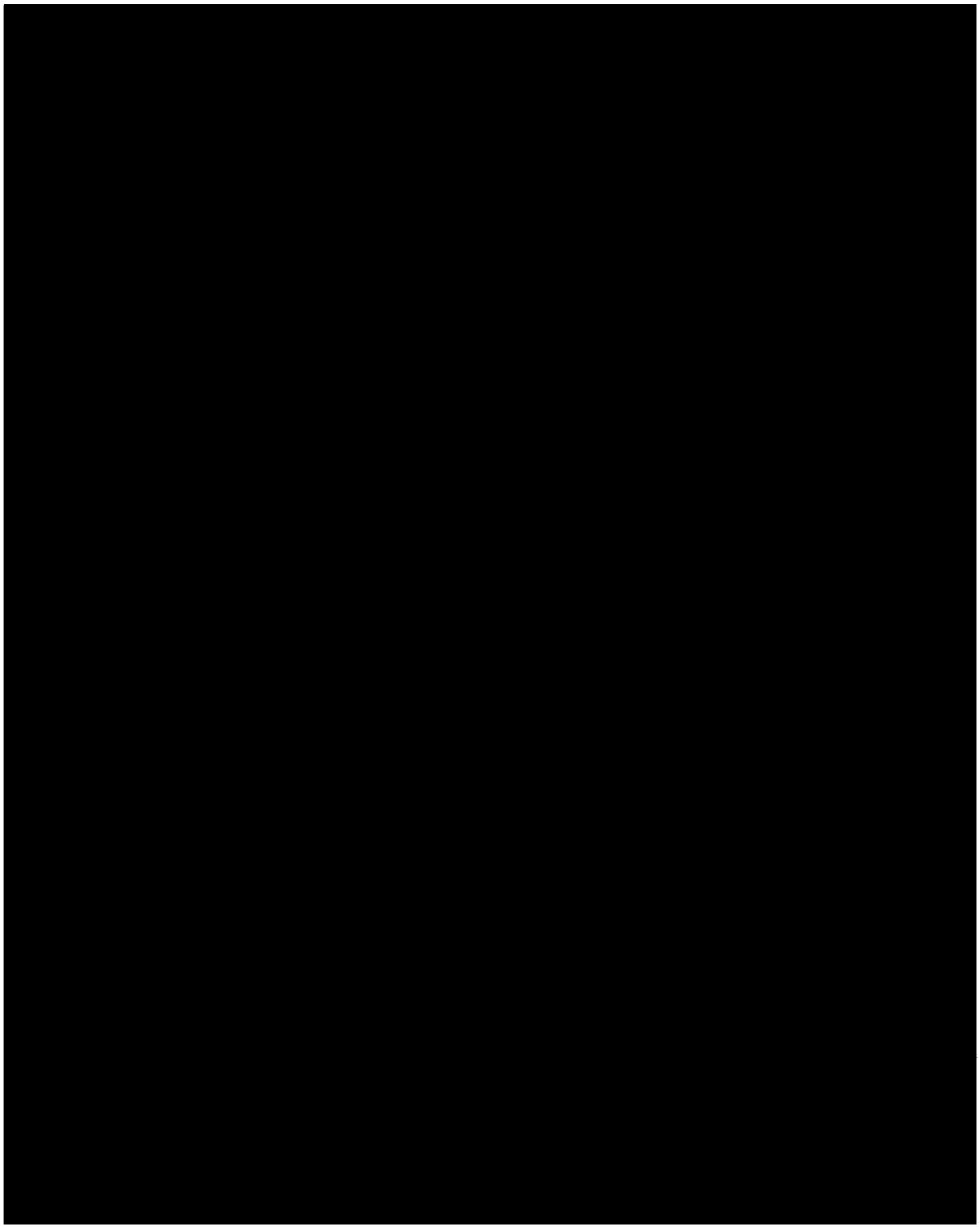
3.2 Conclusions

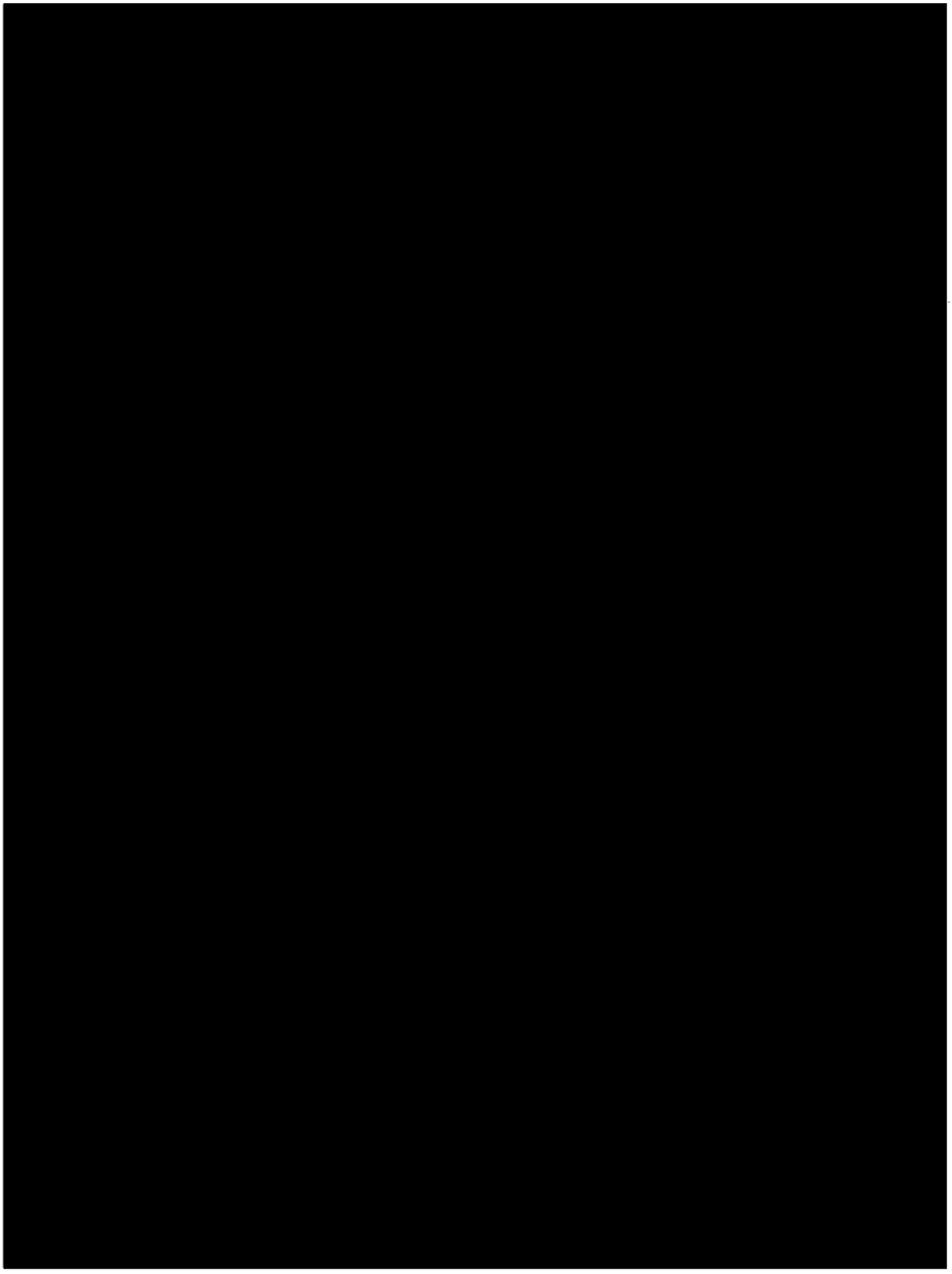
The IEPR process was used to review the Brushy Bayou Project; changes were made and documents were improved in accordance with the General Charge. The IEPR Process is considered to be complete by the team and ultimately resulted in a satisfactory design.

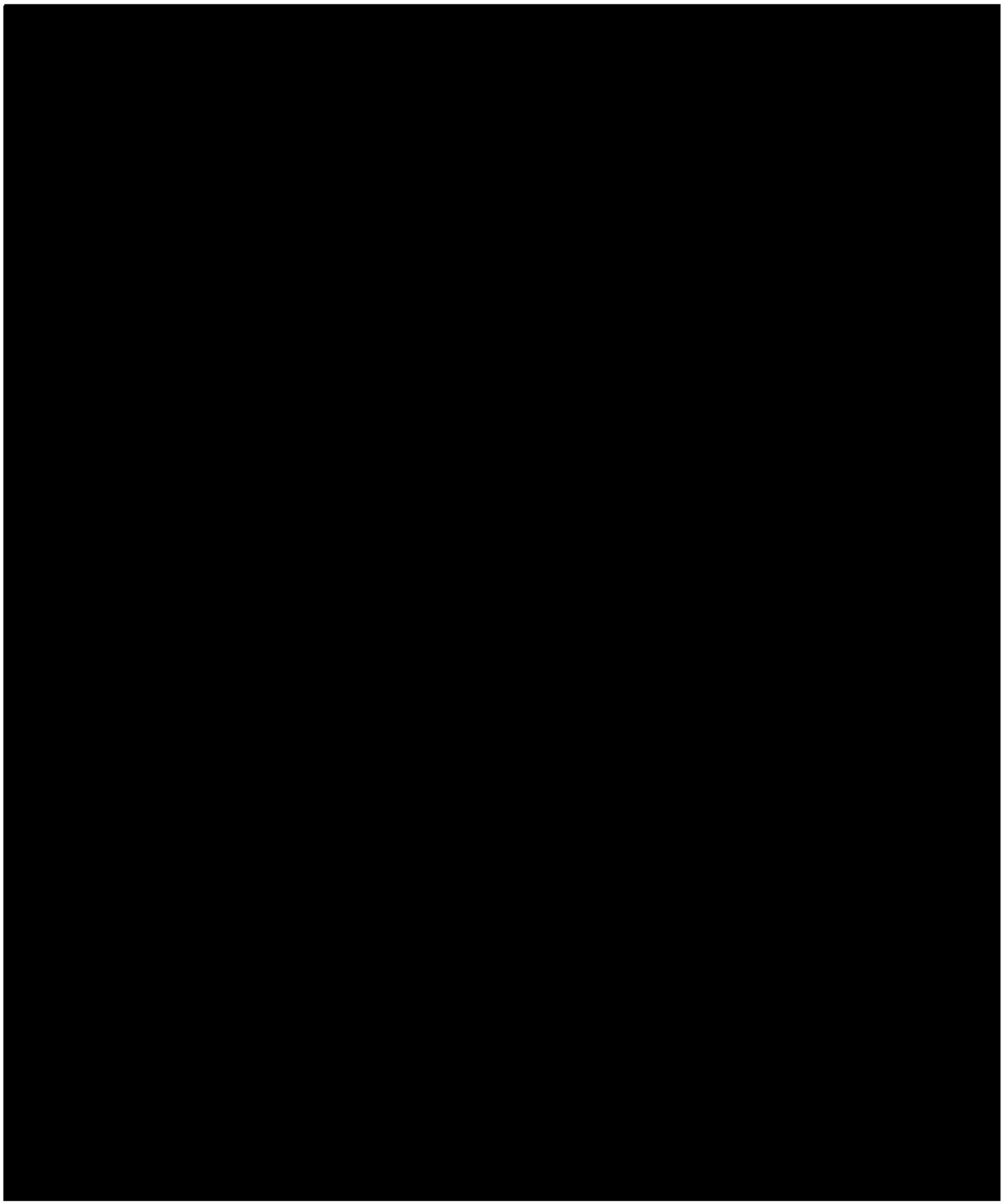
APPENDIX A
Reviewer Resumes

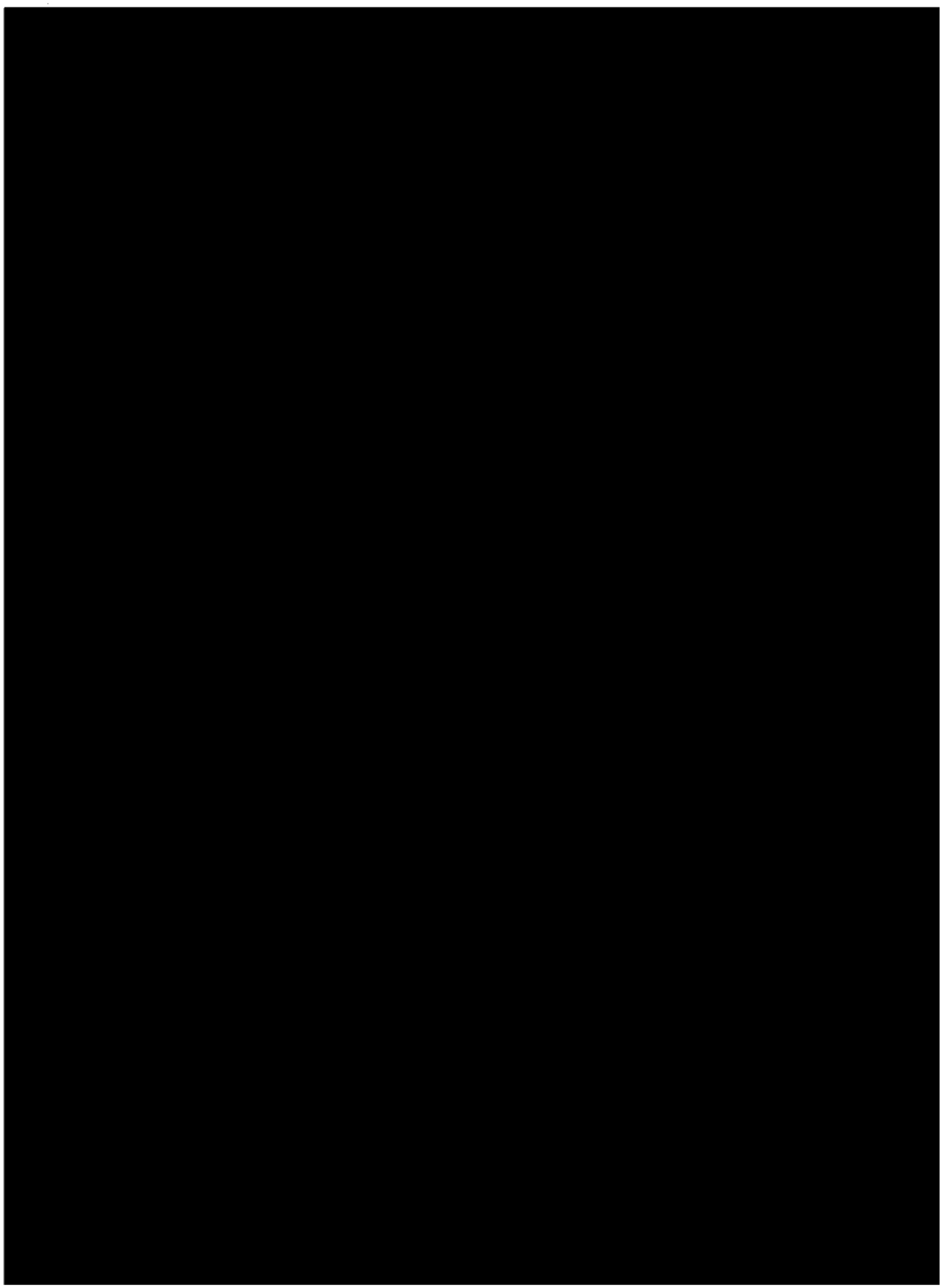


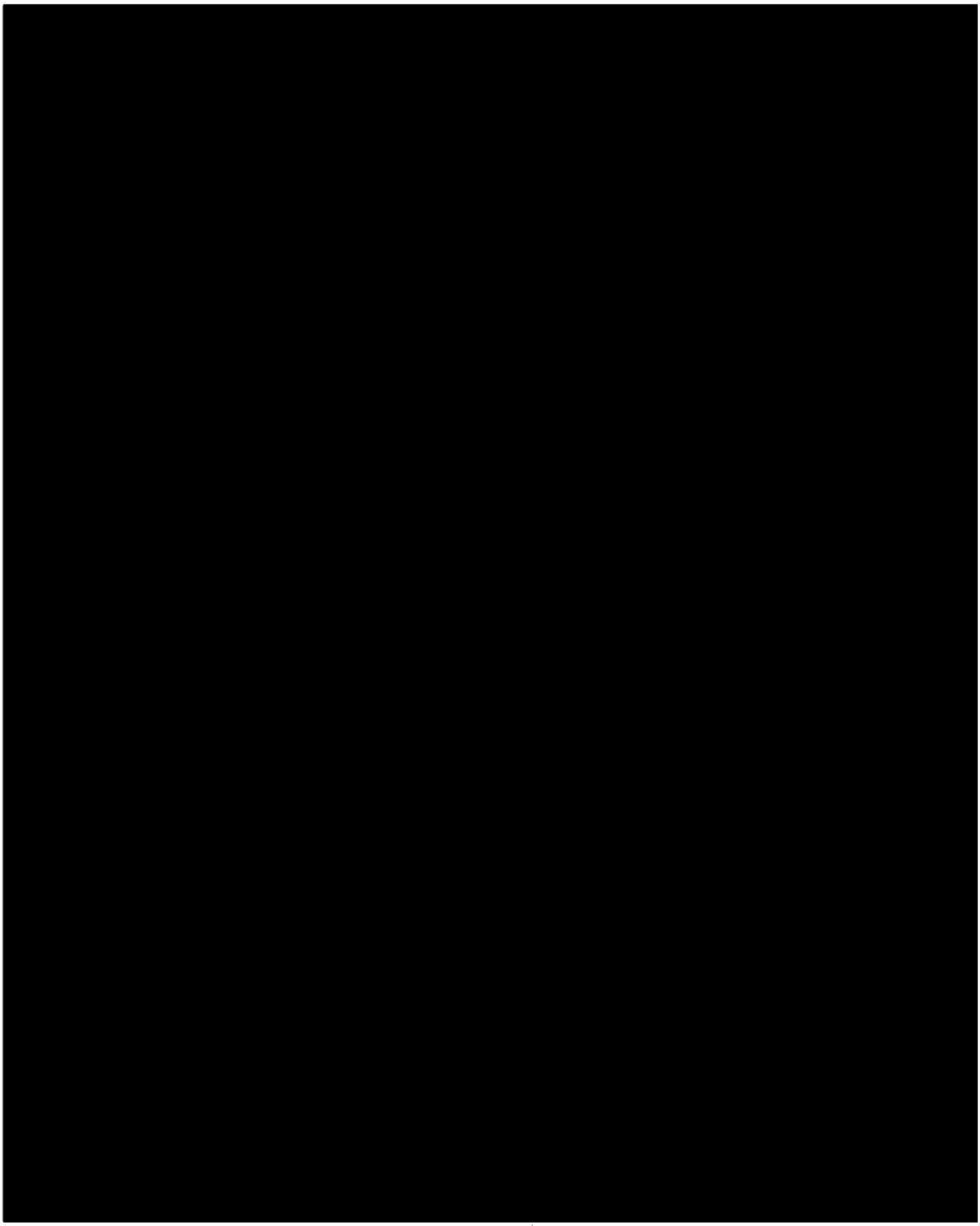












APPENDIX B

NATIONAL ACADEMY OF SCIENCES CONFLICT OF INTEREST FORMS

BI/COI FORM 3

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

BACKGROUND INFORMATION AND CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE

For General Scientific and Technical Studies and Assistance

Brushy Bayou Drainage Structure

There are two parts to this form, Part I Background Information, and Part II Confidential Conflict of Interest Disclosure. Complete both parts, **sign** and **date** this form on the last page, and return the form to the responsible staff officer for the project and committee activity to which this form applies. **Retain a copy for your records.**

PART I **BACKGROUND INFORMATION**

INSTRUCTIONS

Please provide the information requested below regarding **relevant** organizational affiliations, government service, public statements and positions, research support, and additional information (if any). Information is "relevant" if it is related to -- and might reasonably be of interest to others concerning -- your knowledge, experience, and personal perspectives regarding the subject matter and issues to be addressed by the committee activity for which this form is being prepared. If some or all of the requested information is contained in your curriculum vitae, you may if you prefer simply attach your CV to this form, supplemented by additional responses or comments below as necessary.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant business relationships (as an employee, owner, officer, director, consultant, etc.) and your relevant remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups, etc.).

[redacted]

II. GOVERNMENT SERVICE. Report your relevant service (full-time or part-time) with federal, state, or local government in the United States (including elected or appointed positions, employment, advisory board memberships, military service, etc.).

[redacted]

[redacted]

III. RESEARCH SUPPORT. Report relevant information regarding both public and private sources of research support (other than your present employer), including sources of funding, equipment, facilities, etc.

[redacted]

IV. PUBLIC STATEMENTS AND POSITIONS. List your relevant articles, testimony, speeches, etc., by date, title, and publication (if any) in which they appeared, or provide relevant representative examples if numerous. Provide a brief description of relevant positions of any organizations or groups with which you are closely identified or associated.

[redacted]

[redacted]

V. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the assigned task of the committee or panel on which you have been invited to serve, and therefore might constitute an actual or potential source of bias, please describe them briefly.

[redacted]

[redacted]

PART II CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE

INSTRUCTIONS

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The term "conflict of interest" means something more than individual bias. There must be an *interest,* ordinarily financial, that could be directly affected by the work of the committee.

Conflict of interest requirements are *objective* and *prophylactic.* They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the other members of the committee, the institution, and the public interest. The individual, the committee, and the institution should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the work of the committee simply because of the existence of conflicting interests.

The term "conflict of interest" applies only to *current interests.* It does not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future but do not currently exist, because such future interests are inherently speculative and uncertain. For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is <u>not</u> a current interest.

The term "conflict of interest" applies not only to the personal interests of the individual but also to the *interests of others* with whom the individual has substantial common financial interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial interests. Consideration must also be given to the interests of those for whom one is acting in a

[redacted]

fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Much of the work of this institution involves scientific and technical studies and assistance for sponsors across a broad range of activities. Such activities may include, for example: defining research needs, priorities, opportunities and agendas; assessing technology development issues and opportunities; addressing questions of human health promotion and assessment; providing scientific and technical assistance and supporting services for government agency program development; assessing the state of scientific or technical knowledge on particular subjects and in particular fields; providing international and foreign country science and technology assessments, studies and assistance. Such activities frequently address scientific, technical, and policy issues that are sufficiently broad in scope that they do not implicate specific financial interests or conflict of interest concerns.

However, where such activities address more specific issues having significant financial implications -- e.g., funding telescope A versus telescope B, government development or evaluation of a specific proprietary technology, promotion or endorsement of a specific form of medical treatment or medical device, connecting foreign research facilities to specific commercial interests, making recommendations to sponsors regarding specific contract or grant awards, etc. -- careful consideration must be given to possible conflict of interest issues with respect to the appointment of members of committees that will be used by the institution in the development of reports to be provided by the institution to sponsoring agencies.

The overriding objective of the conflict of interest inquiry in each case is to identify whether there are interests – primarily financial in nature – that conflict with the committee service of the individual because they could impair the individual's objectivity or could create an unfair competitive advantage for any person or organization. The fundamental question in each case is does the individual, or others with whom the individual has substantial common financial interests, have identifiable interests that could be directly affected by the outcome of the project activities of the committee on which the individual has been invited to serve? For projects involving advice regarding awards of contracts, grants, fellowships, etc., this institution is also guided by the principle that an individual should not participate in any decision regarding the award of a contract or grant or any other substantial economic benefit to the individual or to others with whom the individual has substantial common financial interests or a substantial personal or professional relationship.

The application of these concepts to specific scientific and technical studies and assistance projects must necessarily be addressed in each case on the basis of the particular facts and circumstances involved. The questions set forth below are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by the particular committee on which you have been invited to serve.

[redacted]

1. FINANCIAL INTERESTS. (a) Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interests valued at less than $10,000), do you or, to the best of your knowledge others with whom you have substantial common financial interests, have financial investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments, by the outcome of the project activities of the committee on which you have been invited to serve?

(b) Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, do you or, to the best of your knowledge others with whom you have substantial common financial interests, have property interests that could be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(c) Could your employment or self-employment (or the employment or self-employment of your spouse), or the financial interests of your employer or clients (or the financial interests of your spouse's employer or clients) be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(d) Taking into account research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), could your current research funding and support (or that of your close research colleagues and collaborators) be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(e) Could your service on the committee on which you have been invited to serve create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests?

If the answer to all of the above questions under FINANCIAL INTERESTS is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under FINANCIAL INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

[redacted]

2. OTHER INTERESTS. (a) Is the central purpose of the project for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer?

(b) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the functions to be performed in this committee activity?
(c) To the best of your knowledge, will your participation in this committee activity enable you to obtain access to a competitor's or potential competitor's confidential proprietary information?

(d) If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal conflict of interest restrictions that may be applicable to your service in connection with this committee activity?

(e) If you are a U.S. Government employee, are you currently employed by a federal agency that is sponsoring this project? If you are not a U.S. Government employee, are you an employee of any other sponsor (e.g., a private foundation) of this project?

(f) If the committee activity for which this form is being prepared involves reviews of specific applications and proposals for contract, grant, fellowship, etc. awards to be made by sponsors, do you or others with whom you have substantial common financial interests, or a familial or substantial professional relationship, have an interest in receiving or being considered for awards that are currently the subject of the review being conducted by this committee?

(g) If the committee activity for which this form is being prepared involves developing requests for proposals, work statements, and/or specifications, etc., are you interested in seeking an award under the program for which the committee on which you have been invited to serve is developing the request for proposals, work statement, and/or specifications -- or, are you employed in any capacity by, or do you have a financial interest in or other economic relationship with, any person or organization that to the best of your knowledge is interested in seeking an award under this program?

If the answer to all of the above questions under OTHER INTERESTS is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under OTHER INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

[redacted]

EXPLANATION OF "YES" RESPONSES:

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

[redacted]

[redacted]

[redacted]

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

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fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Much of the work of this institution involves scientific and technical studies and assistance for sponsors across a broad range of activities. Such activities may include, for example: defining research needs, priorities, opportunities and agendas; assessing technology development issues and opportunities; addressing questions of human health promotion and assessment; providing scientific and technical assistance and supporting services for government agency program development; assessing the state of scientific or technical knowledge on particular subjects and in particular fields; providing international and foreign country science and technology assessments, studies and assistance. Such activities frequently address scientific, technical, and policy issues that are sufficiently broad in scope that they do not implicate specific financial interests or conflict of interest concerns.

However, where such activities address more specific issues having significant financial implications -- e.g., funding telescope A versus telescope B, government development or evaluation of a specific proprietary technology, promotion or endorsement of a specific form of medical treatment or medical device, connecting foreign research facilities to specific commercial interests, making recommendations to sponsors regarding specific contract or grant awards, etc. -- careful consideration must be given to possible conflict of interest issues with respect to the appointment of members of committees that will be used by the institution in the development of reports to be provided by the institution to sponsoring agencies.

The overriding objective of the conflict of interest inquiry in each case is to identify whether there are interests -- primarily financial in nature – that conflict with the committee service of the individual because they could impair the individual's objectivity or could create an unfair competitive advantage for any person or organization. The fundamental question in each case is does the individual, or others with whom the individual has substantial common financial interests, have identifiable interests that could be directly affected by the outcome of the project activities of the committee on which the individual has been invited to serve? For projects involving advice regarding awards of contracts, grants, fellowships, etc., this institution is also guided by the principle that an individual should not participate in any decision regarding the award of a contract or grant or any other substantial economic benefit to the individual or to others with whom the individual has substantial common financial interests or a substantial personal or professional relationship.

The application of these concepts to specific scientific and technical studies and assistance projects must necessarily be addressed in each case on the basis of the particular facts and circumstances involved. The questions set forth below are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by the particular committee on which you have been invited to serve.

1. FINANCIAL INTERESTS. (a) Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interests valued at less than $10,000), do you or, to the best of your knowledge others with whom you have substantial common financial interests, have financial investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments, by the outcome of the project activities of the committee on which you have been invited to serve?

(b) Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, do you or, to the best of your knowledge others with whom you have substantial common financial interests, have property interests that could be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(c) Could your employment or self-employment (or the employment or self-employment of your spouse), or the financial interests of your employer or clients (or the financial interests of your spouse's employer or clients) be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(d) Taking into account research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), could your current research funding and support (or that of your close research colleagues and collaborators) be directly affected by the outcome of the project activities of the committee on which you have been invited to serve?

(e) Could your service on the committee on which you have been invited to serve create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests?

If the answer to all of the above questions under FINANCIAL INTERESTS is either "no" or "not applicable," check here X (NO).

If the answer to any of the above questions under FINANCIAL INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

[redacted]

2. OTHER INTERESTS. (a) Is the central purpose of the project for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer?

(b) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the functions to be performed in this committee activity?
(c) To the best of your knowledge, will your participation in this committee activity enable you to obtain access to a competitor's or potential competitor's confidential proprietary information?

(d) If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal conflict of interest restrictions that may be applicable to your service in connection with this committee activity?

(e) If you are a U.S. Government employee, are you currently employed by a federal agency that is sponsoring this project? If you are not a U.S. Government employee, are you an employee of any other sponsor (e.g., a private foundation) of this project?

(f) If the committee activity for which this form is being prepared involves reviews of specific applications and proposals for contract, grant, fellowship, etc. awards to be made by sponsors, do you or others with whom you have substantial common financial interests, or a familial or substantial professional relationship, have an interest in receiving or being considered for awards that are currently the subject of the review being conducted by this committee?

(g) If the committee activity for which this form is being prepared involves developing requests for proposals, work statements, and/or specifications, etc., are you interested in seeking an award under the program for which the committee on which you have been invited to serve is developing the request for proposals, work statement, and/or specifications -- or, are you employed in any capacity by, or do you have a financial interest in or other economic relationship with, any person or organization that to the best of your knowledge is interested in seeking an award under this program?

If the answer to all of the above questions under OTHER INTERESTS is either "no" or "not applicable," check here X (NO).

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[redacted]

EXPLANATION OF "YES" RESPONSES:

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

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The National Academies of
SCIENCES · ENGINEERING · MEDICINE

BACKGROUND INFORMATION AND CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE

For General Scientific and Technical Studies and Assistance


[redacted]

Brushy Bayou Drainage Structure

There are two parts to this form, Part I Background Information, and Part II Confidential Conflict of Interest Disclosure. Complete both parts, **sign** and **date** this form on the last page, and return the form to the responsible staff officer for the project and committee activity to which this form applies. **Retain a copy for your records.**

PART I **BACKGROUND INFORMATION**

[redacted]

INSTRUCTIONS

Please provide the information requested below regarding **relevant** organizational affiliations, government service, public statements and positions, research support, and additional information (if any). Information is "relevant" if it is related to -- and might reasonably be of interest to others concerning -- your knowledge, experience, and personal perspectives regarding the subject matter and issues to be addressed by the committee activity for which this form is being prepared. If some or all of the requested information is contained in your curriculum vitae, you may if you prefer simply attach your CV to this form, supplemented by additional responses or comments below as necessary.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant business relationships (as an employee, owner, officer, director, consultant, etc.) and your relevant remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups, etc.).

See curriculum vitae (resume) attached as Appendix.

II. GOVERNMENT SERVICE. Report your relevant service (full-time or part-time) with federal, state, or local government in the United States (including elected or appointed positions, employment, advisory board memberships, military service, etc.).

35 years of service with the US Army Corps of Engineers
Current status is retired

III. RESEARCH SUPPORT. Report relevant information regarding both public and private sources of research support (other than your present employer), including sources of funding, equipment, facilities, etc.

None

IV. PUBLIC STATEMENTS AND POSITIONS. List your relevant articles, testimony, speeches, etc., by date, title, and publication (if any) in which they appeared, or provide relevant representative examples if numerous. Provide a brief description of relevant positions of any organizations or groups with which you are closely identified or associated.

See curriculum vitae (resume) attached as Appendix.

[redacted]

V. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the assigned task of the committee or panel on which you have been invited to serve, and therefore might constitute an actual or potential source of bias, please describe them briefly.

None

PART II **CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE**

INSTRUCTIONS

It is essential that the work of committees of the institution used in the development of reports not be compromised by any significant conflict of interest. For this purpose, **the term "conflict of interest" means any financial or other interest which conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization.** Except for those situations in which the institution determines that a conflict of interest is unavoidable and promptly and publicly discloses the conflict of interest, no individual can be appointed to serve (or continue to serve) on a committee of the institution used in the development of reports if the individual has a conflict of interest that is relevant to the functions to be performed.

The term "conflict of interest" means something more than individual bias. There must be an *interest,* ordinarily financial, that could be directly affected by the work of the committee.

Conflict of interest requirements are *objective* and *prophylactic.* They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the other members of the committee, the institution, and the public interest. The individual, the committee, and the institution should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the work of the committee simply because of the existence of conflicting interests.

The term "conflict of interest" applies only to *current interests*. It does not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future but do not currently exist, because such future interests are inherently speculative and uncertain.

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For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is not a current interest.

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[redacted]

If the answer to any of the above questions under FINANCIAL INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

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[redacted]

APPENDIX C
PHASE 1 COMMENTS

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE

Hydrology and Hydraulic Comments 6/2017

As requested the undersigned has completed the initial IEPR of the Constructions Plans for the Brushy Bayou Weir and Drainage Structure project along the Tensas River Levee in Concordia Parish, LA, within the Vicksburg District Corps of Engineers. The project consists of the construction of a drainage structure in the existing Tensas Levee and of a weir to maintain the water level in Brushy Bayou.

General Comment

1. The extent of the hydraulically interconnected system must be defined as the first step in performance analysis. This extent must be broad enough to include channel reaches and floodplains downstream and upstream of the proposed alteration site that a reasonable analyst would expect to be influenced by changes in discharge, volume or corresponding water surface elevation at the proposed alteration site. Figure 1 appears to adequately define the hydraulically interconnected system and study area. However, based on the write-up of "**Hydraulic and Hydrology Study**" paragraph on page 9, it appears that the H&H study area stops at Wild Cow Bayou weir which only includes about half of the study area of figure 1. It does not include the existing outlets of the study area at Old Bayou Cocodrie Structure at the south end of the study area and Tensas Cocodrie Pumping plant and outlet structure on the west middle side of the study area.

Specific Comments

2. Page 7, "a broad crested weir with a width of 230 feet would be installed just upstream from proposed box culvert." Expand on the design criteria and rational for the weir width.

3. Page 8, provide general estimated impacts of Sites 1-7 on the system upon completion.

4. On Page 8-9, a discussion of the areas of past insurance claims by subdivisions and etc. Show the areas on a map.

5. Page 11, Table 1 shows the frequency flows studied. The study should consider a full range of flows, recommending adding up to 100 year flows.

6. Page 11, discussion of the HECRAS model. More detail discussion should be shown for the RAS model, Plan map of streams modeled and RAS Schematic, n values, boundary conditions, and etc.

7. Page 11, Show calibration profiles verses observed stages.

8. Page 12-15 profiles: Where are the profiles for Brushy Bayou and Caney Bayou?

9. Page 14: Luke Martin Bridge width 100 feet. Explain the design criteria for the 100 width recommendation.

10. Page 16: In discussions of 2008, 2010, and 2013 events, an estimate of the frequency of the events would be beneficial information to be included in the report.

11. Page 21-30 inundation maps: The maps don't map the entire inundation area, appears to stop at a cross section width. RAS mapper should be used to map the entire inundation for each event.

12. Insert a combine inundation map of the entire study area before the zoom in inundation maps for each frequency event..

13. Page 30, Show water surface profile on the Tensas River discussed in the paragraph.

14. Table 6, 7, 8: Show on map the general areas of the estimated claim costs and estimated frequency of the events.

15. Page 36, Benefit/Cost: The information presented is not a true B/C analysis. Need to state that had the project been in place during the 2008-2013 time frame the three events would have saved over 9 million dollars in damages if true. The only way to know is to model the three events and determine how much flood reduction would have be obtained. It is doubtful all of the flood claims would have been eliminated.

16. Page 36; "Given that the $9,147,288.38 flood claim costs represent just the costs occurring within a five year time frame (2008-2013), this project will likely have more than justified its cost within two-and-a-half years." Recommend taking this out. This statement is not true, damages is totally dependent on frequency events not on a calendar time frame. It is likely when the three events frequency are estimated they will be much greater than a two year time frame/event.

17. General comment on design drawing. Provide backup design calculations for riprap size and depth of riprap as shown in the design drawing

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE

Civil/Structural Comments 6/2017

CONSTRUCTION PLANS AND SPECIFICATIONS COMMENTS

As requested the undersigned has completed the initial IEPR of the Constructions Plans for the Brushy Bayou Weir and Drainage Structure project along the Tensas River Levee in Concordia Parish, LA, within the Vicksburg District Corps of Engineers. The project consists of the construction of a drainage structure in the existing Tensas Levee and of a weir to maintain the water level in Brushy Bayou.

General

1. No specifications were prepared at the time of the Phase 1 review. It appears that the intent was to use LDOTD Standard specifications for construction. It is possible to build this project with LDOTD specifications, however since these type specifications are tailored more for road and bridge construction, editing and supplementation of the LDOTD specs will be required to produce an acceptable product. The guide specifications of the US Army Corps of Engineers are specifically written to cover the type of construction for drainage structures of this type. The designer in charge will need to either supplement the LDOTD specs with Corps specs or prepare complete specifications using Corps guide specs The IEPR team will review the final specs as part of a Phase 2 effort.
2. The cofferdam/temporary levee will need to be constructed to full height before degrading the existing levee. This requirement should clearly be shown on the plans. This will also require a borrow area which is not currently shown on the plans. The borrow area will need to be tested to ensure that the material is suitable for the cofferdam fill.
3. The required grade of the completed levee should be shown on the plans and should be based on an examination of the official flowline plus freeboard or the existing levee height whichever is higher. Two feet of structure superiority is normally provided for the levee at main structure locations such as this and should be added to the required net grade of the levee. Finally, a "gross grade" for the levee construction should be

shown on the plans which includes some overbuild for expected settlement. Both the net grade and gross grade are normally shown.

4. There are no rights of way or limits of construction shown on the plans to show the contractor the area available for construction. The contractor will need an area for stockpiling of material included since he will need to stockpile the material removed from the levee for later use.
5. It appears there will need to be a smaller cofferdam placed on the riverside to keep any small rises above pool in the Tensas River from entering the work area. Borrow will need to be made available for this fill. The contractor should be required to submit any plans for cofferdams on the riverside for approval.
6. Hydrographs should be included in the plans providing some idea of the stages that can be expected on the river during construction. There are, at a minimum, stage records of the upper pool for Jonesville Lock and Dam available. If there are any river stage records closer to the site they should be provided. If there are any records of stages in Brushy Bayou they should also be included in the plans.
7. A "General Notes" sheet should be provided in the front of the set showing key requirements of the contract such as required strength of the concrete, steel, basis of elevations (NAVD 88?), concrete notes, splice and lap lengths required, etc. An example can be provided upon request.
8. The top of the weir is elevation 44.0 and the upper pool on Jonesville is elevation 34.0. If a bayou runout occurs with the river level at about 34.0 this represents a runout with 10 feet of head roughly speaking. It seems that some type of energy dissipation would be required either downstream of the weir or on the outlet of the structure. This comment relates to a hydraulics comment to verify the sizes of riprap for the conditions shown.

Plans

9. Drawing C-2. There appears to be a number of bid items not covered by this drawing. For example it seems there should be items for sheet-pile, water-stops, filter, cofferdams, dewatering/unwatering, reinforcement, stabilization slab etc. It may be that once the specifications are complete this work will also be completed.
10. Drawing C-3. The sheet pile for the cofferdam shows 13 feet of stick-up which is very high for an I-wall. We calculated the deflection from the CWALSHT output and estimated a 27 inch displacement (assuming the required section modulus sheet-pile is used). Unless we made an error, the displacement and required section modulus seems unreasonable even for this extreme case. This is an extreme case but the number still look very high and indicate that 13 feet of stick-up may simply be more than sheet pile can be asked to carry with water to the top. Suggest consideration be given to leaving the levee side toe of the cofferdam as is and raising the cofferdam crown from 52.0 to elevation 59.0 which will result in 6 feet of stick-up. This meets the

criteria for use of I-walls, and should allow the sheet pile to be pulled and reused in the weir.

11. Drawing C-3. The layout of the structure needs further consideration. The Corps Engineering Manual on Conduits and Culverts, EM 1110-2-2902 provides good advice to use in culvert layouts to help ensure a safe structure. Below are listed some of the main features which are described in more detail in the EM. These features should be incorporated into the project.
    a. The manual provides a typical cross section for a culvert thru a levee on page 3-5 and 3-6 which should be examined.
    b. A sand collar should be provided for the downstream third of the pipe to guard against piping along the culvert.
    c. The headwalls of the structure will need to be raised to confine the sand collar and some levee fill over the sand at the toe of the slope. The headwalls should probably be at about 4 feet in height as opposed to the 10 inches shown. This will also require raising the tops of the wing walls.
    d. The drawing currently shows the levee slope feather edging out on the top of the culverts with the tops of culverts exposed. This will produce an unsafe slope on the levee in this area and subject the slope to erosion and washing away. Raising the headwall will provide for more cover over the top of the culvert at the toe of slope and provide greater confinement of the levee slope and greater protection of the toe of the slope.
    e. The culvert will need joints to minimize the possibility of cracking in the culvert due to uneven settlement caused by the higher weights of fill at the centerline of the levee. The manual recommends a joint every 20 feet but this is subject to judgement. He designer should select joint spacing considering the guidance and the size of this structure. Somewhat over 20 feet might be justified for a culver this size.
    f. The culvert joints are typically cast as male and female and are thicker than the culvert walls with special reinforcement. Example joint used can be provided on request. The joints also have water stops all around. The wing walls should have water-stops in the walls as well as the floor.
    g. The invert of the pipe is usually set with a small portion of the fall from the inlet to the centerline levee and more of the fall from the centerline to the outlet. This prevents future settlement from creating a sag in the invert of the culvert.
    h. A sheet pile cutoff should be provided at the toe of the downstream outlet to prevent undermining of the outlet should a scour hole develop.
12. Drawing C-3. The rights of way or area available should be shown on this sheet.
13. Drawing C-4. This drawing should be larger scale clearly showing elevations of the ground. In particular the area on the riverside appears to have additional contour information which is unclear and will be needed in the event the contractor plans to construct a smaller cofferdam on the riverside. It appears there may be information which would allow for an estimate of the depth of the old bayou if detailed more

clearly. Recommend the plan and profile be larger scale and placed on separate sheets.

14. Drawing C-4. The profile should clearly show the dimensions for the new levee crown width and elevation. The section should show a net grade and a gross grade including consideration of settlement although it may be small in this case. See comment 3 for establishment of the net grade.
15. Additional sections should be provided showing the excavation slopes thru the structure and the types and amounts of backfill required. An example is enclosed.
16. Drawing C-4. This drawing seems to indicate that the material between the cofferdam sheet-pile and the structure is to be excavated leaving the landside portion of the cofferdam in place. This may be an error since it seems unnecessary and would place an extreme load on the sheet pile.
17. Drawing C-6. This drawing and other related drawings should show a 6" stabilization slab as recommended by the soils report.
18. Drawing C-6. Water stop both the floor and walls.
19. Drawing C-7. Add a sheet pile cutoff under the end of the outlet.
20. Drawing C-8. Consider raising the headwall to about 4 feet.
21. Drawing C-8. Consider providing filter material beneath the inlet slab to collect and relieve any excess pressures that may collect during a flood situation.
22. Drawing C-13. It is difficult to understand the intent of the shape required for the "Native clay" backfill around the area where the sheet pile weir ties to the levee slopes. Please define the term native clay in the notes or the specifications.

CALCULATION PACKAGE COMMENTS

23. The culvert is designed for a case with no water. Recommend a case be checked for the flood condition. This case can reasonably be considered an overstress case and may not control but should at least be checked since this is the primary function of the project.
24. On page 20 in checking the shear the hydraulic load factor of 1.3 also applies to the shear and appears to have been overlooked.
25. The soils report recommended checking the stability and sliding of the inlet and outlet. In particular, the inlet should be checked with a flood case and excess uplift pressures under the slab. This will tend to lift the structure and the lighter weight may be an issue with stability.
26. There is no structural analysis presented for the walkway or gate lifting structure supports. The walkway uses channel sections for columns which are quite flexible and

don't have a very good l/r ratio. Please verify that these sections are capable of carrying the loads without buckling.

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE

Geotechnical Comments 6/2017

CONSTRUCTION PLAN COMMENTS

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The following initial comments are submitted for consideration.

Sheet C-3.

1. The side slopes for the Temporary Barrier Dam should have minimum side slopes of 1V on 3.75H for stability as presented in the geotechnical report. Also, the top width should be 8 feet.
2. Sec A-A and C-C. The bottom elevation of the sheet piles should be -4.0 as presented in the geotechnical report.
3. Sec C-C. As presented in the geotechnical report the foundation for the cofferdam should be a layer of sand that was placed as displacement fill to obtain a stable foundation prior to constructing the cofferdam. Since this area will be unwatered prior to construction of the cofferdam, consideration should be given to "mucking" out the foundation rather than displacing with the sand fill.

Sheet C-4.

1. The 440# riprap at the outlet end of the culvert should have a 9" thick layer of bedding/filter stone placed between the fabric and the riprap. Geotechnical personnel can provide the guidance on the requirements based on the soil conditions.
2. A 2 foot thick layer of free draining sand should surround the landside third of the box culvert. This should tie into a free draining sand layer behind the wing walls to allow drainage.

Sheet C-13. The sheet pile tip should be at elevation -4.0.

Sheet C-14.

1. The sheet pile tip should be at elevation -4.0.
2. The 250# riprap at the inlet end of the culvert should have a 9" thick layer of bedding/filter stone placed between the fabric and the riprap. Geotechnical personnel can provide the guidance on the requirements based on the soil conditions.

Sheet C-15.

1. How will the concrete be placed around the sheetpile to elevation 32.0 since the plans do not indicate any excavation will extend to elevation 32.0.
2. Is there a structural/hydraulic need for removing the cofferdam on the Brushy Bayou side of the sheet pile?

General Comments.

1. The plans should show excavation slopes for construction of the box culvert. These slopes should be analyzed by the geotechnical engineer.
2. Sections should be included to show the backfill behind the wing walls. There should be a wedge of free draining sand placed behind the wing walls that exits at the end of the wall. The 2 foot layer of sand around the box culvert should tie into this fill behind the walls to allow for drainage. Also, the sand should be covered with a layer of fabric and riprap at the end of the wall.

GEOTECHNICAL REPORT COMMENTS

As requested the undersigned has completed the IEPR of the Geotechnical Report for the Brushy Bayou Weir and Drainage Structure project along the Tensas River Levee in Concordia Parish, LA, within the Vicksburg District Corps of Engineers. The project consist of the construction of a drainage structure in the existing Tensas Levee and of a weir to maintain the water level in Brushy Bayou.

All seepage, stability, and settlement analyses were conducted in accordance with acceptable USACE procedures and guidance. The following comments are submitted for consideration.

Para 2.1. Additional borings should be made at the landside and riverside toe of the existing levee at the proposed location of the drainage structure. According to the geologic maps the structure will be located in the center of an abandoned course deposit. The borings currently used for the design are located along the edge of the existing abandoned course and may not

adequately represent the conditions at the center of the deposit. The existing analyses could then be reviewed to ensure they represent the actual conditions.

Para 6.2/Figure 6. It appears to be about 75' between the toe of the temporary barrier dam and the toe of the sheetpile cofferdam. The temporary dam is to be constructed as a displacement fill. Experience with constructing closures using a displacement fill in these type of environments has been that rather large stability berms have been required to stabilize the slopes. If this occurs then it could affect the location of the permanent sheet pile cofferdam.

Para 6.3.2/Table 2. The analyses for Figures B-3 and B-4 use a water elevation of 49 for Brushy Bayou while Figures B-5 through B-10 use and elevation of 45. An explanation should be provided as to why elevation 49 is used.. The safety factor for the undrained case, Figure B-7, is less than the required safety factor. An explanation should be provided as to why this is acceptable.

Para 6.3.4. Since the temporary barrier dam will allow the area for the cofferdam to be un watered, consideration should be given to "mucking" out the foundation for the cofferdam rather than using displacement fill

Para 6.4.2. The analyses are based on a unit weight of 121 pcf, yet in paragraph 6.3.3 a value of 118 pcf was used. Need to be consistent unless an explanation is provided for the difference.

Para 6.4.4. If the excavation extends to the sandy silt layer as shown in boring number 1, a dewatering system may be required to control the water in the sandy silt layer. Experience on other sites in this general area has shown that a dewatering system is normally required to control the water in these layers this close to the river. The specifications should be clear as to the contractor responsibility.

Para 6.4.5. The filter collar sands should tie into a sand backfill placed behind the wing walls. These sands should be covered with engineering fabric and riprap. This will provide the outlet for the sand collar.

Figures B-6 and B-8. The first layer of proposed fill shown in the tables should be deleted as the lower layer shown is what applies to the drained condition.

APPENDIX D
PHASE 2 COMMENTS

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE

Hydrology and Hydraulic Phase 2 Responses (4/2018)

(Note: Comment numbers refer to those used in the original Phase 1 review.)

1. The extent of the hydraulically interconnected system must be defined as the first step in performance analysis. This extent must be broad enough to include channel reaches and floodplains downstream and upstream of the proposed alteration site that a reasonable analyst would expect to be influenced by changes in discharge, volume or corresponding water surface elevation at the proposed alteration site. Figure 1 appears to adequately define the hydraulically interconnected system and study area. However, based on the write-up of "**Hydraulic and Hydrology Study"** paragraph on page 9, it appears that the H&H study area stops at Wild Cow Bayou weir which only includes about half of the study area of figure 1. It does not include the existing outlets of the study area at Old Bayou Cocodrie Structure at the south end of the study area and Tensas Cocodrie Pumping plant and outlet structure on the west middle side of the study area.

   Response: The H&H study was performed to determine the extent to which the solution proposed to alleviate flooding in the northern portion of the parish, i.e. diverting a portion of the northern parish stormwater flow to the Tensas river via the proposed Brushy Bayou structure, would be effective. Cocodrie Bayou was only modelled down to the weirs because the bottlenecked portion of the bayou is between the weirs and the northern portion of the parish. It has been observed by Parish officials and the USACE that during heavy rain events, stormwater flows are restricted above the weirs and not below them. For example, during the storm event referenced in the H&H study that occurred in January 2013, there was not enough water showing up at the Cocodrie Pumping station to be able to run the pumps, yet heavy flooding was experienced in the northern portion of the parish. Therefore it was determined that sectioning and modelling the portions of Cocodrie Bayou below the weirs was not needed for the purposes of the H&H study.

   Reply: Since the entire area was not model, recommend that a discussion be provide of the potential benefits to the lower reaches not modeled. The discussion could focus on the reduction in flows to the lower reaches (thus reduction in flooding) for the frequency events modeled.

Specific Comments

2. Page 7, "a broad crested weir with a width of 230 feet would be installed just upstream from proposed box culvert." Expand on the design criteria and rational for the weir width.

Response: The design rationale for the 230 foot wide weir is presented on sheet 3 of the design calculations which were provided to the IEPR team.

Reply: Sheet 3 shows that the weir was designed to pass a 25 year event with 2.43 ft across the weir. There are no discussion on why the 25 year event was chosen for the design criteria

3. Page 8, provide general estimated impacts of Sites 1-7 on the system upon completion.

   Response: Subsequent to submission of the H&H report to GOHSEP and FEMA, it was decided in consultation with those agencies to remove consideration of any work at sites 1-7 from the project being funded by FEMA.

   Reply: ok

4. On Page 8-9, a discussion of the areas of past insurance claims by subdivisions and etc. Show the areas on a map.

5. Page 11, Table 1 shows the frequency flows studied. The study should consider a full range of flows, recommending adding up to 100 year flows.

   Response: The discussion on pages 8 & 9 of the H&H study is geared toward what tributaries were modelled, why they were modelled, and the data that was collected to develop the model. Discussions of past insurance claims and the affected areas is presented on pages 31 through 34 of the H&H report. Concordia Park, Ferriday, Leven's Addition and Doty Road, which are seen from the Tables 6, 7 & 8 to have suffered the most flooding the past, are shown on the inundation maps presented in Figures 19, 20, 24 & 25.

   Reply: ok

6. Page 11, discussion of the HECRAS model. More detail discussion should be shown for the RAS model, Plan map of streams modeled and RAS Schematic, n values, boundary conditions, and etc.

   Response: The map of the streams modeled is presented in Figure 1. Utilizing the flows shown in Table 1 of the H&H report and the surface models, a HEC-RAS 4.1.0 model was developed. The effort began by establishing and calibrating an existing condition model. The model was developed using a network of seven (7) streams made up of eleven (11) reaches. All streams flowed terminally into Cocodrie Bayou which terminated with a Normal Depth B.C. at the existing weir structure.

The model was calibrated using flows and water surface elevations from the flooding that occurred in January 2013. This was done by inputting flows that were measured during the event into the model. Then, the Manning's n values were adjusted until the model reproduced the water surface elevations measured during this period. The calibration values were used throughout the model, except along the ditches that feed into Vidalia Canal which were surrounded by more complex topography. In these areas, Manning's n values were increased to produce results that are representative of the topography. The overbank Manning's n values produced from calibration were higher than would be estimated from observing the land usage and topography, but the discharges calibrated represent a storm event with a more frequent return interval than the events modeled (resulting in a narrower floodplain), and thus the higher, more conservative values were used.

Calibration resulted generally in Manning's n values described as:

Stream	Channel	Overbank
Ditches	0.06	0.05
Bayous and Vidalia Canal	0.035	0.055

Once the model had been calibrated, it was run for the existing conditions and the proposed improved conditions for the Q5, Q10, and Q25 storm events.

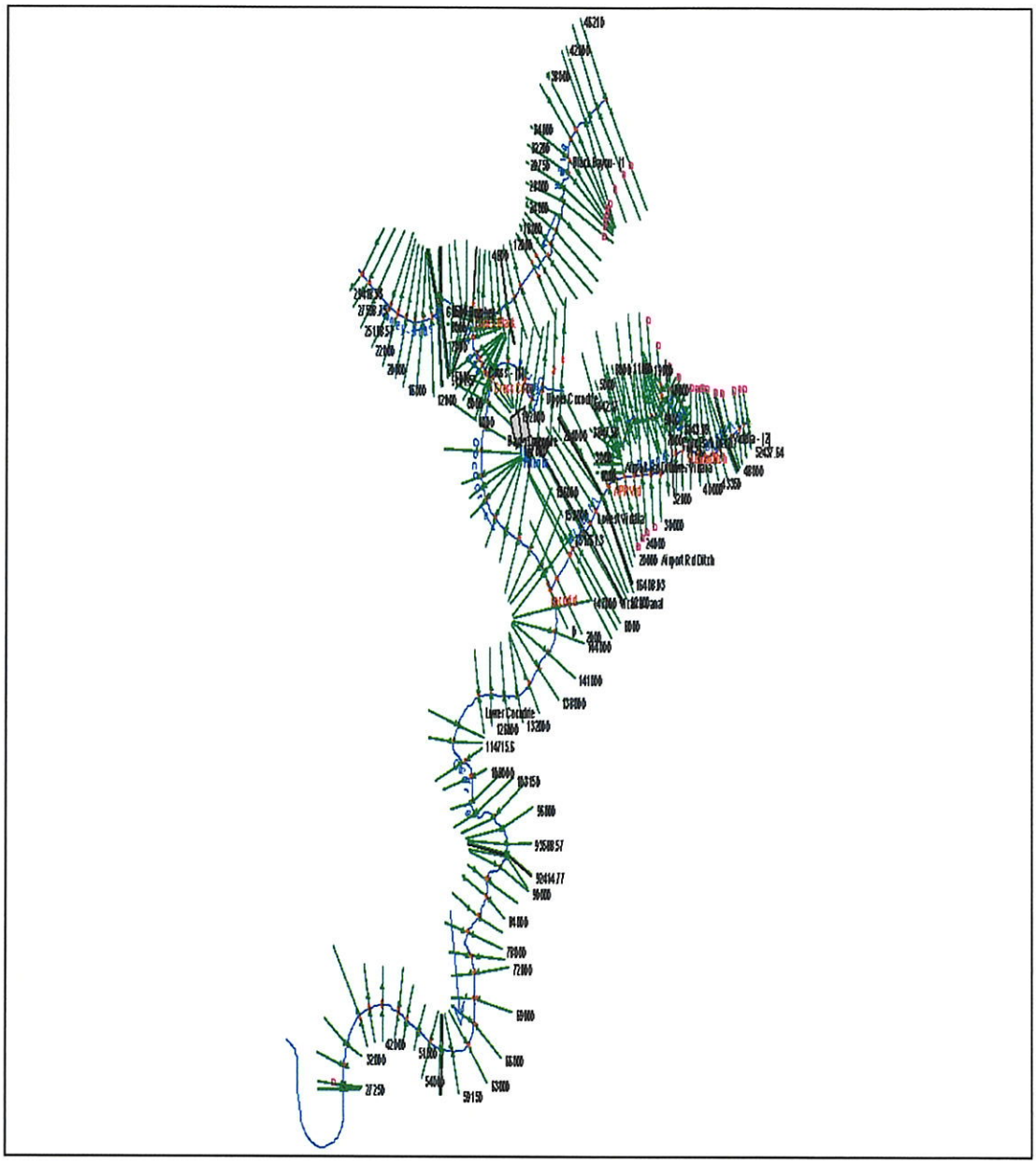
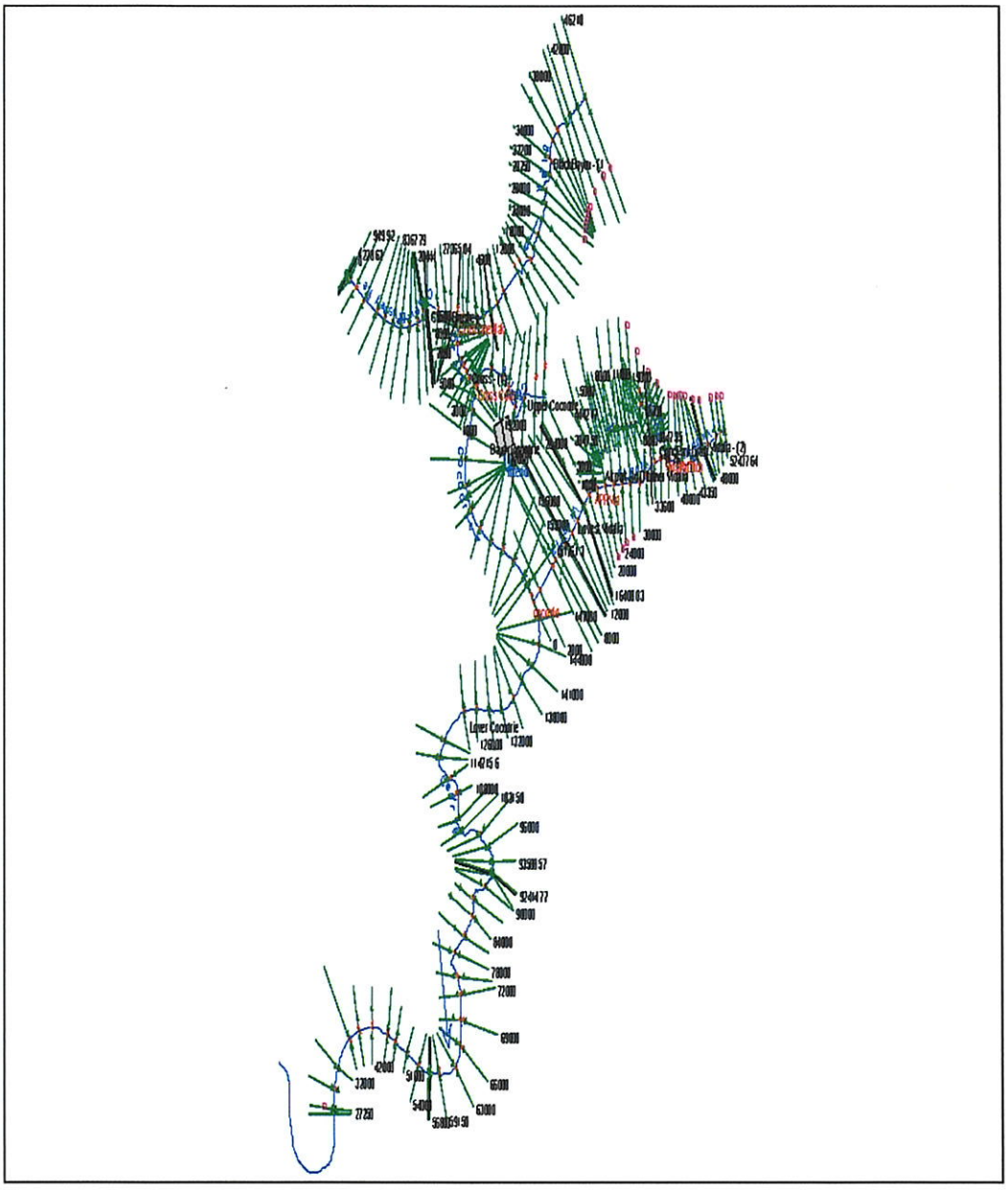


Figure 1 - Existing



7.

Figure 2 - Proposed

In the proposed condition shown in Figure 2 , the now reversed direction of Caney and Brushy Bayous, the portion of the discharge flowing out to the Tensas through Caney and Brushy Bayou and the portion flowing South down Cocodrie Bayou results in the system having two outlets (i.e. two downstream boundary conditions), one on Cocodrie Bayou as before and one at the Tensas River past the proposed culvert. Each of these Downstream B.C.'s requires an upstream discharge specified. To determine the flow partition that would flow to each of these outlets, the

discharge at the diverging point the flowed into each branch was varied incrementally until an equilibrium water surface was achieved at the upstream edge (the aforementioned diverging point).

Reply: Ok

7. Page 11, Show calibration profiles verses observed stages.

Response: Show calibration profiles verses observed stages. See Figure 3 below. Observed levels are shown as circled dots on the graph as they were isolated observation points, i.e. complete water surface profiles were not collected or available.

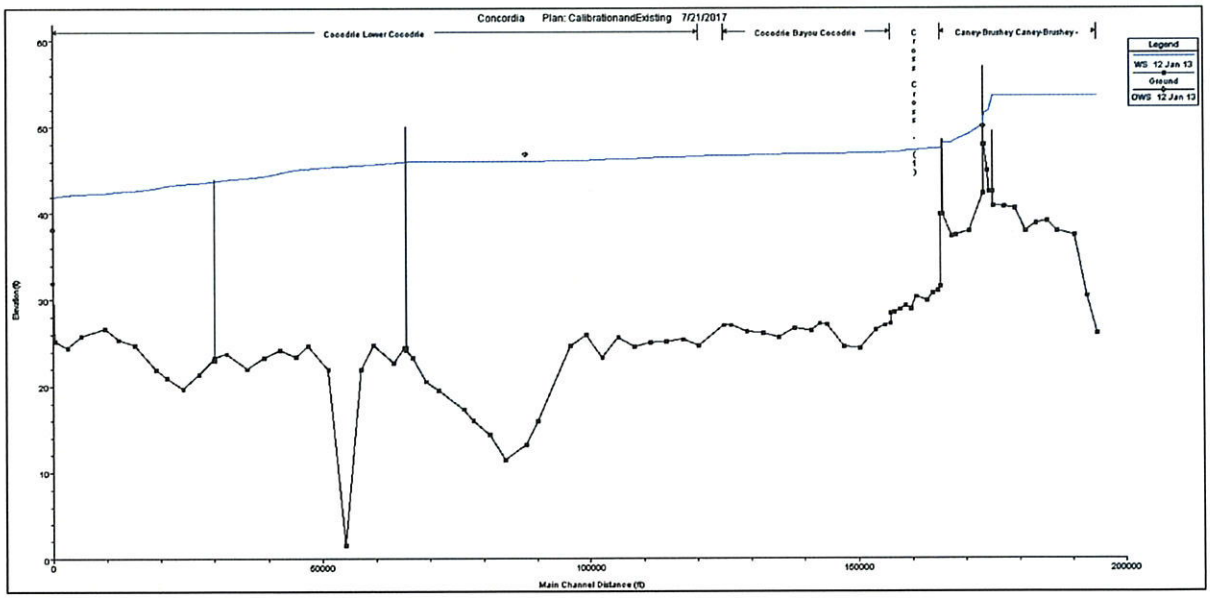


Figure 3 – Observed Stages vs Calibration Profile

Reply: Ok

8. Page 12-15 profiles: Where are the profiles for Brushy Bayou and Caney Bayou?

Response: Provide profiles for Brushy Bayou and Caney Bayou. See figures 4 and 5 below:

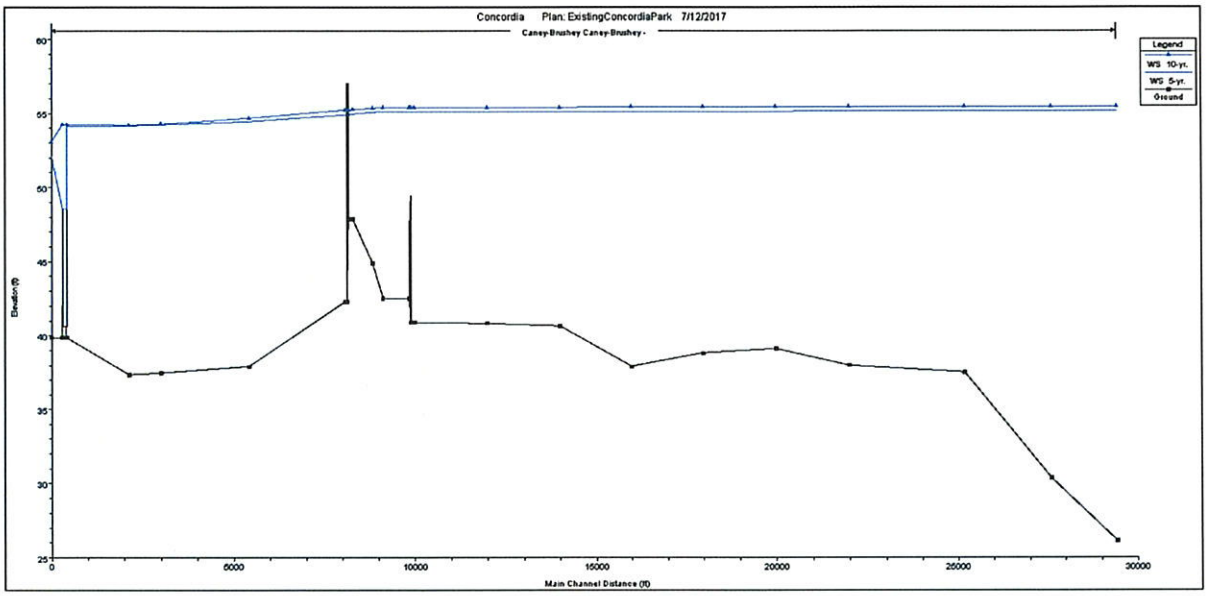


Figure 4 - Caney and Brushy Bayous (Existing)

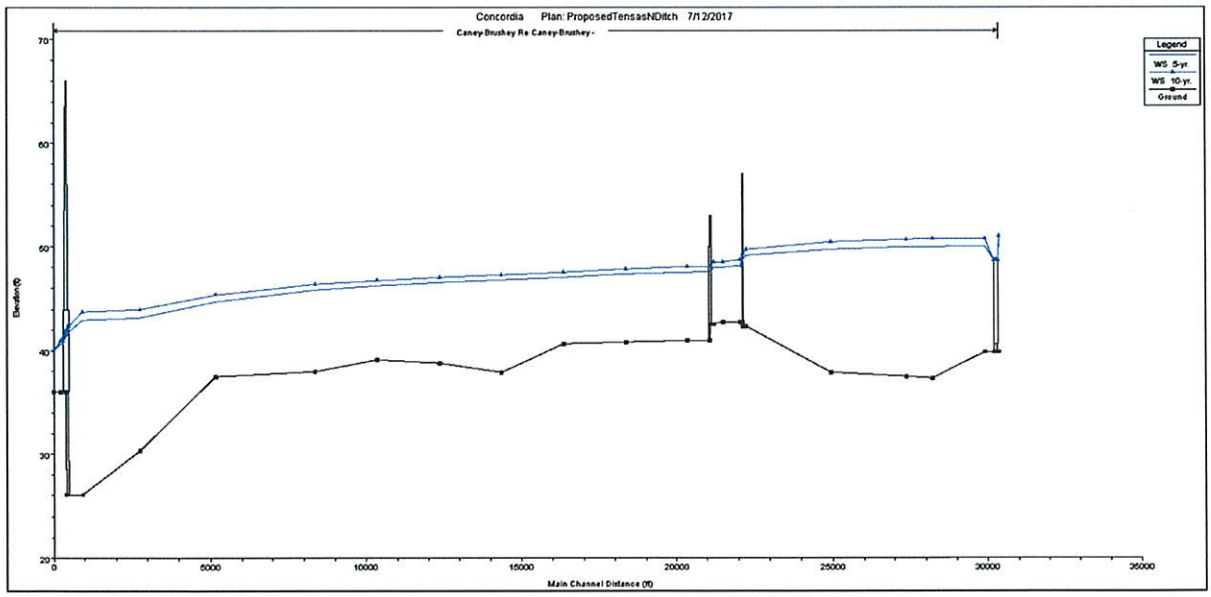


Figure 5- Caney and Brushy Bayous (Proposed)

Note that as the Bayous flow in opposite directions for the two scenarios, the two profiles have reversed stationing (Existing: Left – East & Right – West: Proposed: Left – West & Right – East).

Reply: Show existing and with project for each frequency on the same profile. Should show 3 Figures, one for each frequency model.

9. Page 14: Luke Martin Bridge width 100 feet. Explain the design criteria for the 100 width recommendation.

   Response: This is discussed on page 14 of the H&H report. During the modelling it was determined that a 100 foot bridge opening would be required to pass the modelled flows without causing excess headloss.

   Relpy: Is there any concerns for flows greater than modelled flows?

10. Page 16: In discussions of 2008, 2010, and 2013 events, an estimate of the frequency of the events would be beneficial information to be included in the report.

    Response: This is presented on page 21 of the H&H report.

    Reply: ok

11. Page 21-30 inundation maps: The maps don't map the entire inundation area, appears to stop at a cross section width. RAS mapper should be used to map the entire inundation for each event.

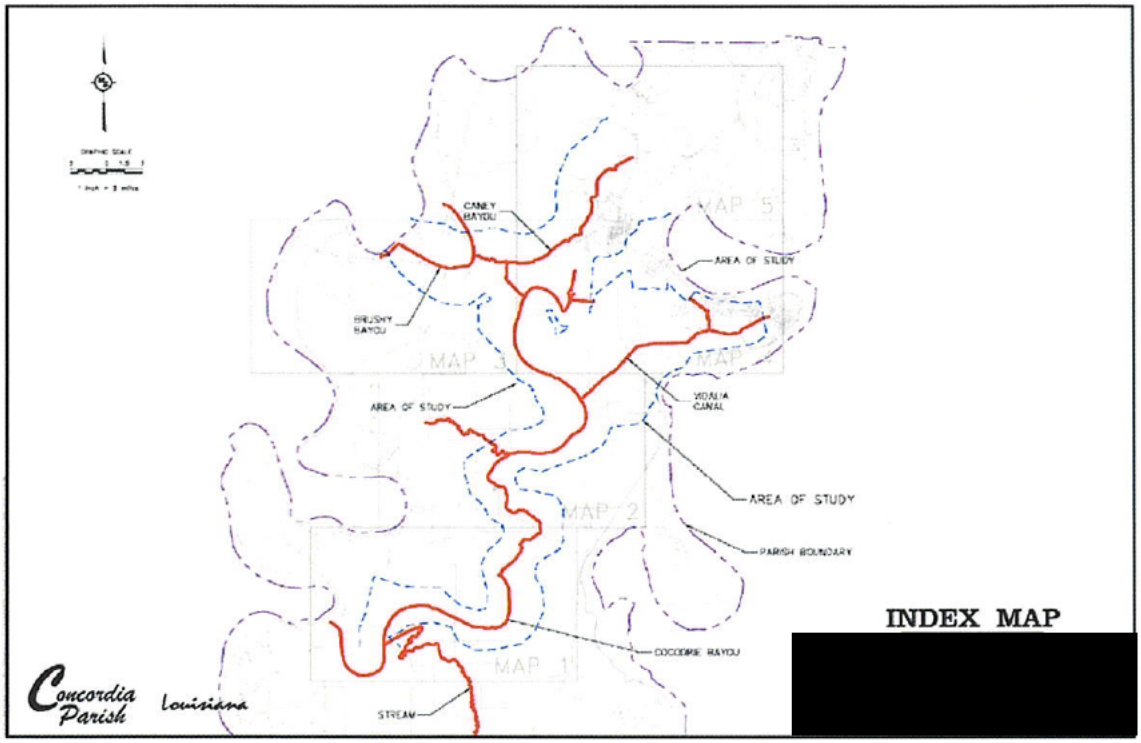
    Response: RAS Mapper was utilized to produce the flood extents shown on the inundation maps. The models were constructed to cover all areas necessary for the scope of the study. One area not mapped was modeled as a storage area. Other areas were determined to not contribute to the flow area and are generally just open farmland.

    Further, this model does not utilize HEC-RAS 5.0's 2-D capabilities. This model was developed before HEC-RAS 5.0 was released; moreover, it is a steady state model and thus to utilize 2-D features, an unsteady model would need to be developed.

    Reply: It is obvious from the inundation maps that the study area doesn't include all inundation areas for the frequency events. The inundation stops at the study limits. It should be noted the inundation is truncated at the study limits.

12. Insert a combine inundation map of the entire study area before the zoom in inundation maps for each frequency event..

    Response: See Figure 6 below:



Reply: It is obvious from the inundation maps that the study area doesn't include all inundation areas for the frequency events. The inundation stops at the study limits. It should be noted the inundation is truncated at the study limits.

13. Page 30, Show water surface profile on the Tensas River discussed in the paragraph.

Response: See Figure 7 below:

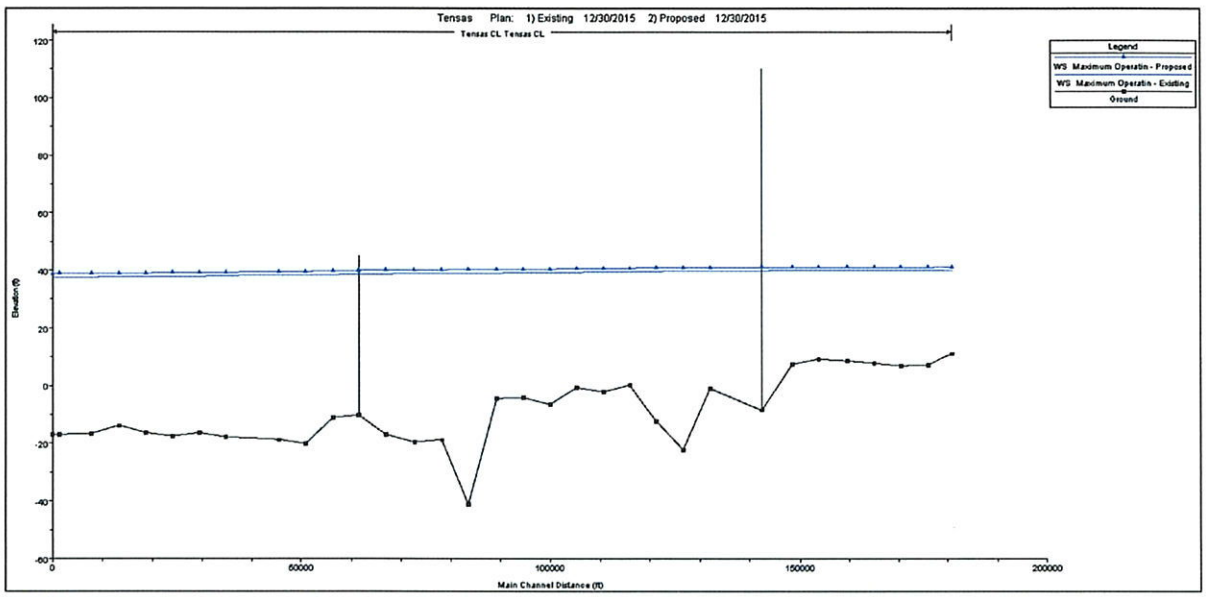


Figure 7- Tensas River Profiles

Reply: Ok

14. Table 6, 7, 8: Show on map the general areas of the estimated claim costs and estimated frequency of the events.

    Response: This is shown on Figures 19 and 24.

    Reply: ok

15. Page 36, Benefit/Cost: The information presented is not a true B/C analysis. Need to state that had the project been in place during the 2008-2013 time frame the three events would have saved over 9 million dollars in damages if true. The only way to know is to model the three events and determine how much flood reduction would have be obtained. It is doubtful all of the flood claims would have been eliminated.

    Response: GOHSEP and FEMA took the costs presented in this report and performed their own BCA and determined that the project merited funding.

    Reply: ok

16. Page 36; "Given that the $9,147,288.38 flood claim costs represent just the costs occurring within a five year time frame (2008-2013), this project will likely have more than justified its cost within two-and-a-half years." Recommend taking this out. This statement is not true, damages is totally dependent on frequency events not on a calendar time frame. It is likely

when the three events frequency are estimated they will be much greater than a two year time frame/event.

Response: GOHSEP and FEMA took the costs presented in this report and performed their own BCA and determined that the project merited funding.

Reply: ok

17. General comment on design drawing. Provide backup design calculations for riprap size and depth of riprap as shown in the design drawing.

Response: The riprap sizing calculations are presented on Design Sheets 1 & 2 dated 8/15/16 which were provided to the IEPR team. The depth was set to allow two layers of the riprap sizes chosen to be placed.

Reply: ok

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)
BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE
Civil/Structural Responses 4/2018
(Note: Comment numbers refer to those used in the original Phase 1 review)

1. USACE specifications have been developed for the Brushy portion of the project. A copy of these is enclosed.

Response: The technical specifications provided are not completely edited to fit the Brushy Bayou Project. The Earthwork and Stone Protection Sections need further editing to comply properly with the project requirements. We recommend the geotechnical engineers review and edit these sections of the specifications. There are also sections that need to be added to the contract or referred to in the LDOTD Standard Specifications. For example, Submittal Requirements, Environmental Requirements, Storm Water Pollution Prevention, Structural Excavation and Backfill, Finishes (Painting), Turf Establishment, Gates and Equipment, and Gravel Bedding. We are also assuming that the contract documents containing information for bidders, bonding requirements, general conditions etc. will be added later.

2. A new Sheet 2 has been added to the plans which provides general notes but also provides a detailed phasing for the construction of the Brushy Structure. It will be the contractor's responsibility to locate, permit, test and close a borrow area. This is noted on the new Sheet 2.

OK.

3. Sections and details have been added to the plans to show the new and gross grades for the re-constructed levee.

OK. Recommend showing the elevation of the Gross Grade so it will be clear what grade the contractor is required to construct for completion of the levee embankment.

4. A sheet has been added to the plans showing the permanent right-of-way associated with the project. A note has been added on Sheet 2 which states the contractor is responsible for the acquiring all other easements and rights-of-way he deems necessary for the project beyond the permanent right-of-way to be acquired by the Parish.

OK.

5. A note has been added on Sheet 2 stating that the Contractor may, at his discretion, add a temporary berm on the downstream end (Tensas side) of the culvert and that he shall submit plans for same to the Engineer if he elects to construct it.

OK.

6. Hydrographs have been added to the plans.

OK. Hydrographs were not included in the set of plans resubmitted. They can be added later. We also recommend that the standard Corps of Engineers "Storm Water Pollution Prevention Plan Sheet" be added to the drawings.

7. A general notes sheet 2 has been added to the plans.

OK.

8. A splash pad has been added on the downstream side of the weir and the riprap has been beefed up between the splash pad and the inlet to the box culvert.

OK. A splash pad 10 inches thick does not have enough mass to avoid being moved by the currents. Recommend 24 inches of thickness be used.

9. Sheet 3 has been revised showing the applicable USACE pay items of the work involved.

OK.

10. To reduce the amount of deflection in the top of the sheet piling, the level of the temporary levee has been increased from 52 to 54, the top of the levee width has been increased from 8 ft. to 15 ft. with 3.5 ft. on the Tensas side and 11.5 ft. on the Brushy side and the berm slope on the Brushy side has been increased from 3:1 to 4:1.

OK.

11. a. The section of the Brushy structure has been revised in the plans to match that show on pages 3-5 and 3-6 of the USACE Manual on Conduits and Culverts, EM 1110-2-2902.
b. An 18" thick sand collar has been added to the downstream third of the culvert.
c. The headwall height has been increased from 10" to 4 ft. See attached copies of the design sheets associated with this change.
d. The length of the box has been shorted to ensure the levee slopes terminate at the box culvert headwalls.
e. Joints have been added to the culvert on 40 ft. centers. Details for the same have been added to the plans.
f. The joints have been designed with a male and female arrangement and include water stops.
g. The invert of the culvert has been modified to provide for a 0.5 percent slope of from the inlet to the mid-point of the culvert with a 1 percent slope from that point to the outlet.
h. Sheet pile cut-off walls have been added at the toes of both the upstream and downstream outlets.

OK. The sand collar needs additional details or an added section to understand the limits of the fill and how it terminates behind the walls. Our rough calculations of the wingwalls show that the proposed thickness of 10 inches and reinforcement appear inadequate. Our calculations show a thickness of 18 inches would require reinforcement of number 9's at 12 inches at least for the highest section of wall. We recommend removal of the trash rack shown on the plans. It appears this rack would block considerable flow.

12. A stand-alone sheet has been added to the plans showing the permanent right-of-way associated with the Brushy Bayou structure.

OK.

13. The scale of the plan view for the structure has been increased to show more detail and the profile and details have been moved to separate sheets.

OK.

14. The profile has been revised to clearly show the dimensions and slopes for the re-constructed levee including a 3' gross additional height which should result in a 2' net increase in height above the structure.

OK.

15. A profile section has been added to the plans showing the proposed excavation for the structure, gross and net grades. Excavation volumes are not included as the cost of those are to be absorbed in the cost of the structure.

OK.

16. The cross-section profile has a note stating that the area between the box culvert and the weir is to be excavated to finish grade "once the box culvert construction is complete". This has been revised to state "once the box culvert construction is complete and the levee has been reconstructed".

OK.

17. An eight inch layer of No. 2 bedding stone has been added under the entire box culvert to act as a stabilization slab.

OK.

18. Sheets associated with the inlet and outlets have been revised to shown water stops in both the floor and wall connections.

OK.

19. Sheet pile cut-offs have been added at the toes of both the upstream and downstream discharge aprons.

OK.

20. The headwall has been raised to 4 ft.

OK.

21. Per EM 1110-2-2902, an 18" layer of filter sand has been added under the inlet and around the wingwalls.

OK.

22. The final grading sheet has been revised to better show the final design contours. The native clay material is specified on the new general notes sheet.

OK.

23. The culvert design has been modified to handle the flooded case. See revised design enclosed.

OK.

24. See revised shear check calculations enclosed.

OK.

25. The geotechnical report assumed that the wing walls were free standing; however, they are attached to an apron which would prevent any sliding and instability. The 18 in. sand layer below the inlet will relieve any hydrostatic uplift pressures.

OK.

26. A structural analysis of the sluice gate access platform is enclosed.

We have reviewed the design of the access platform and offer the following comments:

a. This type platform is normally designed for higher live loads than 60 psf. It is common to use loads as high as 200 psf.
b. The value for E used in the calculations should be 29,000,000.
c. The design of the platform should include loads from the gate lifting equipment which should include the weight of the gate, force to unseat the gate, force to overcome friction due to head on the gate and weight of the stem. The amount of head on the gate should be estimated considering a condition where the operator does not arrive at the perfect condition when there is exactly zero head on the gate after a flood occurrence. The force applied from the operating equipment to the

platform should also consider a condition where the operator is applying maximum force to the lifting equipment assuming a stuck gate and should consider a stalling load if any automatic equipment is used to operate the crank.

d. The platform should provide a means to support the lifting stem at intervals to prevent buckling of the gate stem during closure of the gate.
e. The platform may be suitable for an access walkway loading but does not appear adequate for support of the gate lifting equipment.
f. Consideration should be given to raising the headwall of the riverside outlet to avoid having the gate and guide frame cantilevered above the headwall.
g. Since no welding details are shown for the platform recommend adding a requirement to the specifications that the contractor submit shop drawings of the platform for review and approval by The Engineer.

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

BRUSHY BAYOU WEIR AND DRAINAGE STRUCTURE

GEOTECHNICAL RESPONSES 4/18

Note: These are additional comments and numbers do not refer to Phase 1. All Phase 1 Geotechnical comments have been satisfactorily resolved.

Plans

1. Dwg C-3. In Phase I of the construction phasing recommend including the construction of the temporary levee prior to driving the sheet piling.

2. Dwg. C-5. Recommend showing a section of the Temporary Barrier Dam.

3. Dwg C-6. Recommend including a section that shows the temporary levee constructed to elevation 54 with the sheetpiles.

4. Dwg. C-8. Recommend showing sand filter around pipe.

5. Dwg. C-8. Based on borings B-3 and B-4 the structure will be founded on clay material. According to USACE Standard Riprap Gradation the R1000 riprap should be underlain by 12" of R50 or R90 which is underlain by 6" Bedding Stone #1.

6. Dwg C-9. Section E. The geotextile filter around the 18" sand filter is not required. Also, the sand filter layer is to be located next to the culvert, not below the 8" layer of Bedding Stone as shown.

7. Dwg C-12. Profile View. As shown the sheetpiles may impede the drainage of the sand. It is recommended that a wedge of sand material be placed behind the wing wall, starting approximately 2 feet below the top of the wall, for the sand filter to drain into. Fabric and riprap should be placed over this.

8. Dwg. C-21. According to the USACE Standard Riprap Gradation the R650 riprap should be underlain by a 9" layer of Bedding Stone #2.

9. Recommend including the boring profiles and their location in the plans.

10. Recommend including a section that shows the levee surfacing material.

11. Recommend including a section that shows the backfill behind the wing walls.

12. Unless already done, recommend geotech approval for using the bedding stone as a stabilization slab rather than a "mud"slab.

13. Unless there is reason for doing so, recommend raising the bottom of the concrete encasement to keep from having to excavate additional material.

Specifications

In reviewing the specifications several discrepancies were noted between the Geotechnical Design Report and the specifications, such as different compaction requirements, different moisture requirements, and referencing to the Modified Proctor instead of the Standard Proctor. Numerous references to rocks and boulders, none of which is shown in the borings.

There are references to coastal protection and dikes along the river, none of which apply to this project. The specifications should be tailored to this specific project and not just be general in nature. It is recommended that you work with your geotechnical engineer to tailor the geotechnical aspects of the specifications so they will be project specific.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Re: Independent External Peer Review (IEPR) - Phase 2, Review Comments

[redacted]

[redacted]

With regards to the comments received during the IEPR - Phase 2, Review of the above referenced project, we offer the following (numbers shown correspond to comment numbers). This reply and the changes made to the plans and specifications have been made under the guidance from [redacted]

Hydrology and Hydraulic Comments:

1. The project is being funded by FEMA to alleviate flooding in areas where past flood insurance claims have been filed, i.e. the areas of Concordia Park, Ridgecrest, portions of Ferriday and Ridgecrest. The model covers these areas of concern and the report addresses those areas. There have been no flood insurance claims in the lower reaches of Cocodrie Bayou, this being all agricultural land. Therefore, further discussion of flooding or non-flooding impacts in those areas is mute with regards to this project and the H&H Study.

2. Examination of the existing flood insurance claims indicated that the most recent claims had occurred for storm events falling somewhere between the 5-year and the 10-year recurrence interval. This is discussed on page 21 of the report. The project is only claiming effectiveness for storm events equal to or less than the 10-year storm. Modelling for the 25-year storm showed the entire system backed up and flooded even with the project in place; however, the depth of the flood was still reduced somewhat but not enough to keep it out of some homes, specifically in the Concordia Park area. The weir, box culvert, and the Luke Martin Road Bridge opening were are designed to pass the 25-year flow as a maximum condition. Above this flow, storm flows will be pushed back into the Cocodrie Bayou system.

8. It is felt that the existing profiles as presented provide the clearest presentation of the data given that the flow reverses in that reach from the existing to the proposed solutions.

9. For flows higher than modelled flows (5-year and 10-year) beyond which no impact claim is being made, the bridge opening, which is sized for the 25-year storm flow, will begin to act a throttle, pushing flow back into the Cocodrie System, where it all goes now.

11. See answer to comment No. 1.

Construction Plans and Specification Comments:

1. Revised Earthwork and Stone Protection specs are attached. Sheet C-3 of the plans indicates which parts of the work will be covered by what specifications, i.e. Standard Corps Specifications or LDOTD. Submittal requirements are covered by both, the Corps Section 01 33 00 [redacted]andard frontend documents. While some construction storm water elements are shown on the plans (temporary silt fence, covered by LDOTD specifications), the contractor will be required via the frontend documents to prepare and submit a Louisiana Construction Stormwater Permit. A note has been added to Sheet C-3 to address this. The remaining items are already included either in the Corps specifications or the LDOTD specifications.

6. Hydrographs for the Tensas River have been added to the plans as well as a standard Corps Storm Water Pollution Prevention plan Sheet C-28.

8. Splash pad thickness has been increased from 10 inches to 24 inches on Sheets C-21 and C-23.

11. Additional details have been added to show how the sand collar terminates behind the wing walls. The wing wall design has been revised to provide for an 18" wall thickness and #9 rebar on 6" centers. The trash rack was added as a requirement from the Levee District to keep trees and other larger debris out of the culvert.

26. The access platform design was revisited utilizing a live load of 200 psf and was found to be still more than adequate. The culvert gates are self-contained with a frame that supports the lifting gear and wheel. No lifting or closing loads are transferred to the access platform. Sheet C-15 of the plans has been revised to include intermediate supports for the gate frame and lifting bolt guides. The gate itself is designed for a 17 ft. seating head, a 4 ft unseating head, and an operating head of 13ft. Weld size and type is specified in Note No. 9 on Sheet C-3 and the Corps Welding Specification 05 05 23.16 was included in the package previously submitted.

Geotechnical Comments:

1. The phasing shown on Sheet C-3 has been revised to indicate that the temporary levee will be constructed prior to driving the sheet piling.

2. A section for the temporary barrier dam has been added to sheet C-4 of the plans.

3. This is shown as Section C on Sheet C-6 previously submitted for review.

4. The scale of Sheet C-8 is not adequate to clearly show the sand filter. It is shown on sheets C-7, C-9 and C-12.

5. Sheet C-8 has been revised to show the Rl000 riprap underlain with 6" of No. 1 Bedding Stone.

6. It is felt that the geotextile is required to prevent the fine clay backfill material from plugging the sand filter and to confine the sand filter layer during construction, Section E on Sheet C-9 has been revised to show the sand filter next to the bottom of the culvert with a mud slab placed below the sand filter.

7. The sand filter already extends behind the wingwalls as shown on Sheet C-12 previously submitted. A section has been added to this sheet to indicate how the top of the sand filter shall be handled.

8. Sheet C-21 has been revised to show the R650 underlain with a 9" layer of No. 2 Bedding Stone.

9. Sheet C-27 has been added to the plans showing the locations of the borings and their profiles.

10. The levee surfacing is shown on Section A on Sheet C-8.

11. See No. 7 above.

12. The 8" bedding stone has been replaced with an 8" mud slab. See Sheets C-8, C-9, C-11, C-12, and C-21.

13. The concrete encasement extends to elevation 32 to ensure that the steel piling is never exposed due to scour and is always in an anoxic condition.

The earthwork specification has been edited to ensure that it agrees with the geotechnical report and to remove any general references to rock and boulders. The Stone specification has been edited to remove references to coastal protection and dikes.

Project plan sheets and specifications are available via link provided by email to you. If you should have any questions or comments regarding this information, please do not hesitate in contacting us.

[redacted]

Final IEPR Response

The IEPR team has reviewed these responses and finds the resolutions acceptable.

[redacted]

APPENDIX E
CERTIFICATION OF INDEPENDENT EXTERNAL PEER REVIEW

CERTIFICATION OF INDEPENDENT EXTERNAL PEER REVIEW

The Independent External Peer Review (IEPR) has been completed for the *Brushy Bayou Drainage Structure Project* for *the Concordia Parish Police Jury*. The IEPR was conducted as defined in the IEPR Report and Review Plan to comply with the requirements of EC 1165-2-216. During the IEPR, compliance with established policy principles and procedures and legal requirements was verified. This included the determination whether the proposed alteration would impair the usefulness of the Red River Levee Project or was injurious to the public interest. All comments resulting from the IEPR have been resolved.

[redacted]

SIGNATURE _____ _____
Name Date
District Section 408 Coordinator
Office Symbol

SIGNATURE _____ _____
Date

ATTACHMENT 3: Decision Level Determination Rationale

Per Memorandum dated November 10, 2016, and titled Interim Guidance on Section 408 Decision Level, the following questions must be addressed to determine required review and decision level. If the answer to any of the following questions is "yes", and the District and Division recommend approval of the alterations, then the Section 408 request requires HQUSACE level review and decision.

i. Does the proposed alteration change how the USACE project will meet its authorized purpose? An example would be a proposed alteration to permanently breach a levee system for ecosystem restoration purposes but raise all structures behind the levee to achieve the same flood risk management benefits. This project still meets the authorized flood risk management purpose, but in a different manner. No

ii. Does the proposed alteration preclude or negatively impact alternatives for a current General Investigation (GI) or other USACE study? No

iii. Is the proposed alteration for installation of hydropower facilities? No

iv. Is there a desire for USACE to assume operations and maintenance responsibilities of the proposed navigation alternation pursuant to Section 204(f) of Water Resources Development Act (WRDA) of 1986? No

Therefore, HQUSACE review and decision will not be required.

If the answer to any of the following questions is "yes", and the District recommends approval of the alterations, then the Section 408 request requires MVD level review and decision.

i. Does the proposed alteration require a Type II IEPR, reference EC 1165-2- 214? Yes

ii. Is the non-federal sponsor for a USACE project seeking potential credit under Section 221(a)(4) of the Flood Control Act of 1970, as amended? A decision on a Section 408 request is separate from any decision on potential credit for in-kind contributions. Reference ER 1165-2-208 for requirements regarding credit for in-kind contributions. No

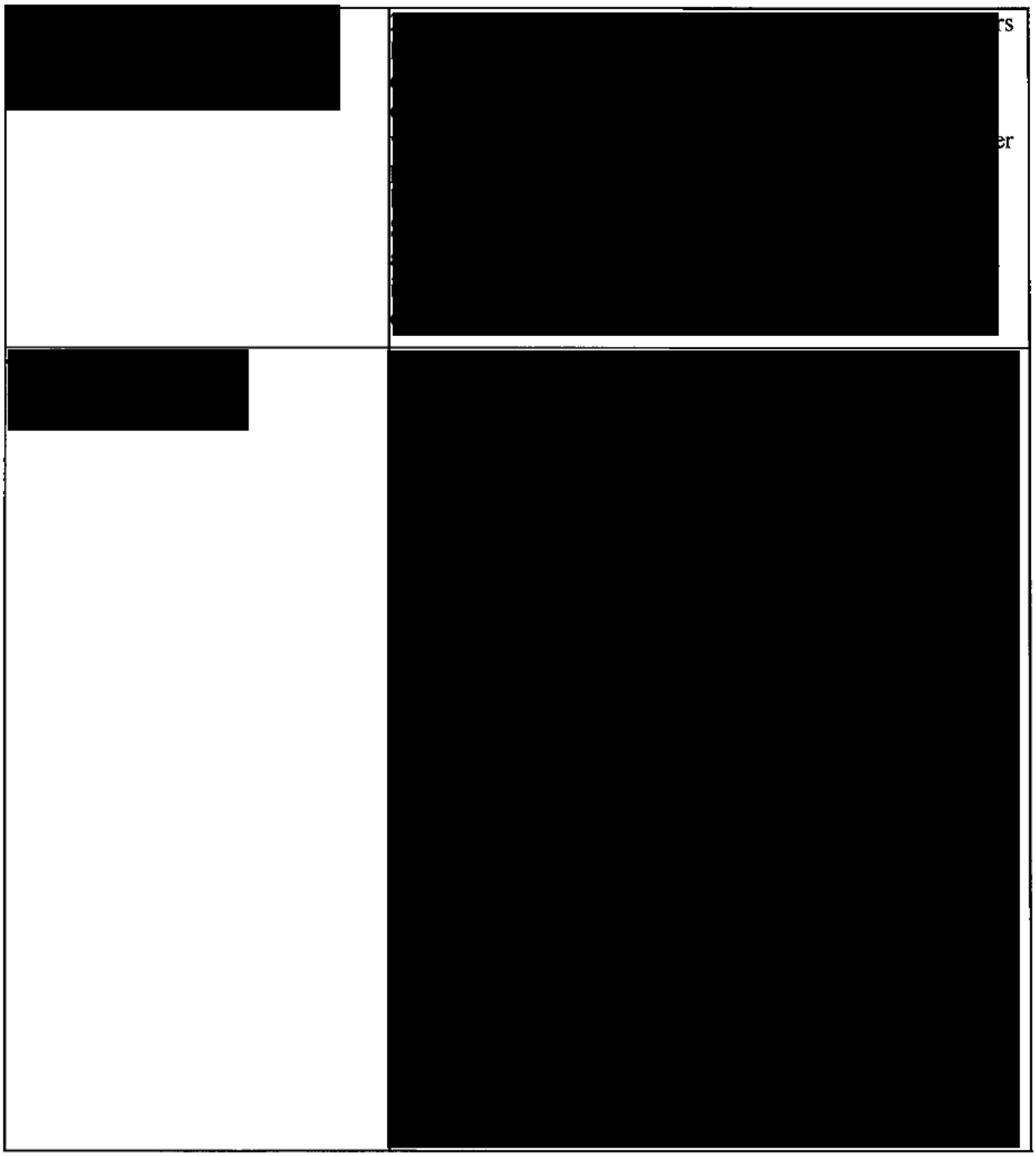
iii. Can the proposed alteration be approved by the District Commander, but the Division Commander established a regional process that requires certain district Section 408 decisions to be made by that Division Commander? No

Therefore, MVD review and decision will be required.

ATTACHMENT 4: Required ATR team members and their expertise.

REQUIRED ATR MEMBERS AND EXPERTISE

ATR Team Members/Disciplines	Expertise of ATR Team Member
ATR Lead [redacted]	[redacted]
[redacted]	
[redacted]	[redacted]



ATTACHMENT 5: Review Plan Revisions

REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Section Number

ATTACHMENT 6: COMPLETION OF ATR AND CERTIFICATION OF ATR

The Agency Technical Review (ATR) has been completed for the Brushy Bayou Drainage Structure for the Tensas-Cocodrie Area Levee of the Red River Backwater Project in Concordia Parish, Louisiana. The ATR was conducted as defined in the Alteration-Specific Review Plan to comply with the requirements of EC 1165-2-216. During the ATR, compliance with established policy principles and procedures and legal requirements was verified. This included the determination whether the proposed alteration would impair the usefulness of the federal project or was injurious to the public interest. All comments resulting from the ATR have been resolved.

[redacted] _____ Date

[redacted] _____ Date

[redacted] _____ Date

Review Plan Checklist for Decision Documents

Date:	17-Dec-18		
Originating District:	Vicksburg (MVK)		
Project/Study Title:	Brushy Bayou DS		
PWI #:			
District POC:	[redacted]		
PCX Reviewer:			

Please fill out this checklist and submit with the draft Review Plan when coordinating with the appropriate RMO. Any evaluation boxes checked 'No' indicate the RP possibly may not comply with EC 1165-2-217 and should be explained. Additional coordination and issue resolution may be required prior to MSC approval of the Review Plan.

REQUIREMENT	REFERENCE	EVALUATION	
1. Is the Review Plan (RP) a standalone document?		☑ Yes	☐ No
a. Does it include a cover page identifying it as a RP and listing the project/study title, originating district or office, and date of the plan?		☑ Yes	☐ No
b. Is the purpose of the RP clearly stated and EC 1165-2-217 referenced?		☑ Yes	☐ No
c. Does it reference the Project Management Plan (PMP) of which the RP is a component?	EC 1165-2-217 Section 7.a	☐ Yes	☑ No
d. Does it succinctly describe the three levels of peer review: District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR)?	EC 1165-2-217, Sections 8, 9 and 10.	☑ Yes	☐ No
e. Does it identify the title, subject, and purpose of the decision document to be reviewed?	EC 1165-2-217, Section 7.e.(1)	☑ Yes	☐ No
f. Does it list the names and disciplines of the Project Delivery Team (PDT)?*	EC 1165-2-217, Section 7.e.(1)	☑ Yes	☐ No
**Note: It is highly recommended to put all team member names and contact information in an appendix for easy updating as team members change or the RP is updated. Also note that rosters should be removed or redacted to protect Personally Identifiable Information prior to posting the Review Plan on the internet.*			
2. Is the RP detailed enough to assess the necessary level and focus of peer review?	EC 1165-2-217, Section 3.a	☑ Yes	☐ No
a. Does it indicate which parts of the study will likely be challenging?	EC 1165-2-217, Section 7.a.(1)	☐ Yes	☑ No
b. Does it provide a preliminary assessment of where the project risks are likely to occur and what the magnitude of those risks might be?	EC 1165-2-217, Section 7.a.(1)	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
c. Does it indicate if the project/study will require an environmental impact statement (EIS)?	EC 1165-2-217, Section 11.d.(1).b	☐ Yes	☑ No
Will an EIS be prepared?			
If yes, IEPR is required.			
d. Does it address if the project report is likely to contain influential scientific information or be a highly influential scientific assessment?	EC 1165-2-217, Section 15.d	☐ Yes	☑ No
Is it likely to contain influential scientific information? If yes, IEPR is required.			
e. Does it address if the project is likely to have significant economic, environmental, and social affects to the nation, such as (but not limited to):	EC 1165-2-217, Section 11.a.	☐ Yes	☑ No
* more than negligible adverse impacts on scarce or unique cultural, historic, or tribal resources?	EC 1165-2-217, Section 11.d.(4), a.	☐ Yes	☑ No
* substantial adverse impacts on fish and wildlife species or their habitat, prior to implementation of mitigation?	EC 1165-2-217, Section 11.d.(4),a.	☐ Yes	☑ No
* more than negligible adverse impact on species listed as endangered or threatened, or to the designated critical habitat of such species, under the Endangered Species Act, prior to implementation of mitigation?	EC 1165-2-217, Section 11,.d.(4),a.	☐ Yes	☑ No
Is it likely? If yes, IEPR is required.			

REQUIREMENT	REFERENCE	EVALUATION	
f. Does it address if the project/study is likely to have significant interagency interest?	EC 1165-2-217, Section 1,b.,(4) and Section 7.f..(1)	☐ Yes	☑ No
Is it likely? If yes, IEPR is required.			
g. Does it address if the project/study likely involves significant threat to human life (safety assurance)?	EC 1165-2-217, Section 1,b.,(1)	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.			
h. Does it provide an estimated total project cost?	EC 1165-2-217, Section 1.b.(2)	☐ Yes	☑ No
What is the estimated cost:			
(best current estimate; may be a range)			
Is it > $200million? If yes, IEPR is required.	WRDA 2014, Sec. 1044.	☐ Yes	☑ No
i. Does it address if the project/study will likely be highly controversial, such as if there will be a significant public dispute as to the size, nature, or effects of the project or to the economic or environmental costs or benefits of the project?	EC 1165-2-217, Section 11.d.(1),d.	☐ Yes	☑ No
Is it likely? If yes, IEPR is required.			
j. Does it address if the information in the decision document will likely be based on novel methods, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?	EC 1165-2-217, Section 1,b.,(7)	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.			
3. Does the RP define the appropriate level of peer review for the project/study?	EC 1165-2-217, Section 8.a.	☑ Yes	☐ No
a. Does it state that DQC will be managed by the home district in accordance with the Major Subordinate Command (MSC) and district Quality Management Plans?	EC 1165-2-217, Section 8.a.	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
b. Does it state that ATR will be conducted or managed by the lead PCX?	EC 1165-2-217, Section 9.c.(1)	☐ Yes	☑ No
c. Does it state whether IEPR will be performed?	EC 1165-2-217, Section 4.b.	☑ Yes	☐ No
Will an IEPR be performed?			
d. Does it provide a defensible rationale for the decision on IEPR?	EC 1165-2-217, Section 11.d.	☑ Yes	☐ No
e. Does it state that IEPR will be managed by an Outside Eligible Organization, external to the Corps of Engineers?	EC 1165-2-217, Section 11.c.	☑ Yes	☐ No
4. Does the RP explain how ATR will be accomplished?	EC 1165-2-217, Section 7	☑ Yes	☐ No
a. Does it identify the anticipated number of reviewers?	EC 1165-2-217, Section 7	☑ Yes	☐ No
b. Does it provide a succinct description of the primary disciplines or expertise needed for the review (not simply a list of disciplines)?	EC 1165-2-217, Section 7	☑ Yes	☐ No
c. Does it indicate that ATR team members will be from outside the home district?	EC 1165-2-217, Section 9.c.(1).a.	☐ Yes	☑ No
d. Does it indicate that the ATR team leader will be from outside the home MSC?	EC 1165-2-217, Section 9.c.	☐ Yes	☑ No
e. Does the RP state that the lead PCX is responsible for identifying the ATR team members and indicate if candidates will be nominated by the home district/MSC?	EC 1165-2-217, Section 7	☐ Yes	☑ No
f. If the reviewers are listed by name, does the RP describe the qualifications and years of relevant experience of the ATR team members?*	EC 1165-2-217, Section 7	☑ Yes	☐ No
**Note: It is highly recommended to put all team member names and contact information in an appendix for easy updating as team members change or the RP is updated.*			
5. Does the RP explain how IEPR will be accomplished?	EC 1165-2-217, Section 11	☑ Yes	☐ No
a. Does it identify the anticipated number of reviewers?	EC 1165-2-217, Section 11	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
b. Does it provide a succinct description of the primary disciplines or expertise needed for the review (not simply a list of disciplines)?	EC 1165-2-217, Section 11	☑ Yes	☐ No
c. Does it indicate that the IEPR reviewers will be selected by an Outside Eligible Organization?	EC 1165-2-217, Section 4.k.(1) & Section 2.a.	☐ Yes	☑ No
d. Does it indicate the IEPR will address all the underlying planning, safety assurance, engineering, economic, and environmental analyses, not just one aspect of the project?	EC 1165-2-217, Section 7.c	☐ Yes	☑ No
6. Does the RP address peer review of sponsor in-kind contributions?		☐ Yes	☑ No
a. Does the RP list the expected in-kind contributions to be provided by the sponsor?	EC 1165-2-217, Section 7.e.(9)	☐ Yes	☑ No
b. Does it explain how peer review will be accomplished for those in-kind contributions?	EC 1165-2-217, Section 8.a	☐ Yes	☑ No
7. Does the RP address how the peer review will be documented?			
a. Does the RP address the requirement to document ATR and IEPR comments using DrChecks?	EC 1165-2-217, Section 7.d.(1)	☐ Yes	☑ No
b. Does the RP explain how the IEPR will be documented in a Review Report?	EC 1165-2-217, Section 11	☑ Yes	☐ No
c. Does the RP document how written responses to the IEPR Review Report will be prepared?	EC 1165-2-217, Section 7.e.(15)	☐ Yes	☑ No
d. Does the RP detail how the district/PCX will disseminate the final IEPR Review Report, USACE response, and all other materials related to the IEPR on the internet and include them in the applicable decision document?	EC 1165-2-217, Section 7.d.(2).a	☑ Yes	☐ No
8. Does the RP address Policy Compliance and Legal Review?	EC 1165-2-217, Section 7,a., (2),c.	☑ Yes	☐ No
9. Does the RP present the tasks, timing and sequence (including deferrals), and costs of reviews?	EC 1165-2-217, Section 7, e., (11)	☑ Yes	☐ No
a. Does it provide a schedule for ATR of the draft and final reports and other supporting materials?	EC 1165-2-217, Section 3.g	☑ Yes	☐ No
b. Does it include interim ATR reviews for key technical products?	EC 1165-2-217, Section 3.g	☐ Yes	☑ No

REQUIREMENT	REFERENCE	EVALUATION	
c. Does it present the timing and sequencing for IEPR?	EC 1165-2-217, Section 4.c.	☐ Yes	☑ No
d. Does it include cost estimates for the peer reviews?	EC 1165-2-217, Section 7.a.(2)	☐ Yes	☑ No
10. Does the RP indicate the study will address Safety Assurance factors?	EC 1165-2-217, Section 12	☐ Yes	☑ No
Factors to be considered include:			
Where failure leads to significant threat to human life	EC 1165-2-217, Section 12.h.(1).(c)	☑ Yes	☐ No
Novel methods\complexity\ precedent-setting models\policy changing conclusions	EC 1165-2-217, Section 12.i.(1)	☑ Yes	☐ No
Innovative materials or techniques	EC 1165-2-217, Section 12.i.(3)	☑ Yes	☐ No
Design lacks redundancy, resiliency of robustness	EC 1165-2-217, Section 12.i.(2)	☑ Yes	☐ No
Unique construction sequence or acquisition plans	EC 1165-2-217, Section 12.i.(3)	☐ Yes	☑ No
Reduced\overlapping design construction schedule	EC 1165-2-217, Section 12.i.(3)	☐ Yes	☑ No
11. Does the RP address model certification requirements?	EC 1105-2-412	☐ Yes	☑ No
a. Does it list the models and data anticipated to be used in developing recommendations (including mitigation models)?	EC 1165-2-217, 7.e.(2).(b).(7)	☐ Yes	☑ No
b. Does it indicate the certification/approval status of those models and if certification or approval of any model(s) will be needed?	EC 1165-2-217, 7.e.(2).(b).(7)	☐ Yes	☑ No
c. If needed, does the RP propose the appropriate level of certification/approval for the model(s) and how it will be accomplished?	EC 1105-2-412 and EC 1165-2-217, 7.e.(2).(b).(7).	☐ Yes	☑ No
12. Does the RP address opportunities for public participation?		☑ Yes	☐ No
a. Does it indicate how and when there will be opportunities for public comment on the decision document?	EC 1105-2-410, Section 7.a.(2).(d)	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
b. Does it indicate when significant and relevant public comments will be provided to reviewers before they conduct their review?	EC 1165-2-217, Section 7.e.(4)	☐ Yes	☑ No
c. Does it address whether the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers?	EC 1165-2-217, Section 7.e.(2).(b).(7).	☐ Yes	☑ No
d. Does the RP list points of contact at the home district and the lead PCX for inquiries about the RP?	EC 1165-2-217, Section 7.e.(1)	☑ Yes	☐ No
13. Does the RP address coordination with the appropriate Planning Center(s) of Expertise?	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No
a. Does it state if the project is single or multi-purpose? Single X Multi ☐	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No
List purpose(s): FRM			
b. Does it identify the lead PCX for peer review? Lead PCX:	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No
c. If multi-purpose, has the lead PCX coordinated the review of the RP with the other PCXs as appropriate?	EC 1165-2-217, Section. 9.c.(1), b.	☐ Yes	☑ No
14. Does the RP address coordination with the Cost Engineering Mandatory Center of Expertise (MCX) in Walla Walla District for ATR of cost estimates, construction schedules and contingencies for all documents requiring Congressional authorization?	EC 1165-2-217, Section. 9.c.(1), d.	☐ Yes	☑ No
a. Does it state if the decision document will require Congressional authorization?		☐ Yes	☑ No
b. If Congressional authorization is required, does the plan state that coordination will occur with the Cost Engineering DX?	EC 1165-2-217, Section 7.i.(3).b	☐ Yes	☑ No
15. Other Considerations: This checklist highlights the minimum requirements for an RP based on EC 1165-2-217. Additional factors to consider in the RP include, but may not be limited to:		☑ Yes	☐ No
a. Is there a request from a State Governor or the head of a Federal or state agency to conduct IEPR likely?	EC 1165-2-217, Section 11.d.(1).(c)	☐ Yes	☑ No
b. Is the home district expecting to submit a request to exclude the project study from IEPR?	EC 1165-2-217, Section 7.f.(1) and Section 11.d	☐ Yes	☑ No

REQUIREMENT	REFERENCE	EVALUATION	
c. Are there additional Peer Review requirements specific to the home MSC or district (as described in the Quality Management Plan for the MSC or district)?		☐ Yes	☑ No
d. Are there additional Peer Review needs unique to the project study?		☐ Yes	☑ No