

REVIEW PLAN

Sparks Arroyo Colonia,
El Paso County, Texas
Feasibility Study

U. S. Army Corps of Engineers
Albuquerque District

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US Army Corps
of Engineers ®

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1. PURPOSE AND REQUIREMENTS

- a. Purpose.** This Review Plan defines the scope and level of peer review for the feasibility study for Sparks Arroyo Colonia, in El Paso County, Texas (Sparks Arroyo Study).
- b. References**
- (a) Engineering Circular (EC) 1165-2-214, Civil Works Review 15 Dec 2012
 - (b) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
 - (c) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
 - (d) ER 1105-2-101, Risk Analysis for Flood Damage Reduction Studies, 3 January 2006
 - (e) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
 - (f) Engineering Manual (EM) 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies, 1 August 1996
 - (g) QMS 02500-SPD, Preparation and Approval of Review Plans
 - (h) QMS 02500.1-SPD, Supplemental Review Plan Checklist
 - (i) Sparks Arroyo, El Paso County, TX Feasibility Project Management Plan
- 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 USACE 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 1165-2-209) 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 peer 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. Sparks Arroyo Study is a single purpose study.

3. STUDY INFORMATION

- a. **Decision Document.** The purpose of the study is to investigate potential solutions to the flooding problems in the Sparks Arroyo Study area of El Paso County, Texas, adjacent watersheds, and in the Rio Grande valley. The decision document for the Sparks Arroyo Study will be an integrated Feasibility Report / Environmental Assessment and will present planning, engineering, environmental and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the recommended plan. Ultimate approval of the Decision Document will be with the Chief of Engineers for recommendation of a project to Congress for authorization. The feasibility phase of this project is cost shared 50/50 with the project sponsor, El Paso County, Texas.

It is anticipated that while this study will be challenging and beneficial, it will not be novel, controversial or precedent setting, nor have significant national importance. However, an Environmental Assessment (EA) will be written and this project study will require an IEPR since the total project cost is estimated to be in excess of \$45 million.

- b. **Study/Project Description.** This single purpose study will focus on flood risk management alternatives south east of the City of El Paso, Texas in the Sparks Arroyo Study area of El Paso County, as well as adjacent watersheds from the headwaters of the Sparks Arroyo near Horizon City, southwest to the Rio Grande Valley bottom and associated drains near the City of Socorro, Texas (Figure 1). Preliminary analyses were completed during the reconnaissance study to establish Federal interest and to determine the need for additional investigations. The Sparks Arroyo Study was rescoped to comply with the SMART Principles in November 2012 and the Alternatives Milestone Conference was conducted in February 2013.

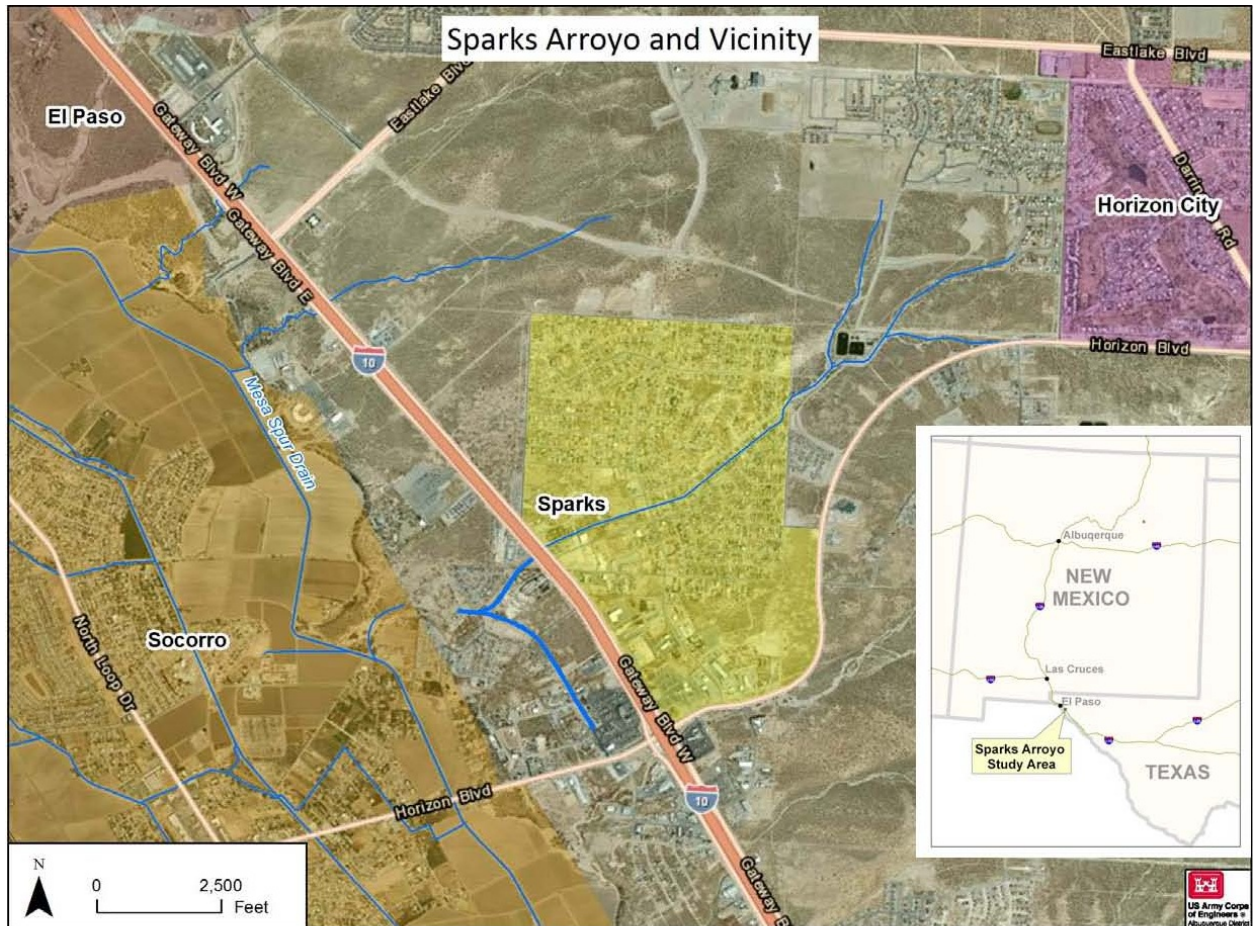


Figure 1 – Sparks Arroyo Study Area

Flooding in the study area is characterized by flash flooding during heavy rain from summer monsoon or tropical systems originating in the Gulf of Mexico. Flash flood flows cause damage as they run off the high mesas in the upper areas of Sub-Basin A and Sparks Arroyo Watershed into the flat valley bottom (Figure 2). The flat mesa topography terminates at steep bluffs that descend to the historic Rio Grande valley. Flow down the bluffs is guided by natural arroyos that descend nearly 250 ft in elevation over approximately 2.5 miles. The flood flows continue southwesterly through residential areas, commercial properties, then under I-10 discharging into the valley bottom. Land use in the valley bottom is residential and agricultural. The valley bottom is very flat and flood flows are now diverted from historic flow paths to the Rio Grande due to a levee system. Flood flows entering the valley and intercepted by the levee system are eventually conveyed to the Rio Grande via irrigation drains. The capacity of these drains is not sufficient for all local storms. The heavy summer monsoon rainfall on the mesas or on the local area also results in flooding in the valley bottom. Flood depths of several feet in the valley bottom occurs causing significant damages.

Damages in the form of flooding, erosion, and sedimentation have occurred along the mesas, arroyos and valley bottom. Velocities of flash floods are a threat to life safety near arroyo channels and at low water crossings. High velocity flows and extreme sediment deposition occur in residential neighborhoods at the mouth of some arroyos and finally, pooling of floodwater causes damages to structures and infrastructure in the valley bottom.

El Paso County owns and operates a Waste Water Treatment Plant (WWTP) within the Sparks Arroyo Study area. The main facility is located between 2 forks of the Sparks Arroyo and is vulnerable to high flows from either tributary (Figure 2). Because of the WWTP's close proximity to Sparks Arroyo, any considered water resource plan will need to evaluate impacts to the facility.

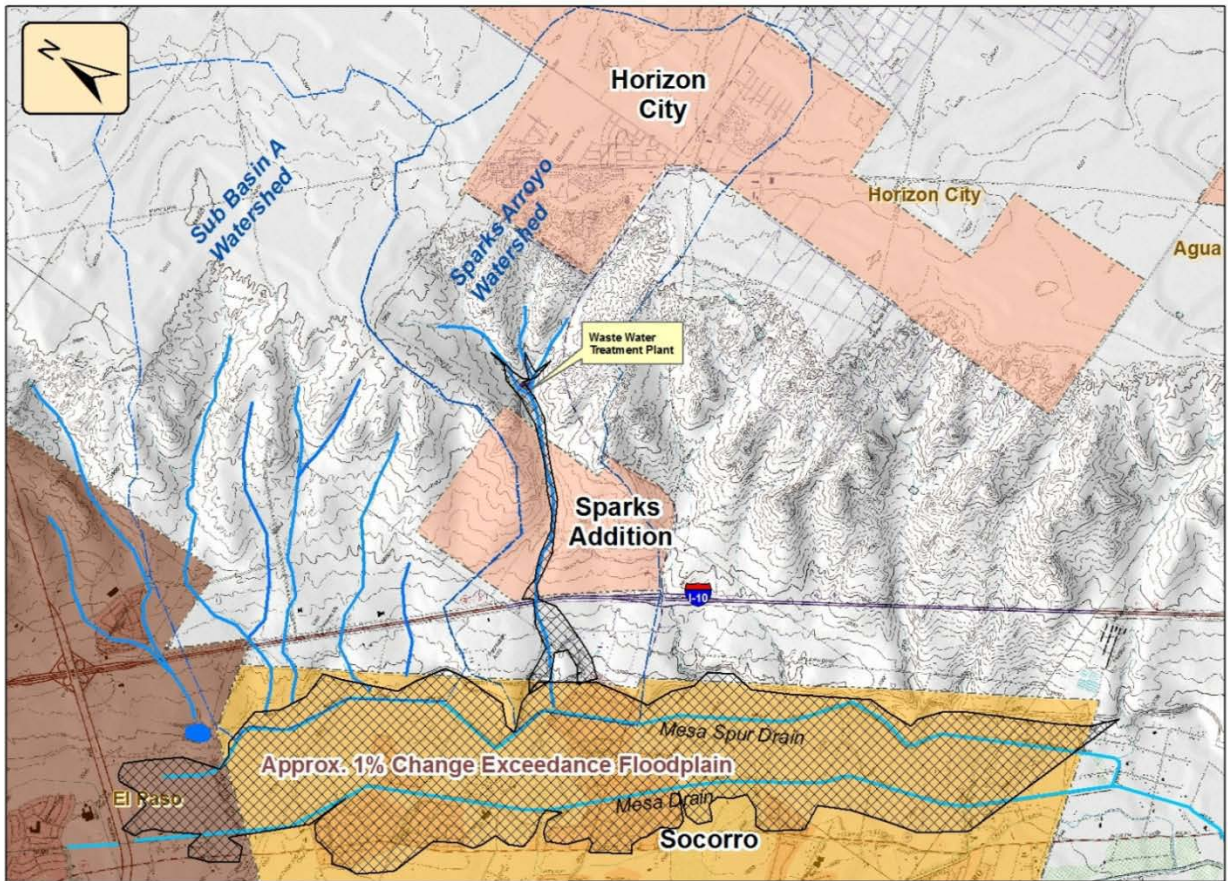


Figure 2: Flows paths in the Sparks Arroyo Study Area

Potential Alternatives:

Preliminary flood risk management measures include channelization, diversions, and detention structures, as well as non-structural measures. The inability to convey water to the river across the nearly flat Rio Grande valley at the mouth of the arroyos is a major constraint to conveyance measures.

c. Factors Affecting the Scope and Level of Review.

This section discusses the factors affecting the risk informed decisions on the appropriate scope and level of review. The project risk register is provided as Attachment 5.

- The Governor has not requested a peer review by independent experts;
- Public and agency input will be sought in order to minimize the potential for controversy.
- Uncertainty related to success of the project ultimately will be low to moderate (if the proposed review processes are implemented) because the methods used for evaluating the project are standard and the concept of implementing proposed project features is not innovative;
- The information in the decision document and the anticipated project design is not likely to be based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices.

There is significant risk to public health, safety and property in the project area. Upstream development in Horizon City as well as the unincorporated areas of El Paso County upstream of Interstate 10 (I-10) in the project area, has resulted in increased runoff within Sparks Arroyo and the arroyos in Sub-Basin A. Additionally, development along Sparks Arroyo and the arroyos in Sub-Basin A, as well as within the Rio Grande floodplain, has increased life safety risk and potential damages from flooding to infrastructure such as the El Paso County Waste Water Treatment Plant, residential and commercial structures, agriculture and improvements.

The increase in runoff within the Sparks Arroyo Study area has been accompanied by the movement of sediment within the water courses. Arroyo tributaries have eroded and picked up additional sediments from the upper and middle portions of the watershed as upstream development has occurred. This sediment has been transported along the arroyos and deposited, damaging residential and commercial areas adjacent to the lower arroyo and Rio Grande floodplains especially downstream of I-10.

Flood flows and their associated sediment deposition have contributed to transportation delays on I-10 and frontage roads, North Loop Drive/Horizon Blvd, and local access roads. These impacts have been caused by high flows and sediment deposition.

Additionally, co-mingling flows from multiple adjacent arroyos in the sub-basins of the study area complicates the analysis of effects caused by any one arroyo or FRM

measure. The optimization and efficiency of combinations of up to five retention structures becomes onerous.

This project is considered to have low risk because:

- The Corps has recently and successfully completed studies and projects of this nature that include detention structures and improved channels;
- The Sponsor has committed to the project despite a long study period and two study expansions; and
- The study area is not environmentally sensitive due to the absence of endangered species or high value wildlife habitat.

Some Project risk exists due to life safety risk considerations:

- Life safety risk under existing conditions includes:
 - ◇ The existing configuration of Sparks Arroyo above the Valley Ridge Addition is diverted from its original flow path. Larger rain events cause the water to jump the embankment and return to the original flow path which drops off a dirt embankment approximately 60-feet high into the neighborhood below. Due to the slope of the area, resulting flows have high velocities and pose a risk to people inside some residences as well as anyone caught outside shelter or attempting to flee the area.
 - ◇ There is a risk that in a large rain event the embankment could fail catastrophically adding large amounts of mud and debris to the flood.
 - ◇ Once the water reaches the valley floodplain in Socorro, TX water depths of 2.5 to 3.5 feet occur blocking ingress and egress along roads to the area. Emergency help may not be able to reach the area in the case of fire or a medical emergency until flood waters recede.
- The With-Project life safety risk includes:
 - ◇ Most alternatives include one to five retention structures upstream of residential and commercial structures. The retention structures would be designed to state and/or Corps standards. In this case the dams would be designed to hold the design event and pass the Probable Maximum Flood.
 - ◇ Failure of any one of these structures would exacerbate existing flooding with by introducing a large amount of water to the floodplain in a short time. A single structure may cause 1-2 feet of flooding to the floodplain in Socorro. Any people, residences or vehicles in close vicinities to a structure when it fails may be subject to high velocity flows.
 - ◇ Failure of a dam at the upstream end of Sparks Arroyo would send a large wave of water down the relatively steep hillside. The WWTP as well as one to two rows of houses in the Sparks Addition and portions of Valley Ridge Subdivision would be subject to several feet of water at very high velocities that would likely carry large amounts of sediment and debris.

- ◇ Catastrophic failure of more than one or all dams simultaneously would likely result in flood depths several inches or a few feet higher than the existing condition.

This project study will require Type I and Type II IEPRs due to the life safety risk described above and because the total project cost may exceed \$45 million. The PDT has determined that this study/project:

- Is not expected to be controversial as:
 - ◇ Sparks Arroyo Study does not have significant public dispute or interagency interest because there are no endangered species or high value wildlife habitat present. Risk of flooding may impact I-10 and local roadways.
 - ◇ Land ownership within the project area is private, County, and local municipality.
 - ◇ SPA has experience doing similar types of measures (channels, detention) within El Paso County and along upstream reaches of the Rio Grande.
 - ◇ There is no request by the Governor of an affected state for a peer review by independent experts.
- Is not expected to have adverse impacts on scarce or unique cultural, historic, or tribal resources based on database searches of known sites and surveys performed during the study:
- Is not likely to contain influential scientific information, nor is it likely to be a highly influential scientific assessment. Is not expected to be based on novel methods, does not present complex challenges for interpretation, does not contain precedent-setting methods or models, and will not present conclusion that are likely to change prevailing practices: and
- Does not involve the rehabilitation or replacement of existing hydropower turbines, lock structures, or flood control gates.

The SPA Chief of Engineering has assessed the threat to human life and agrees with the PDT's life safety assessment that IEPR Type I and Type II (Safety Assurance Review - SAR) are warranted.

As a result, DQC, ATR and IEPR will focus on:

- Completeness and compliance of H&H analysis;
- Review of the planning process and criteria applied;
- Review of the methods of preliminary analysis and design;
- Compliance with sponsor, program, National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) requirements;
- Completeness of preliminary design and support documents;
- Spot checks for interdisciplinary coordination.

In accordance with Section 2035 of WRDA 2007, EC 1165-2-214, a Type II IEPR (SAR) shall be conducted on design and construction activities for any flood risk management projects where existing and potential hazards pose a significant threat to human life. The Sparks Arroyo Study is a flood risk management project that will include an environmental assessment and project cost may exceed \$45M. Safety assurance factors must be considered in all reviews for those studies. Prior to preconstruction engineering and design (PED) of the project identified for construction, a PMP will be developed that will include safety assurance review. Safety assurance review will also be accomplished during construction.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include:

- Existing reports and hard data that they contribute to the study / project;
- Assistance during public involvement actions; and
- Assistance during the formulation of alternatives.

Existing reports or data provided as part of the study are subject to peer review requirements.

4. DISTRICT QUALITY CONTROL (DQC)

All decision 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 home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC; product issues identified via DQC should be resolved prior to ATR and IEPR.

a. Documentation of DQC. DrChecks review software will be used to document all DQC 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:

- (a) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (b) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
- (c) 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

(d) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

b. Products to Undergo DQC. The Sparks Arroyo Study will result in an integrated document which includes all of the analyses necessary to satisfy NEPA and USACE requirements. The combined feasibility report and environmental assessment, supporting appendices and any existing, sponsor or contractor products used to inform the alternative analysis and decision to select one alternative will undergo DQC review.

c. Required DQC Expertise.

DQC Team Members/Disciplines	Expertise Required
Planning	The reviewer should have recent experience in reviewing Plan Formulation processes for FRM studies and be able to draw on “lessons learned” in advising the PDT of best practices.
Economics	The reviewer should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the Feasibility phase.
Environmental Resources	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that may impact native species of plants and animals.
Cultural Resources	The reviewer should have extensive Corps’ experience regarding cultural resources on public and tribal lands. They need to be familiar with Department of Defense as well as USACE policies and procedures as they pertain to Corps studies and projects. http://www.usace.army.mil/CECW/Pages/cultural.aspx
Hydrology	The reviewer should have extensive knowledge of hydrology of arid-land, flashy wash systems and the Rio Grande or similar river system. The reviewer should have extensive knowledge of HEC-HMS.
Hydraulic Engineering	The reviewer should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) and Microstation inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.
Geotechnical Engineering	The reviewer should carry a Professional Engineer’s license and have recent experience in the Corps’ design requirements. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered,

DQC Team Members/Disciplines	Expertise Required
	assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.
Civil Engineering	The reviewer should have recent experience in the design and of plans and specifications for detention/retention structures, and channels, to include tie in to natural features.
Cost Engineering	The reviewer should have extensive Corps' experience in the application of scientific principles and techniques to problems of cost estimating, cost control, business planning and management science, profitability analysis, project management, and planning and scheduling.
Real Estate	The Real Estate reviewer should be a senior real estate specialist with experience in flood risk management studies.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, 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 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. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. For each ATR event, the ATR team will examine, as part of its ATR activities, relevant DQC records and provide written comment in the ATR report as to the apparent adequacy of the DQC effort for the associated product or service.

- a. Products to Undergo ATR.** The Spark Arroyo Feasibility Report will be an integrated document which includes all of the analysis necessary to satisfy NEPA and USACE requirements. The Feasibility report and all of the Appendices will undergo ATR review. ATR review of the Hydrologic, Hydraulic and Sediment Analyses will begin prior to initiation of ATR review for the other technical elements in order to verify assumptions from the modeling that are used in development of the hydraulic, economic, environmental and plan formulation analysis. The following products will have ATR conducted:

- Hydrologic, Hydraulic and Sediment Analyses
- Draft Integrated Feasibility Report
- Final Integrated Feasibility Report

Should other products or documents have the need for ATR identified, the PDT will coordinate with the PCX and ATR Lead at least four weeks in advance to prepare for the review of those products.

- b. Required ATR Team Expertise.** An ATR Leader shall be designated for the review by the FRM-PCX and will come from outside the MSC. The PDT requests that the PCX recommend an ATR Leader and ATR team from district(s) that have experiences in flood risk management projects in large, semi-arid river systems similar to that in El Paso County. In general, the ATR Leader is responsible for providing information necessary for setting up the reviews, to include value engineering, communicating with the Project Manager and Plan Formulator, providing a summary of critical review comments, collecting grammatical and editorial comments from the ATR team, ensuring that the ATR team has adequate funding to perform the review, facilitating the resolution of the comments, and certifying that the ATR has been conducted and resolved in accordance with policy. It is South Pacific Division policy to conduct a value engineering study during the Feasibility phase of the study. The SPA Value Engineering Officer will be responsible for leading the value engineering study. Further the ATR will be coordinated with the Cost Engineering MCX. The ATR Leader will review the draft and final reports to determine if there is substantial new information that requires further review prior to ATR certification.

Note: SPA reserves the right to nominate specific reviewers by technical discipline.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR Lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The ATR 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).
Planning	The reviewer should have recent experience in reviewing Plan Formulation processes for FRM studies and be able to draw on “lessons learned” in advising the PDT of best practices.
Economics	The reviewer should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the Feasibility phase.
Environmental Resources	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that may impact native species of plants and animals.
Cultural Resources	The reviewer should have extensive Corps’ experience regarding cultural resources on public and tribal lands. They need to be familiar with Department of Defense as well as USACE policies and

ATR Team Members/Disciplines	Expertise Required
	procedures as they pertain to Corps studies and projects. http://www.usace.army.mil/CECW/Pages/cultural.aspx
Hydrology	The reviewer should have extensive knowledge of hydrology of arid-land, flashy wash systems and the Rio Grande or similar river system.
Hydraulic Engineering	The hydraulic engineering reviewer should be an expert in the field of urban hydrology & hydraulics, geomorphology/sediment transport, have a thorough understanding of the dynamics of the open channel flow systems, application of detention / retention basins, effects of best management practices and low impact development on hydrology, non-structural solutions involving flood warning systems, and non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-RAS modeling including the use GIS (ARC-INFO) and Microstation inputs to the model). The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.
Geotechnical Engineering	The reviewer should carry a Professional Engineer's license and have recent experience in the Corps' design requirements for detention/retention structures and levee work. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.
Civil Engineering	The reviewer should have experience in review of plans and specifications for detention/retention structures, and channels, utility relocations, positive closure requirements and internal drainage for levee construction, and application of non-structural flood damage reduction, specifically flood proofing. A certified professional engineer is suggested. Team member will also have a thorough understanding of non-structural measures, levee, flood wall, and retaining wall design.
Cost Engineering	This reviewer will be familiar with cost estimating for similar civil works projects using MCACES. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. A separate process and coordination is also required through the Walla Walla District MX for cost engineering.
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results.
Real Estate	The Real Estate reviewer should be a senior real estate specialist

ATR Team Members/Disciplines	Expertise Required
	with experience with federal civil work real estate laws, policies and guidance. Reviewers should also have experience in flood risk management studies and working with respective sponsor real estate issues.

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:

- (a) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (b) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
- (c) 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
- (d) 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 (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:

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

- 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;
- Identify and summarize each unresolved issue (if any); 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.

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 each ATR event. In addition, an ATR Certification statement signed by District leadership should be completed for the draft report and final report per EC 1165-2-214. A sample Statement of Technical Review and sample ATR Certification is included in Attachment 2.

d. **ATR Strategy**

- **The ATR's will be numbered chronologically based on their intended purpose.**
 - ◇ ATR #1 is the ATR of the hydrologic, hydraulic and sediment analyses
 - ◇ ATR #2 is the ATR for the Draft Integrated Report.
 - ◇ ATR #3 will be the ATR for the Final Integrated Report.
 - ◇ Additional ATRs will be numbered sequentially and titled appropriately as needed.

The PDT and ATRT will provide descriptive titles for the reviews as they are coordinated with the vertical team and PCX in addition to the numbering scheme discussed above. Should other products or documents have the need for ATR identified; the PDT will coordinate with the ATR Lead.

- #### e. **ATR #1: Work products of the hydrologic, hydraulic and sediment analyses.**
- The reviews should be appropriate to the level of risk and complexity inherent to the project, and verify compliance with clearly established policies, principles and procedures, using justified and valid assumptions. Verification shall include review of analysis assumptions; methods, procedures, and material used in the analysis; the appropriateness of the data used; and reasonableness of the results, including whether the product meets the customer's need consistent with law and existing USACE policy.

The Work Product review will consist of DQC and then ATR. DQC will be conducted by qualified reviewers and documented prior to the start of ATR. The ATR team (ATRT) will be composed of reviewers approved by the Communities

of Practice (COP), the FRM-PCX Deputy Director, and the ATRT Lead. The purpose of the Work Product ATR is to validate the completeness of the analyses before initiating Alternative Analyses and additional study efforts which are based on the hydrologic, hydraulic and/or sediment analyses. The list of reviewers will be provided to SPA for inclusion in the Review Plan. See the table below, for the list of DQC and ATRT reviewers for each work product.

Work Product	Reviewer
Hydrologic	
DQC	
ATR	
Hydraulic	
DQC	
ATR	

The Work Product ATR will be documented in a review report. The work products will be documented in one review report. EC 1165-2-214 CIVIL WORKS REVIEW requires a completion of an ATR statement for work products, but does not require a certification statement for ATR of products other than the draft and final comprehensive reports. The Work Product ATR will reduce the level of uncertainty and risk associated with the hydrologic, hydraulic and sediment analyses as they are used to ultimately identify a tentatively selected plan.

- f. **ATR #2: Draft Integrated Report.** The reviews should be appropriate to the level of risk and complexity inherent to the project, and verify compliance with clearly established policies, principles and procedures, using justified and valid assumptions. As decision documents, the draft combined feasibility study and environmental assessment, supporting appendices and any existing, sponsor or contractor products used to inform the alternative analysis and decision to select one alternative will undergo ATR in accordance with Paragraph 9 of EC 1165-2-214. As alternative plans are formulated, the review process will focus on data, assumptions and the engineering, scientific, economic, social & environmental analysis process.
- g. **ATR #3: Final Integrated Report.** The reviews should be appropriate to the level of risk and complexity inherent to the project, and verify compliance with clearly established policies, principles and procedures, using justified and valid assumptions. As decision documents, the draft combined feasibility study and environmental assessment, supporting appendices and any existing, sponsor or contractor products used to inform the alternative analysis and decision to select

one alternative will undergo ATR in accordance with Paragraph 9 of EC 1165-2-214. As alternative plans are formulated, the review process will focus on data, assumptions and the engineering, scientific, economic, social & environmental analysis process.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

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 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.
- a. Decision on IEPR.** Based on the criteria in EC 1165-2-214 and the discussion in Section 3, “Factors Affecting the Scope and Level of Review”, Type I IEPR will be conducted for this study. This project study will require Type I IEPR as it will include existing life safety risk and the estimated total project cost may exceed \$45 million.

IEPR will focus on the formulation of the flood risk management plan. The review panel will be composed of individuals with expertise in arid region riverine systems

ecology, groundwater surface water interactions, geotechnical engineering, hydraulic, hydrologic and sediment modeling. The entire feasibility report with appendices will be provided to the IEPR team. It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers. It is recommended that the panel conduct a site visit if possible. A representative of the panel will attend the Civil Works Review Board.

IEPR will be conducted by a contractor and managed by the FRM-PCX. The FRM-PCX will follow the process established in EC 1165-2-214 in managing the IEPR.

- b. Products to Undergo Type I IEPR** The combined draft feasibility report and environmental assessment, supporting appendices and any existing, sponsor or contractor products used to inform the alternative analysis and decision to select one alternative will undergo IEPR review. The review will take place at the draft report stage, concurrent with public review.
- c. Required Type I IEPR.** The IEPR will be conducted by a contractor and managed by the FRM-PCX. The FRM-PCX will follow the process established in EC 1165-2-214 in managing the IEPR.

Primary disciplines or expertise needed for the review – the IEPR panel may include the same disciplines as the ATR team, but for most studies the makeup of the IEPR panel is a subset of the ATR disciplines and may focus on more specific aspects of the study. Final determination of the review disciplines required for IEPR will be determined later in the study process through consultation between the PDT and ATR team. At a minimum, the IEPR panel will consist of engineering, environmental and economics.

Anticipated reviewers as well as number of reviewers – will be determined by the PDT and ATR team after the ATR process. At a minimum, the Type I IEPR panel will consist of Engineering, Hydrology and Hydraulics, environmental and economics and the Type II IEPR panel will consist of Engineering, Hydrology, and Hydraulics.

Type I IEPR Panel Members/Disciplines	Expertise Required
Economics	The reviewer should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the Feasibility phase.
Environmental	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that may impact native species of plants and animals.
Engineering	The reviewer should have recent experience in the design and

Type I IEPR Panel Members/Disciplines	Expertise Required
	of plans and specifications for levees and river bridges, to include tie in to natural features.
Hydrology	The reviewer should have extensive knowledge of hydrology of arid-land, flashy wash systems and the Rio Grande or similar river system.
Hydraulic Engineering	The reviewer should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.

d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. 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 Section 4.d 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.

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.

e. Products to Undergo Type II IEPR, SAR. This list of products to undergo SAR is preliminary and will be refined as the review plan is updated during the transition from Feasibility Phase to the Planning, Engineering, and Design (PED) phase. The products expected to undergo SAR will be: Detailed Design Reports, Plans and Specifications, and other reports developed during the PED phase.

f. Required Type II IEPR Panel Expertise. This section outlines the number of Type II IEPR panel members expected and briefly describes the expertise that will be represented on the panel. This will be refined as the study moves from the Feasibility phase to the PED phase. The expertise represented on the Type II IEPR panel is similar to those on the ATR team, but is more specifically focused and doesn't involve as many disciplines. The panel includes the necessary expertise to assess the engineering, environmental, and economic adequacy of the PED phase documents as well as during construction as required by EC 1165-2-214,

Appendix E. The PDT has made the initial assessment of the expertise needed based on the PMP and the factors affecting the scope and level of review outlined in Section 3 of the review plan. The Type II IEPR contractor will determine the final participants on the panel. The following table provides the disciplines that will be included on the IEPR team and a description of the expertise required.

Type II IEPR Panel Members/Disciplines	Expertise Required
Engineering	The reviewer should have recent experience in the design and of plans and specifications for levees and river bridges, to include tie in to natural features.
Hydrology	The reviewer should have extensive knowledge of hydrology of arid-land, flashy wash systems and the Rio Grande or similar river system.
Hydraulic Engineering	The reviewer should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.

- g. Documentation of Type II IEPR, Safety Assurance Review.** The SAR review panel will prepare a review report which will be finalized by the District and coordinated with the RMO per EC 1165-2-214, Appendix E.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout 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 shall be coordinated with the Cost Engineering MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the 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 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. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. 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 input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

- a. Planning Models.** The following 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 Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.5 (Flood Damage Analysis)	The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans to aid in the selection of a recommended plan to manage flood risk.	Certified
IWR Planning Suite	USACE Institute for Water Resources (IWR) Planning Suite Decision Support Software assists with the formulation and comparison of alternative plans by conducting cost effectiveness and incremental-cost analysis, identifying the plans which are the best financial investments, and displaying the effects of each plan on a range of decision variables.	Certified

b. Engineering Models. The following engineering 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 Will Be Applied in the Study	Approval Status
HEC-HMS (Hydrologic Modeling System)	Corps approved for assessing and reducing flooding in a watershed to simulate the precipitation-runoff processes of dendritic watershed systems. It implements the risk-based analysis procedures contained in EM 1110-2-1619 to develop hydrology models and determine water usage in the study area.	HH&C CoP Preferred Model
HEC-RAS 4.0 (River Analysis System)	HEC-RAS provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without and with project conditions along the Rio Grande and its tributaries. This model will be used for with project flood stages and levee design.	HH&C CoP Preferred Model
MCACES	This is a cost estimating model that was developed by Building Systems Design Inc. The Army Corps of Engineers began using this model in 1989. This will be used as a tool to determine cost estimates for project alternatives.	Enterprise Model

c. Value Engineering (VE). The PDT used value management knowledge gained from previous projects in the Rio Grande Valley including the Central and Southeast El Paso Flood Risk Management systems. During the plan formulation portion of the feasibility phase, the input will be solicited from the personnel listed in the table shown in Attachment 1, who possess the experience and collective knowledge in development and construction of similar projects.

10. REVIEW SCHEDULES AND COSTS

a. DQC Schedule and Cost

Task	Date
DQC of H&H Analyses	January 2014
DQC of Appendices as Available	
DQC of Draft Document	
DQC of Final Document	

The estimated costs for DQC are as follows:

- H&H Analyses \$2,500
- Milestone Documentation and Technical Appendices \$7,500
- Draft Report \$12,000
- Final Report \$12,000

Total \$34,000

b. ATR Schedule and Cost.

Task	Date
ATR of H&H Analyses	February 2014
ATR of Appendices as Available	
ATR of Draft Document	
ATR Lead Participation in In Progress Reviews (IPR)	
ATR Lead Participation in Tentatively Selected Plan (TSP) Conference	
ATR Lead Participation in Agency Decision Milestone (ADM) Conference	
ATR of Final Document	
ATR Certification	

The estimated costs for ATR are as follows:

• H&H Analyses	\$7,500
• IPR, TSP and ADM	\$5,000
• Draft Report	\$50,000
• Final Report	<u>\$40,000</u>
Total	\$102,500

Cost/Schedule risk analysis and the MCACES will be certified by the Cost Center of Expertise also as part of the ATR.

c. Type I IEPR Schedule and Cost.

Task	Date
Develop IEPR Charge, SOW and IGE	July 2014
A/E Review of IEPR SOW	July-August 2014
Negotiate IEPR Contract	August 2014
Draft Review Documents and Charge provided to OEO	September 2014
Award IEPR Contract	October 2014
USACE/OEO Kickoff meeting with IEPR Panel	October 2014
Review Documents and Charge provided to IEPR Panel	February 2015
IEPR Panel Review and Comment	March – April 2015

Provide IEPR Panel with Public Comments	March 2016
OEO submits IEPR Report to USACE	April 2016
HQ and Congressional Coordination	April 2016
USACE Response to IEPR Report	May 2016
IEPR Panel Back-Check	July 2016

The estimated costs for IEPR are as follows:

• FRM PCX for IEPR Manager	\$10,000 (Cost Shared)
• District Support of IEPR	\$50,000 (Cost Shared)
• IEPR Contract	<u>\$150,000 (Federal Cost)</u>
Total	\$102,500

d. Type II IEPR Schedule and Cost. This IEPR will take place during PED. The IEPR is estimated to cost approximately \$100,000. As additional information becomes available, this Review Plan will be updated.

e. Model Certification/Approval Schedule and Cost. All models are certified or approved for use without further model review. Should any planning models be developed that would need to be certified/approved, this Review Plan will be updated.

f. In-Progress Reviews. To facilitate the study process and to access the vertical team, In-Progress Reviews (IPRs) have been incorporated into the PDTs detailed task schedule. These IPRs are currently scheduled to take place during Plan Formulation of Alternatives, at the Tentatively Selected Plan, at the NED Plan determination and at the draft GRR/SEIS. Additional IPRs may be added to achieve USACE vertical team alignment on particular issues if they are identified.

g. Value Engineering. Value Engineering (VE) studies have not been completed and are expected to cost about \$20,000 for this project. VE studies are anticipated prior to the Alternative review Conference in accordance with CESP R 1110-1-8.

11. PUBLIC PARTICIPATION

In Jan 29, 2009, the PM and the Planner attended a constituent meeting in the city of Socorro, TX. The meeting was held by the neighborhood association at Valley Ridge with the mayor of Socorro and El Paso County Commissioner in attendance. The Corps was invited to present the findings of the initial study and planning to date on the Sparks Arroyo Study.

The public will have other opportunities to participate in this study. Public review of the draft report will begin approximately 1 month after the completion of the ATR process and policy guidance memo. One or more public workshops may be held during the public review period if warranted. Comments received during the public comment period for the draft report will be provided to the IEPR team prior to completion of the final Review Report and to the ATRT before review of the final Decision Document. The public review of necessary state or Federal permits will also take place during this period. A formal State and Agency review will occur concurrently with Headquarters review of the Draft Chief's report. However, it is anticipated that intensive coordination with these agencies will have occurred concurrent with the planning process. Upon completion of the review period, comments will be consolidated in a matrix and addressed, if needed. A comment resolution meeting will take place if needed to decide upon the best resolution of comments. A summary of the comments and resolutions will be included in the document.

Public Comment Action	Estimated Date
Public Meetings and Workshops as warranted	March 2016
Public Comments or Questions	30 March 2016 – 12 April 2016

The public will have opportunity to provide written comments on the draft EA in March/April 2016.

Release of the draft combined Feasibility Report/EA for public review will occur after issuance of the TSP policy guidance memo and concurrence by HQUSACE. The public for comment period will coincide with finalization of the policy compliance review. Upon completion of the review periods, comments will be consolidated in a matrix and addressed, if needed. A summary of the comments and resolutions will be included in the document.

Tribal coordination has been performed and will continue once a tentatively selected plan is identified. There have also been numerous formal and informal discussions with the County of El Paso, City of Socorro, and the United States Fish and Wildlife Services (USFWS) regarding this project.

12. REVIEW PLAN APPROVAL AND UPDATES

The Albuquerque District's 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 decision 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.

13. REVIEW PLAN POINTS OF CONTACT

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

- Planning Chief, 505-342-3201,
- Review Management Organization: FRM PCX Deputy Director, 415-503-6852
- SPD Reviewer: District Support Team Lead: 415-503-6556

ATTACHMENT 1: TEAM ROSTERS

Project Delivery Team Members

Name	Discipline	Phone
	Economics	505-342-3366
	Hydrology, Hydraulics & Sedimentation [H&H]	505-342-3329
	Cultural Resources	505-342-3671
	Geotechnical	505-342-3469
	Plan Formulation	505-342-3364
	Hydrology, Hydraulics & Sedimentation [H&H]	505-343-6294
	Project Management	505-342-3187
	Cost Engineering	505-342-3111
	Real Estate	505-342-3224
	Environmental Resources	505-342-3264
	Geotechnical	505-342-3317
	Civil Engineering	505-342-3419
	Environmental Engineering	505-342-3331

ATR Team (TBD by FRM-PCX)

Name	Discipline	District	Qualifications/ Experience	Phone

**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 Sparks Arroyo Feasibility General Investigations Report for Sparks Arroyo Feasibility Study, El Paso County, Texas. 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.

SIGNATURE

ATR Team Leader
CESWF-PEC-PF (Tulsa, OK)

Date

SIGNATURE

Project Manager
CESPA-PMC

Date

SIGNATURE

Program Manager, Flood Risk
Management National Planning Center of
Expertise
CESPD-PDS

Date

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.

SIGNATURE

Chief, Engineering Division
CESPA-EC

Date

SIGNATURE

Chief, Planning Division
CESPA-PML

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
4 Dec 2012	Format Update to meet guidance; Schedule and Cost Updates	Whole Document
25 Feb 2014	Format Update to meet guidance; Correct Project Name to match P2; Schedule and Cost Updates	Whole Document

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
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/MSD	The District or MSD 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
MSD	Major Subordinate Command	WRDA	Water Resources Development Act