DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
PO BOX 2870
PORTLAND OR 97208-2870

CENWD-RBT

20 December 2011

MEMORANDUM FOR Commander, Kansas City District (CENWK-PM-CJ/Seth Laliberty)

SUBJECT: Review Plan Approval for Swope Park Industrial Area Flood Protection Project, Kansas City District

1. Reference Engineering Circular 1165-2-209, Water Resources Policies and Procedures: Civil Works Review Policy, 31 January 2010.

2. The enclosed review plan for the Swope Park Industrial Area Flood Protection Project is approved.

3. This review plan has been prepared in accordance with reference1. A Type II Independent External Peer Review (IEPR) is required. The Risk Management Center will serve as the Review Management Organization for the Type II IEPR through use of an existing Independent Delivery Independent Quantity contract.

4. Any revisions to this review plan will require new written approval from this office. For further information, please contact Mr. Steve Bredthauer at (503) 808-4053.

Encl

DAVID J. PONGANIS
Acting Director, Programs

CF:
CENWD-PDD

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, KANSAS CITY DISTRICT
700 FEDERAL BUILDING
601 E. 12TH STREET
KANSAS CITY, MISSOURI 64106-2896

REPLY TO
ATTENTION OF:

CENWK-ED

15 November 2011

MEMORANDUM FOR Commander, Northwestern Division, USACE, ATTN: Mr. Stephen Bredthauer

SUBJECT: Swope Park Industrial Area Review Plan (P2# 156415), Kansas City, Missouri, Kansas City District, Northwestern Division.

1. Enclosed for Major Subordinate Command (MSC) Commander approval is the Swope Park Industrial Area Flood Protection Project review plan. This review plan was prepared in accordance with EC 1165-2-209, Civil Works Review Policy.

2. The Swope Park Industrial Area Flood Protection Project is currently in the implementation phase. As required by EC 1165-2-209, request review and approval of the Review Plan.

3. The point of contact for this memorandum is the project manager, Seth LaLiberty, at (816) 389-3023 or seth.j.laliberty@usace.army.mil

REXFORD G. GOODNIGHT, P.E.
Chief, Engineering Division
Kansas City District

REVIEW PLAN
FOR THE
SWOPE PARK INDUSTRIAL AREA FLOOD PROTECTION PROJECT
KANSAS CITY, MISSOURI
KANSAS CITY DISTRICT
NORTHWESTERN DIVISION

US Army Corps
of Engineers ®
Kansas City District

P2# 156415

16 DECEMBER 2011

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1.0 Purpose and Requirement.

1.1 Purpose and Authority. The purpose of this Review Plan (RP) is to define the scope and level of review for implementation documents for the Swope Park Industrial Area (SPIA) Flood Protection project. This project is in the implementation phase. This RP is a stand-alone document but is also included as an appendix of the SPIA Flood Protection Project Management Plan (PMP). The project is authorized by the Water Resources Development Act of 2007, Section 1001(29), Public Law 110-114. The Kansas City District will execute the project and report to the Northwestern Division in Portland, Oregon. There are in-kind contributions.

1.2 Documents for review. The project is in the implementation phase. The implementation documents are the plans, specifications, design documentation report, and operations and maintenance manual.

1.3 Requirement. This review plan is required by EC 1165-2-209 (31 JAN 10), which establishes the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE) decision and implementation documents through independent review. The EC outlines three levels of review: District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR).

1.3.1 Address inquiries on the review plan to the contacts listed below:

District Quality Control
Kansas City District.....Mr. Seth LaLiberty (816) 389-3023

ATR and IEPR
Review Management Office
Northwestern Division..... ...Mr. Stephen Bredthauer (503) 808-4053

1.3.2 References.

a. Engineer Circular 1105-2-408, Peer Review of Decision Documents, 31 MAY 05

b. Engineer Circular 1105-2-410, Review of Decision Documents, 22 AUG 08

c. Engineering Circular 1165-2-209, Water Resources Policies and Procedures: Civil Works Review Policy, 31 JAN 10

d. Engineer Regulation 1105-2-100, Planning Guidance Notebook, 20 NOV 07

e. Engineer Regulation 1110-1-12, Quality Management, 30 SEP 06

f. Engineer Regulation 1110-2-1155, *Dam Safety Assurance Program*, 12 SEP 97

g. US Army Field Manual 5-19, *Composite Risk Management*, 21 AUG 06

2.0 Review Documents Information

2.1 General. The project consists of the design and construction of approximately 1,215 meters of reinforced concrete floodwall, approximately 869 meters of compacted earthen levee, a 1-hectare interior

storm water retention pond, a rolling gate enclosure, an interior drainage system, and fish and wildlife mitigation.

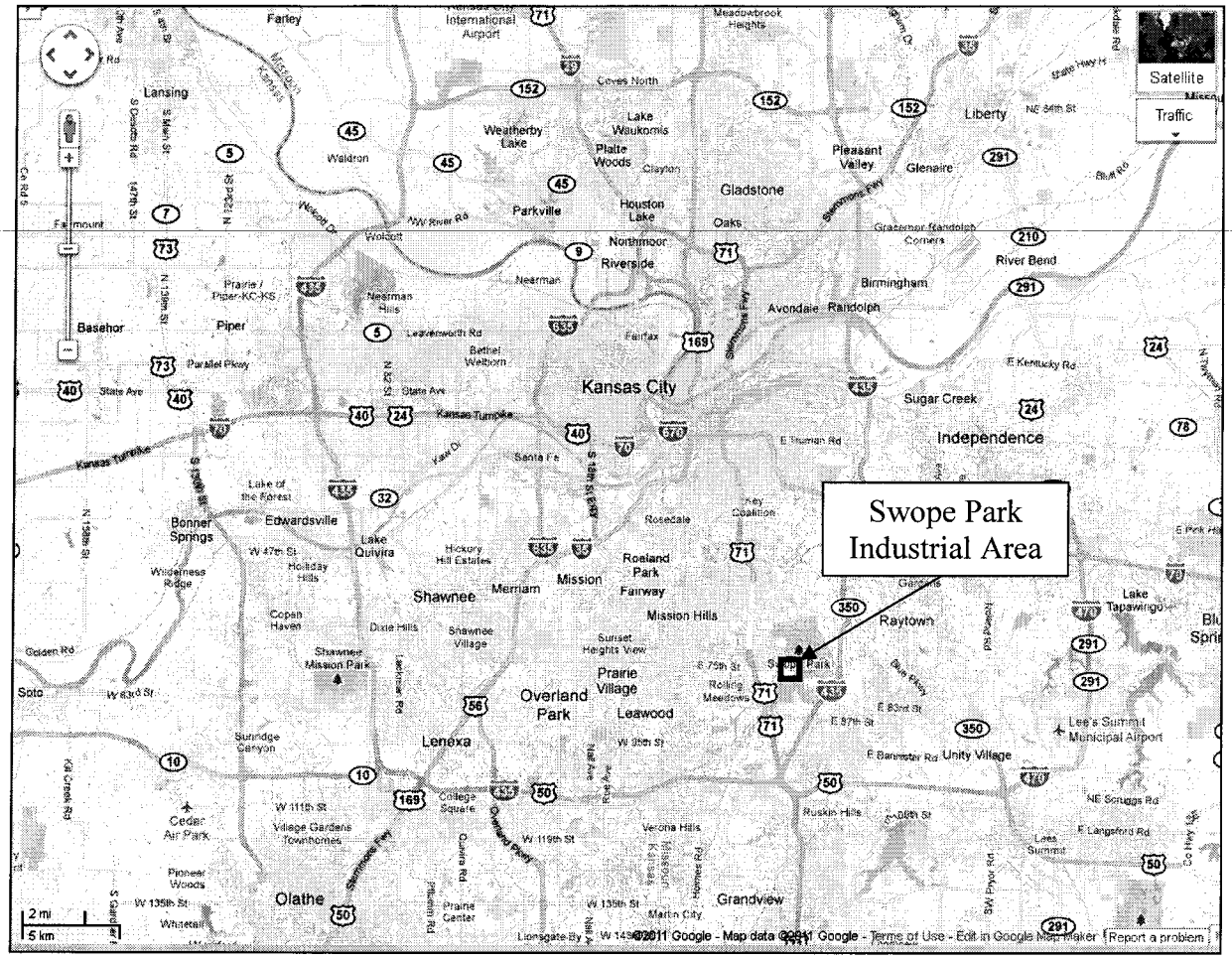

Figure 1. Swope Park Industrial Area General Location

2.2 The Swope Park Industrial Area is a local flood protection project located on the left bank of the Blue River. The 50-acre site drains approximately a 272 square-mile area in a highly urbanized part of the Kansas City Metropolitan Region. Within the corporate limits of Kansas City, Missouri, the industrial park is centered on 75th Terrace and bounded by a Union Pacific Railroad track and the Blue River channel. See Figure 2.

2.3 In-Kind Contributions. The project sponsors, the City of Kansas City, Missouri (KCMO) have agreed to provide $180,000 worth of project coordination team work as in-kind contributions.

2.4 Implementation Documents. Implementation documents include the plans, specifications, design documentation report (DDR), and an Operations and Maintenance (O&M) manual. The purpose of implementation documents is to provide a detailed plan for construction. The plans, specifications, DDR and O&M manual will be developed by a contracted AE and reviewed by a USACE quality assurance team. A construction contractor or USACE hired labor will complete the construction.

Figure 2. Swope Park Industrial Area, Project View

2.5 Factors Affecting the Scope and Level of Review. This section addresses the factors necessary to determine the appropriate scope and level of review for these documents. This information is used by the PDT and vertical team to assess the appropriate level of review and types of expertise represented on the review teams. Factors considered in selecting the type of review are:

2.5.1 Life Safety. The project includes levees and floodwalls that protect human life. It is critical that these features are designed to current criteria, and are designed, constructed and ultimately perform as intended.

2.5.2 Project Cost. The total cost of the project is authorized at $22,940,000. This cost includes preliminary engineering and design ($1.4M, complete), completion of the design, reviews required by law, construction supervision and administration, contracting costs, project management, quality assurance labor costs, LERRD (lands, easements, rights of way, relocations, and disposal) costs, work in kind, and construction.

2.5.3 Public Support. There is strong public support for this project. The project features will help protect businesses and infrastructure from flooding, which in turn helps support jobs in the area. While there are always a few members of the public opposed to any project of this type, no negative public comments have been received to date and few are expected.

2.5.4 Project Visibility and Area Disturbed. The project will result in a visible floodwall and levee in an industrial area. However, they will be constructed in areas that are not readily visible from private residences due to significant tree cover and vegetation. During construction a larger area will be disturbed, but this will be temporary and is not expected to impact, either visibly or audibly, private residences.

2.5.5 Factors considered but not deemed influential. The engineering employed to support the implementation documents is structural design, hydraulics and hydrology, biology, geotechnical evaluation, and civil engineering. The design and design methods in the implementation documents are not be based on novel methods, do not present complex challenges for interpretation, do not contain precedent-setting methods or models, and do not present conclusions that are likely to change prevailing practices. This project does not have significant environmental impacts nor does it disturb known cultural or historically significant sites. Little to no public controversy is expected.

3.0 Levels of Review.

3.1 There are three levels of review considered for the SPIA Flood Protection Project: 1. District Quality Control, 2. Agency Technical Review, and 3. Type II Independent External Peer Review. Each level, and how it applies to the project, is explained below.

3.2 District Quality Control. DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). It is managed in the home district and may be conducted by staff in the home district as long as they are not doing the work involved in the study, including contracted work that is under review. Basic quality control tools used on the project include a Quality Management Plan providing for seamless review, peer quality checks and reviews, supervisory reviews, quality assurance team (QAT) reviews, a biddability, constructability, operability, and environmental (BCOE) review, AE product development checklists, and established Business and Quality Procedures (BQPs) used to ensure quality procedures are followed. The implementation documents will be produced by an AE with quality procedures followed as described in the AE's quality control plan (QCP). Per the district BQP's, the AE's QCP will be reviewed by the QAT and approved by the district's quality control program manager.

3.2.1 DQC efforts include the necessary expertise to address compliance with published Corps policy. When policy and/or legal concerns arise during DQC efforts that are not readily and mutually resolved by the PDT and the reviewers, the district seeks issue resolution support from Northwestern Division and Headquarters, U.S. Army Corps of Engineers (HQUSACE) in accordance with the procedures outlined in Appendix H, ER 1105-2-100 or other appropriate guidance.

3.2.2 The Northwestern Division and Kansas City District quality management plans address the conduct and documentation of this fundamental level of review. DQC is required for this project.

3.3 Risk Informed Decisions on Appropriate Reviews. All work products undergo DQC and all implementation documents must undergo ATR. However, there is some level of judgment applied to determine if IEPR is required. Therefore, this RP includes Attachment 3 to document the risk-informed decision that determines the IEPR level of review.

3.4 Agency Technical Review (ATR). ATR is an in-depth review undertaken to ensure the quality and credibility of the government's scientific information, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. ATR is mandatory for all decision and implementation documents. For other work products, a case specific risk-informed decision is made as to whether ATR is appropriate. The purpose of ATR is to ensure proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams are comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team is selected from outside the Northwestern Division.

3.4.1 Required ATR Team Expertise. The ATR team consists of at least five members including the ATR team lead. The following paragraphs describe the list of required disciplines as well as the experience required by each of the ATR team members. The ATR team members, along with their resume of experience, will be approved by the RMO prior to the start of the ATR. See Table 3 for a list of ATR team members.

3.4.1.1 Hydraulics. Team member will be an expert in the field of stream hydraulics, have a thorough understanding of pipe hydraulics and watershed hydrology, with familiarity of commonly used drainage features.

3.4.1.2 Structural. Team member will be an expert in floodwall design, including levee/floodwall transitions, with experience designing gatewells and flood gates.

3.4.1.3 Geotechnical. Team member will be an expert in seepage, slope stability and foundations analysis, with experience designing riprap protection.

3.4.1.4 Civil. Team member will be an expert in designing levees and detention ponds, and have experience designing stormwater collection systems and bank stabilization.

3.4.1.5 Environmental. Team member will be an expert in the environmental assessment process with knowledge of the NEPA process, cultural surveys, biological assessments, and endangered species.

3.4.1.6 Other disciplines/functions involved in the project may be included as needed with appropriate experience and educational requirements.

3.4.2 Documentation of ATR. EC 1105-2-408 requires the use of DrChecks (https://www.projnet.org/projnet/) to document all ATR comments, responses, and associated resolution accomplished. ATR team members must register with the DrChecks website and they will receive access to DrChecks through the project manager. A PDT member is assigned to take the lead in resolving comments for each of the primary project disciplines. It is the PDT member's responsibility to coordinate resolution of the comment with other team members as required, evaluate the DrChecks comment, enter the PDT's response into DrChecks, and ensure the ATR team member conducts a comment backcheck. It is the PDT member's responsibility to ensure all DrChecks ATR comments in their discipline are properly addressed, resolved, and closed.

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

ATR team will prepare a Review Report which includes a summary of each unresolved issue; each unresolved issue will be raised to the vertical team for resolution. Review Reports are considered an integral part of the ATR documentation and will:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

3.4.4 ATR Issue Resolution. ATR efforts include the necessary expertise to address compliance with applicable published policy. When policy and/or legal concerns arise during ATR that are not readily and mutually resolved by the PDT and the reviewers, the District will seek issue resolution support from the Northwestern Division and HQUSACE in accordance with the procedures outlined in ER 1105-2-100 (Appendix H), or other appropriate guidance.

3.4.5 ATR Completion. ATR is considered complete and certified when all ATR concerns are either resolved or referred to HQUSACE for resolution and the ATR documentation is complete. A sample ATR certification is included as Attachment 1.

3.5 Independent External Peer Review (IEPR). IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. Any work product that undergoes ATR may also undergo Type I and/or Type II IEPR. In general, decision documents undergo Type I IEPR and implementation documents undergo Type II IEPR (or Safety Assurance Review). Meeting the specific conditions identified for possible exclusions is not, in and of itself, sufficient grounds for recommending exclusion.

3.5.1 Type I IEPR. This project is not anticipated to require Type I IEPR because it is in the implementation phase and not the study phase.

3.5.2 Type II IEPR. A Type II IEPR is conducted to insure public health, safety, and welfare. The circumstances requiring a Type II IEPR are described in Appendix E of EC 1165-2-209. Each of those circumstances is explicitly considered in developing a risk-informed rationale for determining the appropriate level of review, including the need for a safety assurance review. This project is anticipated to require Type II IEPR because failure of the levees or floodwall could pose a significant threat to public health, safety, or welfare. See Attachment 3 for details regarding the risk informed Type II IEPR decision.

3.5.2.1 Type II IEPR Decision. Based on the analysis provided in Attachment 3, it is recommended that Type II IEPR be conducted on the SPIA project.

3.5.2.2 Type II IEPR Team Selection. The Review Management Office (RMO) approves the disciplines and experience required for the IEPR team. For the Type II IEPR on this project, the district will fund the Risk Management Center (a Corps of Engineers organization with the Institute for Water Resources) to issue a contract to an AE firm to conduct the IEPR. The AE will submit names of personnel qualified to conduct the review. The RMO will approve the reviewers and verify that neither the AE nor the reviewers have worked on the project in the past.

3.6 Policy and Legal Compliance Review. The Kansas City District Office of Counsel is responsible for legal review of decision and implementation documents and signs a certification of legal sufficiency prior to construction of the project.

3.7 Model Certification/Approval. EC 1165-2-209 requires certification (for Corps models) or approval (for non-Corps models) of planning models used for all planning activities.

3.7.1 Planning Models. This project is in the implementation phase and does not require a planning model.

3.7.2 Implementation Models. Due to the simplicity and limited hydraulic, environmental, economic, social, geologic, geotechnical aspects of this project, and also because this project is in the implementation phase, in the professional judgment of the PDT, the hydraulic model of the Blue River will be the only model used in this project. The hydraulic model was produced using HEC-RAS which is standardized software used throughout the Corps and civil works industry. HEC-RAS is an engineering model with Enterprise status. The hydraulic model was completed in 2006 and will be updated with the most current hydraulic information during the design.

4.0 Posting Review Plans.

4.1 District. The Kansas City District maintains a web site that hosts electronic versions of review plans for its studies/projects as well as a list of the current and active Review Plans with links to the documents. In posted documents, lists of the names of USACE reviewers may be displayed. Northwestern Division and HQUSACE postings also link to the district's site. The district will establish a mechanism on their web site for allowing the public to comment on the adequacy of the RP, and will consider public comments on RPs. The RP is published on the Kansas City District's public internet site following approval by Northwestern Division. The Kansas City District website is located here: http://www.nwk.usace.army.mil/index.cfm.

4.2 Northwestern Division. Northwestern Division will post on its website, and update at least every three months, an agenda of RPs. The agenda describes all decision and implementation documents, the RP for each entry on the agenda, and provides a link from the agenda to each document made public. The Northwestern Division's website is located here: http://www.nwd.usace.army.mil/home.asp

5.0 Review Schedules and Costs

5.1 DQC Schedule and Cost. DQC, which includes peer reviews and a biddability, constructability, operability, and environmental (BCOE) review will be accomplished within the Kansas City District. The entire DQC process takes about 2-3 months and runs concurrently to the design. DQC costs are paid from project funds.

5.1.1 DQC Schedule

AE's QCP Delivered	4 November 2011
QCP Approved	10 November 2011
AE Peer review of implementation documents	1 Jan 2012-16 July 2012
QAT Review	14 April 2012-8 June 2012
BCOE Review	8 June 2012-15 June 2012

5.1.2 Peer Reviews. Prior to the QAT review, all implementation documents will receive a peer review. The peer review is conducted by a peer in the same discipline who double checks calculations, assumptions, and other design details used in the product. The AE's QCP will detail the peer review process.

5.1.3 QAT Review. Concurrent with ATR, the QAT will review the implementation documents to ensure they meet the necessary requirements. All ATR and QAT comments will be resolved prior to BCOE.

5.1.4 BCOE. The BCOE review considers all aspects of the documents used to bid for a construction contract to ensure they will result in a biddable and constructible project. BCOE occurs prior to advertising the contract for bids. The BCOE review disciplines are listed in Table 4.

5.1.5 Certification of Technical and Legal Review. Also prior to awarding the contract, the implementation documents will receive a certification of technical and legal review from the Kansas City District's Office of Counsel.

5.2 ATR Schedule and Cost. ATR will be accomplished outside of the Kansas City District. The ATR process takes about 2 months spread out over the project duration. Following is the schedule for the ATR review:

5.2.1 ATR Schedule

Review documents and charge sent to ATR Team	D+0
ATR DrChecks comments complete	D+14
ATR draft report	D+19
Interim review meeting	D+20
DrChecks evaluations complete	D+25
AE completes revisions	D+30
ATR backchecks complete	D+30
ATR certification form signed	D+30
ATR final report complete	D+35
Report sent to NWD	D+35

5.2.2 ATR Cost. Following are the estimated costs for ATR:

Table 1. ATR Costs

Discipline	Estimated Labor Cost
ATR Team Lead	$15000
Supporting Disciplines	$5000 ea. @ 5 ea. =$25,000
TOTAL	$40,000

5.3 IEPR Schedule and Cost. IEPR will be accomplished outside of the USACE. IEPR is expected to add 3 months to finalizing the Swope Park design. IEPR will follow the same general process as ATR with the IEPR team receiving a charge and the review documents, followed by a review and comment period, resolution of the comments, and certification of the review. The review is planned for early June, concurrent with the ATR. IEPR is expected to cost $150,000.

6.0 Public Participation.

Public comments are welcome on the review plan. The review plan is posted on the Kansas City District's web page located here: http://www.nwk.usace.army.mil/index.cfm. The public comment period is 30 days. The Kansas City District will consider public comments and recommend changes to the review plan

if necessary to the Northwestern Division. Significant and relevant public comments will also be provided to reviewers prior to conduct of the review. Also, due to changes in the project, the review plan may require updates. Updates are posted to the same website and the Public will have a similar opportunity to comment on review plan updates. Since the project does not meet the requirements for IEPR, the Public, including scientific or professional societies, is not asked to nominate potential reviewers. Public comments on the review plan may be made by writing or emailing the following contact:

Kansas City District, Corps of Engineers
c/o Seth LaLiberty, CENWK-PM-CJ
601 E. 12th St.
Kansas City, MO 64106
Email: seth.j.laliberty@usace.army.mil

7.0 Review Teams.[1]

Table 2. Quality Assurance Team

Name	District	Discipline
[redacted]	CENWK	Project Management
	CENWK	Civil
	CENWK	Geotechnical
	CENWK	Environmental
	CENWK	Geology
	CENWK	Hydraulics
	CENWK	Structural
	CENWK	Cost Estimating
	CENWK	Legal

*Technical Lead

Table 3. Agency Technical Review Team

Name	District	Discipline
[redacted]	CELRP	ATR Team Lead and Civil
	CELRP	Structural
	CELRP	Environmental
	CELRP	Hydraulics/Hydrology
	CELRP	Geotechnical

Table 4. BCOE Certifiers

Name	District/Section	Discipline
[redacted]	CENWK-CD-C	Construction Branch Chief
	CENWK-CD	Construction Division Chief
	CENWK-ED-G	Geotechnical Engineering Branch Chief
	CENWK-ED	Engineering Division Chief

Table 5. IEPR Reviewers

Name	District/Section	Discipline
TBD		IEPR Team Lead

[1] Names will be removed in version posted for public review to protect privacy.

		Civil
		Structural
		Environmental
		Hydraulics/Hydrology
		Geotechnical

Attachment 1: ATR Certification

STATEMENT OF AGENCY TECHNICAL REVIEW (ATR)

COMPLETION OF AGENCY TECHNICAL REVIEW

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

SIGNATURE
[Name] Date
ATR Team Leader
[Office Symbol or Name of AE Firm]

SIGNATURE
[Name] Date
Project Manager (home district)
[Office Symbol]

SIGNATURE
[Name] Date
Review Management Office Representative
[Office Symbol]

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:
[Describe the major technical concerns and their resolution]

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

SIGNATURE
[Name] Date
Chief, Engineering Division (home district)
[Office Symbol]

Attachment 2: Statement of Legal Review

STATEMENT OF LEGAL REVIEW

CERTIFICATION OF LEGAL REVIEW:

This product including all associated documents required by the National Environmental Policy Act, has been fully reviewed by the Office of Counsel, Kansas City District and is approved as legally sufficient.

_____ Date: _____

District Counsel

Attachment 3: IEPR Decision Documentation

1.0 The project is in the implementation phase and therefore does not require a Type I IEPR. This attachment documents the vertical team's risk informed recommendation to conduct Type II IEPR. According to EC 1165-2-209, the vertical team must make a risk-informed decision whether or not to conduct Type II IEPR or make a risk informed recommendation to the Chief of Engineers or Director of Civil Works to not conduct Type II IEPR.

2.0 The following table, based on the US Army Field Manual 5-19, *Composite Risk Management*, was used to assess each risk in the IEPR tables.

Table 6. Risk Assessment Matrix

	Risk Probability			
Risk Severity	**Frequent**	**Likely**	**Seldom**	**Unlikely**
Catastrophic	Extremely High	Extremely High	High	Moderate
Critical	Extremely High	High	Moderate	Low
Marginal	High	Moderate	Moderate	Low
Negligible	Moderate	Low	Low	Low

3.0 The following table details the risks, frequency, severity, risk assessment, and how the risk contributes to the IEPR decision.

Table 7. Type II IEPR Risk Assessment (Implementation Documents)

Risk	Risk Probability	Risk Severity	Risk Assessment	Risk Contributes to IEPR Decision?	Notes
Project poses a significant threat to human life	Seldom	Cata-strophic	High	Yes	The completed project will eventually fail in a storm event that exceeds the design storm. This failure could endanger human life, but since it is impossible to build a structure to resist every storm, some level of risk to human life must be accepted. Type II IEPR will verify the assumptions and design criteria used to design the project features to ensure an acceptable level of risk is mitigated.

Risk	Risk Probability	Risk Severity	Risk Assessment	Risk Contributes to IEPR Decision?	Notes
Project involves the use of innovative materials or techniques where the engineering is based on novel methods, presents complex challenges for interpretations, contains precedent-setting methods or models, or presents conclusions that are likely to change prevailing practices.	Unlikely	Critical	Low	No	This project does not involve any innovative materials or techniques based on novel methods or complex challenges.
The project design requires redundancy, resiliency, and robustness	Likely	Critical	High	Yes	There is only one line of flood protection provided by the levees and floodwalls, which requires robustness and resiliency. The design must ensure these principles are communicated to the constructors. Type II IEPR will ensure the design is resilient and robust.
The project has unique construction sequencing or a reduced or overlapping design construction schedule	Unlikely	Critical	Low	No	

Risk	Risk Probability	Risk Severity	Risk Assessment	Risk Contributes to IEPR Decision?	Notes
Risk of a faulty or incomplete design making it to construction	Seldom	Critical	Moderate	No	DQC and ATR by personnel with experience on similar projects will mitigate the risk of a faulty or incomplete design
Risk of contractor misinterpreting design which results in project failure	Unlikely	Cata-strophic	Moderate	No	Construction quality control procedures and oversight will mitigate this risk.

4.0 Based on the above assessment, as well as the fact that the project would benefit from Type II IEPR, it is the risk-informed recommendation of the vertical team that Type II IEPR is required for this project.

Attachment 4. Acronyms

AE: Architectural and/or Engineering Firm

ATR: Agency Technical Review

BCOE: Biddability, Constructibility, Operability, and Environmental Review

BQP: Business and Quality Procedures

DDR: Design Documentation Report

DQC: District Quality Control

EC: Engineer Circular

HQUSACE: Headquarters, United States Army Corps of Engineers

IEPR: Independent External Peer Review

ITR: Independent Technical Review

KCMO: The City of Kansas City, Missouri

LERRD: Lands, Easements, Relocations, Rights of Way, Disposal Areas

NWD: Northwestern Division, US Army Corps of Engineers

NWK: Kansas City District, US Army Corps of Engineers

O&M: Operations and Maintenance

PDT: Project Delivery Team

PMP: Project Management Plan

QAT: Quality Assurance Team

QCP: Quality Control Plan

RP: Review Plan

RMO: Review Management Office

SAR: Safety Assurance Review

SPIA: Swope Park Industrial Area

USACE: US Army Corps of Engineers

WRDA: Water Resources Development Act