

PROJECT REVIEW PLAN

MANHATTAN KANSAS LOCAL PROTECTION Flood Risk Management Feasibility Study

Kansas City District

Program Code = 013394

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**US Army Corps
of Engineers ®**

**REVIEW PLAN
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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of review for the feasibility report on the Manhattan Kansas Local Protection, Flood Risk Management Feasibility Study.

b. References

- 1) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 2012
- 2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- 3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- 4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- 5) City of Manhattan Kansas Levee Unit Feasibility Study Project Management Plan (PMP)
- 6) Kansas City District Quality Management System Program Management Plan, 3 Jan 2011
- 7) Northwestern Division Quality Management Sys. Program Management Plan, 28 Sep 2010

c. **Requirements.** This review plan was developed in accordance with EC 1165-2-214, 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 four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the review effort described in this Review Plan is the Flood Risk Management PCX.

The RMO will coordinate with the Cost Engineering Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The RMO will be the Risk Management Center in future implementation phases and if/when Type II IEPR begins.

3. STUDY INFORMATION

- a. **Decision Document.** This review plan is for the Manhattan Kansas Local Protection Feasibility Study. This study, which is more specifically a Section 216 feasibility study (FS), will produce the final Feasibility Report. The report will contain the feasibility investigations, findings, and recommended plan for reliability improvements to the existing Manhattan Kansas local protection project. The final report requires MSC, HQUSACE, and Chief of Engineers approval to enable a Chief of Engineers Report transmittal to Congress. Congressional authorization is then needed to move forward with any recommended construction project. It is anticipated at this time that an Environmental Assessment will accompany the final report and provide the supporting environmental and NEPA documentation for any recommended Federal action.
- b. **Study/Project Description.** The U.S. Army Corps of Engineers Kansas City District (CENWK) and the local project sponsor (City of Manhattan Kansas) are conducting a feasibility study of the existing local protection project which serves a highly-developed area around downtown Manhattan, Kansas. This is a single purpose study focusing on flood risk management. The existing Manhattan Kansas local protection project is comprised primarily of one levee unit and associated appurtenances. The levee unit withstood the Flood of 1993, but some elements of the system were seriously challenged as the flood crested. This event raised a concern that the levee may provide less than the authorized benefits for which it was designed.

The City of Manhattan is located in central Kansas, and lies at the confluence of the Big Blue River and the Kansas River. The Big Blue River is on the east side of the downtown area and connects to the Kansas River on the southeast side of the city. The Manhattan levee unit is located generally west and north of the confluence of the Big Blue River and the Kansas Rivers, and is approximately 28,850 feet long. The levee was typically constructed with a 10-foot crown width and three horizontal to one vertical (3H: 1V) embankment slopes. A limited number of major structural features are associated with this levee.

The Corps of Engineers Tuttle Creek Lake is situated just to the north of Manhattan with the Big Blue River flowing into and out of Tuttle Creek Lake. Tuttle Creek is a major lake in the Kansas River basin system of lakes, which are critical to the Corps' flood risk management mission for both the Kansas and Missouri Rivers.

The City of Manhattan, Kansas owns and operates the Manhattan Kansas local protection project and is the local sponsor for this feasibility study. The City serves as the primary local point of contact for all community-related matters regarding this study. City staff work with the Corps of Engineers study team members on a routine basis and ensure that City and local considerations are taken into account as the study progresses.

The FS will update and verify data on the level of flood risk management provided by the existing project, and as warranted, will develop alternative plans for increasing the reliability of the existing project. The current estimated costs for an early array of cost-shared alternative plans ranges between \$15 million to \$40 million. Plans will be technically viable, economically feasible and environmentally acceptable.

- c. **Factors Affecting the Scope and Level of Review.** This section points out significant elements of the project that will affect the review of the decision document.

- 1) The existing local protection project works in tandem with the Corps' Tuttle Creek Lake which lies just to the north and upstream on the Big Blue River. The reservoir performance under flood conditions and especially the associated lake releases are considered within this study.
- 2) The City of Manhattan lies within the confluence of two major rivers, the Big Blue River and the Kansas River, both of which have a history of multiple and sometimes catastrophic flooding. A number of Corps projects have provided some regulation of these rivers in the mid-twentieth century and this has resulted in reduced flooding risks to the Manhattan area.
- 3) Residual risk: A close examination of the current existing residual flood risk, and any future with-project (with reliability improvements) residual risk is critical to a complete understanding of the before-and-after risk profile of the study area. The study will seek to determine an appropriate level of tolerable residual risk for any reliability improvements, but it is unlikely to produce solutions which will eliminate such risks.
- 4) Life Safety Risk: A significant risk of loss of life arises from very large flood events which could overwhelm the existing local protection project.
 - o The land area within the levee unit is almost completely developed and exhibits intense commercial, governmental and industrial uses accompanied by an extensive residential population located generally near the outer reaches of the current protection. Should a flood event occur during business hours, the potential for loss of life may be greater, but regardless of the timing, a life safety threat would exist for a significant portion of the city's population.
 - o Life safety may be affected by any one of these flood-related variables: depth of floodwaters, velocity of floodwaters, proximity of the affected population, flood warning time, extent of prior evacuation planning, and the level of evacuation support and assistance available at the time of the flood event. The Kansas and Big Blue Rivers are gauged, regulated to some extent, and regularly forecasted. This normally results in more than one day of warning time for large flood events. The study area has multiple evacuation routes which are normally sufficient to allow the population to exit the floodplain if warnings are promptly heeded.
 - o The District Chief of Engineering has reviewed and concurs with this Review Plan's assessment and presentation of life safety risk. Further review and assessment of life safety risk will be conducted in future design phase efforts and will be a primary consideration of IEPR.
- 5) Construction risk: Any modification of the existing local protection project must maintain at least the performance of the existing features throughout the construction period. Emergency response plans must be prepared, monitored and executed properly as any adverse conditions unfold.
- 6) The Governor of Kansas is not likely to make a request for a peer review by independent experts. The project has not yet and is not anticipated to cause a major public dispute. Significant interagency interest is not foreseen at this time.
- 7) No novel methods or materials are proposed to be implemented. The report is not anticipated to contain influential scientific information nor be a highly influential scientific assessment.
- 8) There are no identified scarce or unique cultural, historical, or tribal resources in the immediate project footprint. The project area is a highly urbanized for the most part, and the implementation of proposed modifications is not anticipated to significantly impact cultural assets, nor fish and wildlife resources and habitat.
- 9) This feasibility report is not anticipating future designs that require redundancy. Due to the dynamic nature of flooding events, flood risk management projects must be resilient and robust. No unique construction sequencing is anticipated.

- d. **In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The sponsor has not provided, nor is the sponsor expected to provide any in-kind products.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, 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 Kansas City District will manage the DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and Northwestern Division.

- a. **Documentation of DQC.** The DQC team will use the standard USACE tool and internet-based DrChecks to comment, evaluate, and resolve issues identified during reviews. The review by the DQC team will be available to the ATR team to reference.
- b. **Products to Undergo DQC.** The DQC team will review alternatives, recommendations, and cost estimates in the final screening of alternatives within the planning process. DQC will continue with final economic analysis, supporting engineering and technical appendices, and the feasibility report documentation to include the environmental assessment.
- c. **Required DQC Expertise.** The following disciplines are and will be involved in DQC:
 - 1) H&H
 - 2) Structural
 - 3) Geotechnical
 - 4) Economics
 - 5) Environmental/NEPA specialties
 - 6) Plan Formulation
 - 7) Civil / Site Engineer
 - 8) Cost Estimating
 - 9) Real Estate Specialists

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents including supporting data, analyses, etc. 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 and conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. The ATR team lead is from outside the home MSC. The ATR team lead and the Louisville District was identified as the primary source for ATR support early in the study. Additional team members may be added from other Districts as needed.

- a. **Products to Undergo ATR.** Specific products that have or will undergo ATR as the study progresses.
 - 1) Engineering analysis (engineering appendices)

- 2) Alternative Formulation Briefing (AFB) documentation
- 3) Selected plan cost estimate
- 4) Draft and final Feasibility Reports and associated environmental documentation.

b. Required ATR Team Expertise. The ATR team will have at least one subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis and written communication of risk and uncertainty. The following disciplines will be represented on the ATR team.

ATR Team Members/Disciplines	Expertise Required
ATR Lead – <i>May be combined with Plan Formulation</i>	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Plan Formulation	The Planning reviewer should be a senior water resources planner with knowledge of current flood risk management planning and policy guidance, and have extensive experience in plan formulation for flood risk management projects especially those that involve levees in urban areas.
Risk Analysis	The Flood Risk Analysis reviewer will be experienced with performing and presenting risk analysis in accordance with ER 1105-2-101 and other related Corps of Engineer guidance, including familiarity with how information from various disciplines involved in the analysis interact and affect the study results.
Economics	Team member will have extensive experience in related flood risk management projects, and have a thorough understanding of HEC-FDA.
Hydrology and Hydraulic (H&H) Engineering	Team member will need extensive H&H experience (15 years or more) and must be considered an expert in both hydrology and hydraulics. The reviewer must be familiar with large basin hydrology modeling, reservoir discharge-frequency evaluation, the geometry and layout of urban levee systems and the effects of levees on water surface profiles around confluence areas of major rivers. This team member must have experience in the application, evaluation, and modeling of both structural and nonstructural flood risk management measures including levee system layout and modifications, flood warning systems and flood proofing; and must have experience in both computer modeling using HEC-RAS and the necessary H&H contributions to HEC-FDA risk and uncertainty evaluation.
Geotechnical Engineering	Team member will have extensive experience in levee & floodwall design, post-construction evaluation, and rehabilitation. This is a critical ATR team member, and a certified professional engineer is recommended with a minimum of 10 years experience.

Civil Engineering / Site Utilities Relocations	Team member will have experience in utility relocations, positive closure requirements, pump station analysis, and internal drainage for levee construction. A certified professional engineer is suggested.
Structural Engineering	Team member will have a thorough understanding of levee, flood wall, and retaining wall design, and structures typically associated with levees (pump stations, gatewell structures, utility penetrations, stoplog & sandbag gaps, and other closure structures). A certified professional engineer is recommended.
Cost Engineering	Team member will be familiar with cost estimating for similar projects. Team member will review only on the selected plan, not the entire suite of formulated alternatives, as presented by the PDT in the latest version of MCACES, which is MIII. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. These efforts will be coordinated with Cost Engineering Mandatory Center of Expertise at the Walla Walla District.
Real Estate	Team member will be familiar with necessary components in a real estate plan for an urban flood risk management project involving structural and nonstructural approaches. An understanding of the use of a gross appraisal in the screening process is essential.
Environmental/NEPA	Team member will be familiar with environmental laws, policies, requirements and procedures, habitat assessment, and the potential impacts typical of large flood risk management features on the natural environment.
Other disciplines/functions	<p>ATR team leader will determine if other review disciplines are needed for this study. Such disciplines might be: Construction Operations, Cultural Resources or Hazardous/Toxic Waste.</p> <p><i>Note that legal review is not under the purview of the ATR Team Leader but is instead responsible to the Corps of Engineers Office of Counsel chain-of-command.</i></p>

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.

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 (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for 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:

- 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 Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

Generally IEPR may be required for decision documents under certain circumstances. 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. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project

implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels 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. Type II IEPR reviews will consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

Decision on IEPR. Type I IEPR is deemed appropriate for this study based on the risk to life safety associated with the existing Manhattan Kansas Local Protection Project and the potential for the study to recommend modifications thereto. The study will benefit from a Type I IEPR that independently considers whether the recommendations take a reasonable route towards the proper management of residual flood risk in the Manhattan Kansas area. Note that:

- 1) The study team anticipates that Type II IEPR will be required during PED phase, and
- 2) Thus the Type I IEPR panel shall consider certain Safety Assurance aspects during their review per EC 1165-2-214, Appendix D, paragraph 2.c.(3).

a. Products to Undergo Type I IEPR. The draft Feasibility Report will undergo Type I IEPR. An IEPR contract will be coordinated through the PCX and awarded to an Outside Eligible Organization (OEO) in accordance with Corps policies. The IEPR panel will be selected and managed by the OEO per EC 1165-2-214. The IEPR panel will be identified and then expected to conduct a project site visit near the start of their review.

b. Required Type I IEPR Panel Expertise. The IEPR panel will need to include five individuals representing expertise in Civil Works planning, river biology/ecology/ NEPA, hydrologic/hydraulic engineering, geotechnical/structural engineering, and civil engineering/construction.

IEPR Panel Members/Disciplines	Expertise Required
Civil Works Planner	The Civil Works planning panel member should have experience and credentials in flood risk management problem identification and solution development for major river watersheds and the associated urban areas. This same panel member will need some experience in economic analysis for NED evaluations under Federal Principles and Guidelines. Some familiarity with Corps of Engineers ER 1105-2-100, Planning Guidance Notebook is beneficial.
River Biology/Ecology and NEPA Compliance Expert	The environmental expert panel member should have environmental regulatory expertise in NEPA, CWA, FWCA, and ESA. The environmental panel member should be familiar with mid-western U.S. river ecology and the changes in river function and processes resulting from the implementation of flood risk management measures.

IEPR Panel Members/Disciplines	Expertise Required
Hydrologic and Hydraulic Engineering	The hydrologic and hydraulic engineering panel member should be familiar with large basin hydrology modeling, reservoir discharge-frequency evaluation, the geometry and layout of urban levee systems. Experience in the evaluation of residual and induced damages resulting from implementing flood risk management measures is beneficial.
Geotechnical/Structural Engineering	The geotechnical/structural engineering panel member should have extensive experience in geotechnical evaluation of flood risk management structures including static and dynamic slope stability evaluation, and the evaluation of the seepage through earthen foundations of large urban levees.
Civil Engineering and Construction	The civil/construction engineering panel member should have extensive experience in the design and construction of large earthen structures normally used in flood risk management applications. Ability to review for constructability issues within urban areas and modification of large civil works structures is beneficial.

- c. **Documentation of Type I IEPR.** The IEPR panel comments will be compiled by the OEO and 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 the ATR Section above. The OEO will prepare a final Review Report that will accompany the publication of the final decision 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.
- d. **The final Review Report** will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed during the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and

complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents will be coordinated with the Cost Engineering MCX at Walla Walla District. This MCX will assist in determining the cost engineering expertise needed on the ATR team and Type I IEPR team (if any), and assist in development of the review charge(s). The MCX will also provide the Cost Engineering MCX certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 (Assuring Quality of Planning Models) mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. Note that the use of a certified/approved planning model does not constitute a technical review of the planning product. The selection and application of the model and the use of appropriate input and output data remains the responsibility of the model users and is subject to DQC, ATR, and IEPR.

EC 1105-2-412 does not cover engineering models used in planning studies. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the use of appropriate input and output data remains the responsibility of the model users and is subject to DQC, ATR, and IEPR.

- a. **Planning Models.** The following standard planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Is Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.5a	The PDT is using HEC-FDA for risk-based economic analysis of the existing project conditions and for potential flood risk management measures (EM 1110-2-1619, ER 1105-2-101). The Hydrologic Engineering Center’s Flood Damage Analysis (HEC-FDA) software provides the capability to perform an integrated engineering and economic analysis during the formulation and evaluation of flood risk management plans.	Certified.

- b. Engineering Models.** The following engineering models are being used in the development of the decision document. Where indicated these models have undergone examination by the Corps of Engineers Hydraulics, Hydrology, & Coastal Engineering sub-Community of Practice (HH&C sub-CoP).

Model Name and Version	Brief Description of the Model and How It Is Applied in the Study	Approval Status
Kansas River UNET Model	River flow rates for both the Kansas and Big Blue Rivers are based on output from the Kansas River UNET model. The Kansas River UNET model was developed by the Kansas City District for unsteady flood routing of the daily flows over the period of 1920 to 1997. This model is employed in a manner similar to the (regulated and unregulated) evaluations previously conducted for the USACE Kansas River Hydrology Report (2002) and the USACE Upper Mississippi River System Flow Frequency Study – Appendix E (2003).	HH&C Sub-CoP Allowed for Use
HEC-RAS 4.1	The PDT is using the USACE Hydrologic Engineering Center’s River Analysis System (HEC-RAS) to establish water surface elevations for a range of probable flows for both existing conditions and potential project alternatives. These water surface elevations are generated for both the Big Blue and Kansas Rivers and are eventually used as input to HEC-FDA (<i>see HEC-FDA model above</i>). The model is calibrated and verified to major local flood events.	HH&C Sub-CoP Preferred

10. REVIEW SCHEDULES AND COSTS

- a. ATR Schedule and Cost.** Initial coordination of the ATR process was undertaken near the start of the study and some limited engineering feasibility products have undergone early ATR review at this time. ATR will continue and expand with the following activities planned:
- Feb/Mar 2013 -- ATR Team Lead participates in IPR with HQ-USACE. Specific date TBD by HQ.
 - 30 Aug 2013 -- Complete engineering appendices (interim product) ATR review.
 - 30 Oct 2013 -- Complete pre-AFB documentation (interim product) ATR review.
 - Jan 2014 -- ATR Team Lead participates in AFB with HQ-USACE. Specific date TBD by HQ.
 - Feb 2014 through Jul 2014 -- Review of draft and final Feasibility Reports and any associated cost estimate and engineering reviews. Exact schedule to be determined by AFB results and Project Guidance Memorandum directives. Final ATR sign-off is expected NLT Jul 2014.

The estimated total cost for ATR is \$50,000 to \$75,000.

- b. Type I IEPR Schedule and Cost.** A single round of IEPR will be undertaken for review of the complete draft Feasibility Report and will begin following the Alternative Formulation Briefing in early 2014. The current anticipated cost for IEPR is \$100,000 to \$200,000.
- c. Model Certification/Approval Schedule and Cost.** All planning models used on this study are previously certified and approved.

11. PUBLIC PARTICIPATION

Local involvement occurred to a limited extent during the reconnaissance phase. Feasibility phase public and local agency involvement and participation opportunities are scheduled for early in 2013, and will continue into 2014 with the release of the draft Feasibility Report and environmental documentation for formal public comment. Public comments received on the draft Feasibility Report will be considered and provided to the project reviewers and included in the final Feasibility Report. The public has not been asked to provide nominations for external peer reviewers.

The final Feasibility Report and associated environmental documentation, and the IEPR Review Report and Corps responses will all be made available to the public on the Manhattan Kansas study website supported by the Kansas City District Corps of Engineers.

12. REVIEW PLAN APPROVAL AND UPDATES

The USACE Northwestern Division Commander is responsible for approving this Review Plan. Previous versions and updates predate this requirement. 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 decision document. Like the Project Management Plan, the Review Plan is a living document and may change as the study progresses. The Kansas City District is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) shall 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, shall be posted on the Kansas City District's webpage. The latest Review Plan will also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

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

- Manhattan Kansas FS Project Manager, Planning Branch, USACE Kansas City District, 816-389-3513.
- District Support Planner, USACE Northwestern Division, Missouri River Basin, 503-808-3858.
- Deputy Director, USACE Flood Risk Management National Planning Center of Expertise South Pacific Division, 415-503-6852.

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the decision document for Manhattan Kansas Local Protection feasibility study. The ATR was conducted as defined in the project’s Review Plan to comply with the requirements of EC 1165-2-214. 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 DrCheckssm.

Roger Setters ATR Team Leader CELRL	Date
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G. Lamar McKissack Jr. Project Manager CENWK-PM-PF	Date
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Eric Thaut Review Management Office Representative CESPD-PDS-P	Date
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CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

SIGNIFICANT CONCERNS WILL BE SUMMARIZED HERE FOLLOWING THE ATR.

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

Dave Mathews Chief, Engineering Division CENWK-ED	Date
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Jennifer Switzer Chief, Planning Branch CENWK-PM-P	Date
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ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS (as used in this document).

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
AFB	Alternative Formulation Briefing	MCX	Mandatory Center of Expertise
ATR	Agency Technical Review	MSC	Major Subordinate Command
CENWK	Kansas City District, US Army Corps of Eng.	NED	National Economic Development
CoP	Community of Practice	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	NER	National Ecosystem Restoration
CWA	Clean Water Act	NWD	Northwestern Division
DQC	District Quality Control/Quality Assurance	NWK	Kansas City District
EA	Environmental Assessment	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
EC	USACE Engineer Circular	OEO	Outside Eligible Organization
EIS	Environmental Impact Statement	PCX	Planning Center of Expertise
EM	USACE Engineer Manual	PDT	Project Development Team
ER	USACE Engineer Regulation	PMP	Project Management Plan
FRM	Flood Risk Management	RMC	Risk Management Center
FS	Feasibility Study	RMO	Review Management Organization
Home District/MS	The District or MSC responsible for the preparation of the decision document	SAR	Safety Assurance Review
H&H	Hydrologic and Hydraulic Engineering	UNET	Unsteady Open Channel Flow Simulation Model
HEC-FDA	Hydrologic Engineering Center's Flood Damage Analysis model	USACE	U.S. Army Corps of Engineers
HEC-RAS	Hydrologic Engineering Center's River Analysis System	WRDA	Water Resources Development Act
HQUSACE	Headquarters, U.S. Army Corps of Engineers		
IEPR	Independent External Peer Review		
IPR	In-Progress Review		