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

REPLY TO
ATTENTION OF:

CEMVD-PD-SP

12 DEC 12

MEMORANDUM FOR Commander, St. Louis District

SUBJECT: Review Plan Approval for East St. Louis, Illinois Flood Protection Project, Design and Construction Review Plan

1. References:

a. Email, CEMVS-PM-F, 3 December 2012, subject: Review Plans (encl 1).

b. Memorandum, IWR-WD, 30 November 2012, subject: Risk Management Center Endorsement - East St. Louis, Illinois Flood Protection Project, Design and Construction Review Plan (encl 2).

2. The enclosed Review Plan (RP) for East St. Louis, Illinois Flood Protection Project, Design and Construction has been prepared in accordance with EC 1165-2-209. The RP has been coordinated with the Upper District Support Team and the Flood Risk Management Center who endorsed the plan in reference b. of the enclosed memorandum.

3. I hereby approve this RP, which is subject to change as circumstances require, consistent with study development under the Project Management 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.

4. The MVD point of contact is Mr. Philip Hollis, CEMVD-PD-SP, (601) 634-5293.

2 Encls

EDWARD E. BELK, JR., P.E., SES
Director of Programs

REVIEW PLAN

East St. Louis, Illinois Flood Protection Project

Design and Construction Activities

St. Louis District

MSC Approval Date: *Pending*
Last Revision Date: *none*

US Army Corps
of Engineers ®

REVIEW PLAN

East St. Louis, Illinois Flood Protection Project
Design and Construction Activities

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review needed for the Design and Construction Activities of the East St. Louis, Illinois Flood Protection Project.

b. **References**

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
(2) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
(3) East St.Louis & Vicinity Flood Protection Rehabilitation PMP (P2 328240)
(4) Review Plan, Metro East St. Louis Levee Systems Modification Section 408 Submittal Revision 2, 28 June 2012

c. **Requirements.** This review plan was developed in accordance with EC 1165-2-209, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines three general levels of review: District Quality Control (DQC), Agency Technical Review (ATR), and Type II Independent External Peer Review (IEPR).

2. PROJECT INFORMATION

The review plan will serve as implementation document for the design and construction of the East St. Louis, Illinois Flood Protection Project. The East St. Louis, Illinois Flood Protection Project is located on the left descending bank between Mississippi River Miles 175 and 195 above the confluence with the Ohio River. It protects a large part of the East St. Louis, Illinois metropolitan area in Madison and St. Clair Counties in southwestern Illinois. The Federally-owned Chain of Rocks levee and the East St Louis, Illinois levee form a single levee system that provides flood protection for the cities of East St. Louis, Granite City and numerous other municipalities.

a. **Study/Project Description.** The project focuses on correcting the deficiencies (flaws) in the underseepage and through-seepage designs for the East St. Louis, Illinois levee, and alternative additional underseepage and through-seepage controls designed for a Mississippi River flood at 54 feet on the St. Louis gage. This corresponds to the net levee grade of the East St. Louis riverfront levee (the design flood at 52 feet on the St. Louis gage plus 2 feet of freeboard). Section 216 of the Flood Control Act of December 31, 1970, Public Law 91-611, is the authority to implement design deficiency correction projects without additional Congressional authorization if the criteria in Engineer Regulation 1165-2-119 are met. Project sponsors are expected to be the Southwestern Illinois Flood Prevention District Council for construction, and Metro East Sanitary District (MESD) for operation and maintenance. The recommended plan includes 369 new relief wells; filling 314 existing wood stave relief wells with grout; ditching and pipe collector systems; a 61 cfs seepage pump station, a 7 cfs lift station, a variable frequency drive for one pump; 2,410 linear feet of seepage berms; a small fill area along the levee; 12,300 linear feet of slurry trench cutoff wall through the levee and to bedrock; 2,640 linear feet of shallow (40 ft deep) cutoff wall at the riverside levee toe; 3,640 linear feet of clay filled cutoff trench; 1,320 linear feet of 5 foot thick riverside clay blanket; environmental and archeological mitigation work; utility relocations; and easements for berms, relief wells in locations with no existing wells, three flowage areas, slurry

trench cutoff wall staging areas and equipment access areas, an excavated material disposal area, and environmental mitigation areas.

b. **Factors Affecting the Scope and Level of Review.** The East St. Louis, Chain of Rocks, Wood River and Prairie Du Pont/Fish Lake levees in the Metro East area have net levee grades higher than a 500-year flood, however, the Corps of Engineers believes these levees have significant underseepage problems and possible other problems and cannot certify that the levee systems will protect against a 100-year flood. The Federal Emergency Management Agency (FEMA) requires a professional engineer's certification that the levees will protect against a 100-year flood, otherwise, after a period of time for public input and map preparation, FEMA will revise the Flood Insurance Rate Maps and change the designation of the areas behind the levees from protected areas to flood hazard areas. The lack of certification is negatively impacting property values in the Metro East area, and flood insurance rates will increase dramatically if the area is designated a flood hazard area. There is tremendous interest in the communities and region to complete the work that will allow certification by a professional engineer before FEMA changes the floodplain designations. The three counties in the Metro East area, Madison, St. Clair and Monroe Counties, have formed flood prevention districts and passed sales taxes to generate revenues for levee improvements. The county flood prevention districts formed the Southwestern Illinois Flood Prevention District Council. This council has hired an engineering firm to design the improvements needed to allow the East St. Louis, Wood River and Prairie Du Pont/Fish Lake levees to be certified for a 100-year level of protection. The council will complete any necessary construction, and ultimately the engineering firm will certify these levees and the Chain of Rocks levee for a 100-year flood. Design and construction at the Federally-owned Chain of Rocks levee is being accomplished by the Federal Government for the authorized level of protection. Local interests also want the East St. Louis, Wood River and Prairie Du Pont/Fish Lake levees brought back to their original level of protection which is greater than the 500-year flood, but achieving the 100-year certification is their top priority. Although higher floods would be very rare events, floods that exceed the 100-year or 500-year level of protection could occur. Level of review for these improvements will be determined by the Metro East St. Louis Levee Systems Modification Section 408 Submittal Review Plan.

c. **In-Kind Contributions.**
The Metro East Sanitary District and Southwestern Illinois Flood Protection District are responsible for 35% of the total project shared costs. There are no in kind services anticipated as part of this cost share, but the sponsors will receive a credit for lands, easements, rights of way, relocations, and disposal areas.

3. DISTRICT QUALITY CONTROL (DQC)

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The DQC is managed in the home district. Reviews under this heading may include over the shoulder peer reviews; and Bid-ability, Constructability, Operability, and Evnvironmental (BCOE) Reviews.

a. **Products to Undergo DQC.** Key products for review include plans, specifications, design documentation reports, and cost estimate for the final design review.

b. **Required DQC Team Expertise.** Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts.

c. **Documentation of DQC.** Dr.Checks review software will be used to document all DQC comments, responses and associated resolutions accomplished throughout the review process.

4. AGENCY TECHNICAL REVIEW (ATR)

The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product.

a. **Products to Undergo ATR.** All plans and specifications completed subsequent to approval of this review plan will undergo ATR. FY13 anticipated work consists of relief well design for underseepage control. The design of the remaining project components has not yet been schedules.

b. **Required ATR Team Expertise.** ATR team will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The leader of the ATR team shall be from outside the home MSC. The disciplines represented on the ATR team will reflect the significant disciplines involved in the engineering and design effort. These disciplines include a getotechnical, structural, civil, mechanical, cost, and hydraulic engineer along with a geologist. The chief criterion for being a member of the ATR team is knowledge of the technical discipline and a minimum of ten years of relevant experience in projects similar to East St. Louis, Illinois Flood Protection Project. See attachement 1 for ATR team members.

c. **Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

(1) The review concern – identify the product's information 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 be properly followed;
(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers 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 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 team coordination and the agreed upon resolution. 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:

- 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;
- 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. A sample Statement of Technical Review is included in Attachment 3.

5. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

In accordance with EC 1165-2-209 a Type II IEPR (SAR) shall be conducted on design and construction activities for hurricane, storm, and flood risk management projects where existing and potential hazards pose a significant threat to human life. This applies to new projects and to the major repair, rehabilitation, replacement,or modification of existing facilities. Type II IEPR, or Safety Assurance Review (SAR), are managed outside USACE. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare. The Review Management Office (RMO) for Type II IEPR reviews is the USACE Risk Management Center (RMC).

a. **Products to Undergo Type II IEPR.** Key products for review include 95% plans and specifications, design documentation reports, cost estimate for the final design review, and any Section 408 submittals from the Southwestern Illinois Flood Protection District that require Type II IEPR as determined by the referenced Metro East St. Louis Levee Systems Modification Section 408 Submittal Review Plan At a later date the IEPR team will review in-progress construction.

b. **Required Type II IEPR Panel Expertise**. The RMO requires that each member of the IEPR panel shall have a professional engineer license and/or a professional geologists license, and a panel to include members that have expertise in the following areas: a) levee safety design; b)seepage and piping analysis; c)geotechnical, structural, civil, hydraulic design; and d) geological concerns. The IEPR Panel will be a maximum of 5 members, but will vary based on complexity of product being reviewed. The following types of expertise may be represented on the Type II IEPR team:

(1) IEPR team leader. The IEPR team leader shall hold a professional license in structural or civil engineering with a MS degree or higher civil or structural engineering. The IEPR leader shall

have a minimum of 15 years of design experience and experience with multi-million dollar, flood risk management projects. The team leader shall be a recognized leader with good communication skills to lead a diverse review team comprised of individuals located across the nation.

(2) Hydraulics. The reviewer for hydraulics shall be a registered professional engineer with a minimum of a MS degree or higher in engineering science. The reviewer shall have a minimum of 15 years experience in hydrologic analysis and design of hydraulic structures as it relates to riverine flood risk management projects. Reviewer should have experience in the analysis and design involving interior drainage and riverine models using HEC-RAS and hydrology models using HEC-HMS. This member should also be knowledgeable in coincidence of frequency and the application of USACE risk and uncertainty analyses on flood risk management projects. Reviewer should be experienced with similar projects in an urban setting and participated in review of riverine flood risk management projects.

(3) Structural. The reviewer for structural features shall be a registered professional structural engineer with a MS degree or higher in civil or structural engineering. The reviewer shall have a minimum of 15 years experience in the design, layout, and construction of large urban flood risk management projects. Reviewer should be familiar with the design and construction of tall (15 feet high) flood walls, removable flood walls, closure structures, interior drainage facilities, concrete placement, and relocation of underground utilities. The reviewer should have experience with static and seismic design per industry code standards and USACE design regulations for Civil Works projects including soil-structure interaction evaluation and design. The reviewer shall also have a working knowledge of the software Mathcad 15, CWALSHT - USACE sheet pile design, CPGA - USACE pile group analysis, CFRAME - USACE frame analysis, CTWALL – USACE cantilever wall analysis, STAAD Pro- Finite element analysis, RISA-3D- Finite element analysis, and Microsoft Excel.

(4) Civil. The reviewer for civil features shall be a registered professional engineer with a minimum MS degree or higher in civil or construction engineering. They shall have a minimum of 15 years experience in the design, layout, and construction of a large urban flood risk management projects to include knowledge regarding levees, interior drainage facilities, earthwork, concrete placement, design of access roads, and relocation of underground utilities. The reviewer must be familiar with USACE regulations and standards.

(5) Mechanical. The reviewer for mechanical features shall be a registered professional engineer with a BS degree or higher in mechanical engineering. Reviewer shall have a minimum of 15 years in mechanical design of pump stations. The Reviewer must be familiar with USACE regulations and standards

(6) Geotechnical. The reviewer for geotechnical features shall be a registered professional engineer with a minimum BS degree or higher in civil or geotechnical engineering. Reviewer shall have a minimum of 15 years experience in subsurface investigations, floodwall and levee design, seepage and slope stability evaluations, erosion protection design, and construction and earthwork construction. The reviewer must be familiar with USACE regulations and standards.

(7) Electrical. The reviewer for electrical features shall be a registered professional engineer with a BS degree or higher in electrical engineering. Reviewer shall have a minimum of 15 years in electrical design of pump stations. The reviewer must be familiar with USACE regulations and standards.

c. **Documentation of Type II IEPR.** Dr Checks review software will be used to document IEPR comments. Panel comments should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 5 above. The IEPR team will prepare a final Review Report that will accompany the publication of the final implementation document and shall:

- 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.

The MSC Chief of Business Technical Division will approve the final report. After receiving the report from the panel, the District Chief of Engineering and Construction Division shall consider all comments contained in the report and prepare a written response for all comments and note concurrence and subsequent action or non-concurrence with an explanation. The District Chief of Engineering and Construction Division shall submit the panel's report and District responses to the MSC for final MSC Commander approval and then make the report and responses available to the public on the District's website.

6. REVIEW SCHEDULES AND COSTS

a. **ATR Schedule and Cost.** The estimated cost per ATR is $20,000. The ATR will occur at 95% P&S design submittal following this review plan. The first ATR has not been scheduled at this time, but will occur at 95% P&S submittal for the relief wells design, currently scheduled for FY13. The comment resolution meeting will be held via teleconference.

b. **Type II IEPR Schedule and Cost.** The IEPR costs are paid from Project funds. Milestones to consider for a Type II IEPR (SAR) are the record of final design in the Design Documentation Report; the completion of the plans, specifications, and cost estimate; the midpoint of construction for a particular contract, prior to final inspection, or any critical design or construction decision milestone. The IEPR schedule is established by the RMO in conjunction with the District (PM and PDT). Type II IEPR (SAR) has not been scheduled at this time, but will be coordinated with the RMC. Type II IEPR for the relief well design is anticipated to occur in FY13 at an estimated cost of $60,000.

7. PUBLIC PARTICIPATION

The approved Review Management Plan will be posted on the District public website. There is no formal public review for the DDR, plans and specifications and construction phases. However, the cost share partners, Metro East Sanitary District and Southwest Illinois Flood Protection District, will have opportunities to review the DDR, plans and specifications and construction phases as part of the PDT. Monthly meetings will be held with personnel from the Sponsors.

8. REVIEW PLAN APPROVAL AND UPDATES

The Mississippi Valley Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the implementation document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

9. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- *Tracey Kelsey, St. Louis District Project Manager, 314-331-8477*
- *Philip Hollis, Mississippi Division Program Manager, 601.634.5293*
- *Tom Bishop, Risk Management Center, 303.963.4556*

ATTACHMENT 1: TEAM ROSTERS

Project Delivery Team

A complete listing of the project delivery team can be found in the Project Management Plan

Vertical Team

The Vertical Team consists of members of the HQUSACE and CEMVD Offices. The Vertical Team plays a key role in facilitating execution of the project in accordance with the PMP. The Vertical Team is responsible for providing the PDT with Issue Resolution support and guidance as required. The Vertical Team will remain engaged seamlessly throughout the project via monthly telecons as required and will attend In Progress Reviews and other key decision briefings. The CEMVD District Liaison is the District PM's primary Point of Contact on the Vertical Team.

DQC Roster

Team Member	Area of Expertise	Contact Information
TBD	Civil Engineering	
TBD	Geotechnical Engineering	
TBD	Mechanical Engineering	
TBD	Electrical Engineering	
TBD	H&H Engineering	
TBD	Structural Engineering	

ATR Roster (ATR Roster will be determined by size and complexity of product)

Recommended Agency Technical Review Panel		
NAME	DISCIPLINE	Education & Experience
TBD	ATR Team Leader/Civil, P.E.	BS in Civil Engineering, 15+ years experience in the civil design and construction of levees
TBD	Getotechnical, P.E.	BS in Civil/ Geotechnical Engineering, 10+ years experience in the geotechnical design and construction of levees
TBD	Hydrology and Hydraulics, P.E.	BS in Civil/Hydraulic Engineering, 10+ years experience in the hydrology and hydraulic design
TBD	Mechanical, P.E.	BS in Mechanical Engineering, 10+ years experience in mechanical design
TBD	Electrical, P.E.	BS in Civil/Hydraulic Engineering, 10+ years experience in electrical design
TBD	Structural Engineer	BS in Structural Engineering, 10+ years experience in the structural design and construction of levee enclosure structures

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *East St. Louis, Illinois Flood Protection Project*. 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[sm].

Reviewers:

_____ Date

(Name, ATR Team Leader, *Office Symbol/Company)*

_____ Date

Nathan Snorteland
Director, Risk Management Center
CEIWR-RMC

Project Deliver Team Members:

_____ Date

(Tracy Kelsey, Project Manager, CEMVS-PM-N)

_____ Date

(Name, Techincal Manager, *Office Symbol)*

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:

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

_____ Date

(Name, Chief, Engineering Division, *Office Symbol)*

ATTACHMENT 4: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 5: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
Home District/MSC	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
ITR	Independent Technical Review	SAR	Safety Assurance Review
LRR	Limited Reevaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act