
**PEER REVIEW PLAN
SANTA CRUZ RIVER FEASIBILITY STUDY
(TRES RIOS DEL NORTE)
LOS ANGELES DISTRICT**

February 2009



**US Army Corps
of Engineers** ®
Los Angeles District

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1. PURPOSE AND REQUIREMENTS

A. Purpose. This document outlines the review plan for Santa Cruz River (Tres Rios del Norte) Feasibility Study. This study was authorized by Section 6 of Public Law 761, dated June 28, 1938 (Flood Control Act of 1938, and a Resolution of the Committee on Public Works and Transportation, U.S. House of Representatives, adopted May 17, 1994 (Docket 2425). The decision document for this study provides specific planning details necessary for approve to design and construct the project.

Engineer Circular (EC) 1105-2-410 (Circular) dated 22 Aug 2008 "Review of Decision Documents" provides the procedures for improving the quality and credibility of U.S. Army Corps of Engineers (USACE) decision documents through an independent review process. It complies with Section 515 of Public Law 106-554 (referred to as the "Data Quality Act "); and the Final Information Quality Bulletin for Peer Review by the Office of Management and Budget (referred to as the "OMB Bulletin. It also provides guidance for the implementation of Section 2034 of WRDA 2007 (P.L. 110-114). This Circular also presents a framework for establishing the appropriate level and independence of review and detailed requirements of review documentation and dissemination.

B. Requirements. All decision documents and their supporting analyses will undergo District Quality Control (DQC) and Agency Technical Review (ATR) and may also require IEPR, to "ensure the quality and credibility of the government's scientific information", in accordance with this circular and the quality management procedures of the responsible command. The Circular addresses review of the decision document as it pertains to both approaches and planning coordination with the appropriate Center. The Circular also requires that DrChecks (<https://www.projnet.org/projnet/>) be used to document all ATR and IEPR comments, responses, and associated resolution accomplished.

The types of technical review are provided below and have been redefined and renamed for consistency with recent legislation and to establish a more comprehensive lexicon. This Circular uses the terms "home district" or "home MSC" to refer to the office that has been assigned responsibility for a study or project and whose commander will sign any recommendations or decision document. Where studies are conducted by non-Federal interests, the "home district" will be the district which has the area of responsibility that contains the proposed project.

(1) **District Quality Control (DQC).** DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). It is managed in the home district and may be conducted by staff in the home district as long as they are not doing the work involved in the study, including contracted and in-kind work that is being reviewed. In-kind products are all subject to DQC and will be incorporated into the report and technical appendixes as appropriate. Products provided in the past have been reviewed and incorporated already. In-kind products remaining to be completed include assessment of cultural resources for the EIS. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. Additionally, the PDT is responsible for a

complete reading of the report to assure the overall integrity of the report, technical appendices and the recommendations before approval by the District Commander. It is expected that the MSC/District quality management plans address the conduct and documentation of this fundamental level of review. DCQ is not covered by this Review Plan.

(2) **Agency Technical Review (ATR).** ATR (which replaces the level of review formerly known as Independent Technical Review [ITR]) is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of a project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), etc.), and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home MSC.

(3) **Independent External Peer Review (IEPR).** This 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. The criteria for application of IEPR are: (1) the total project cost exceeds \$45 million; (2) there is a significant threat to human life; (3) it is requested by a State Governor of an affected state; (4) it is requested by the head of a Federal or state agency charged with reviewing the project if he/she determines the project is likely to have a significant adverse impact on resources under the jurisdiction of his/her agency after implementation of proposed mitigation (the Chief has the discretion to add IEPR under this circumstance); (5) there is significant public dispute regarding the size, nature, effects of the project; (6) there is significant public dispute regarding the economic or environmental cost or benefit of the project; (7) cases where information is based on novel methods, presents complex challenges for interpretation, contains precedent-setting methods or models, or presents conclusions that are likely to change prevailing practices; or (8) any other circumstance where the Chief of Engineers determines IEPR is warranted. IEPR may be appropriate for feasibility studies; reevaluation studies; reports or project studies requiring a Chiefs Report, authorization by Congress, or an EIS; and large programmatic efforts and their component projects. IEPR is managed by an outside eligible organization (OEO) that is described in Internal Revenue Code Section 501(c)(3), is exempt from Federal tax under section 501(a), of the Internal Revenue Code of 1986; is independent; is free from conflicts of interest; does not carry out or advocate for or against Federal water resources projects; and has experience in establishing and administering IEPR panels. The scope of review will address all the underlying planning, engineering, including safety assurance, economics, and environmental analyses performed, not just one aspect of the project.

(4) **Policy and Legal Compliance Reviews** In addition to the technical reviews described above, decision documents will be reviewed throughout the study process for their compliance with law and policy. These reviews culminate in Washington-level 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 Chief of Engineers. Guidance for policy and legal compliance reviews is addressed further in Appendix H, ER 1105-2-100. The technical review efforts addressed in this Circular are to augment and complement the policy review processes by addressing compliance with published Army policies pertinent to planning products, particularly policies on analytical methods and the presentation of findings in decision documents. DQC and ATR efforts are to include the necessary expertise to address compliance with published planning policy.

(5) **Planning Center of Expertise (PCX) Coordination.** The Circular outlines PCX coordination in conjunction with preparation of the review plan. Districts should prepare the plans in coordination with the appropriate PCX and appropriate consultation with the allied Communities of Practice. The MSC Commander's approval of the review plan is required to assure that the plan is in compliance with the principles of this Circular and the MSC Quality Management Plan (ER 5-1-11). The review plans must anticipate and define the appropriate level of review. All reviews are expected to be completed and documented before the District Commander signs the report. HQUSACE policy review will be completed before the draft decision and NEPA documents are released for public review and again before the Chief of Engineers signs his report. To the maximum extent practicable, reviews shall be scheduled and conducted in a manner to avoid or minimize delays in study or project completion.

2. PROJECT DESCRIPTION

A. Decision Document. The purpose of the decision document is to present the results of a feasibility study undertaken to solve a water resources problem in the Tres Rios del Norte area of the Santa Cruz River Watershed. The study is cost shared with the non-Federal Sponsors: Pima County, the City of Tucson, and the Town of Marana. The document will provide planning, engineering, and implementation details of the recommended restoration plan to allow final design and construction to proceed subsequent to the approval of the plan.

B. General Site Description. The Tres Rios del Norte study area is located in the Upper Sonoran Desert in the Santa Cruz River Watershed. The Santa Cruz River headwaters are in the San Rafael Valley in southeastern Arizona. From its headwaters, the river flows south into Mexico before re-entering Arizona about six miles east of Nogales. The river continues northward to Tucson then northwest to its confluence with the Gila River 12 miles southwest of Phoenix.

C. Project Scope. The study area is an 18-mile reach of the Santa Cruz River that extends into northern Pima County. Within the study reach, the Santa Cruz River has confluences with two major tributaries, the Rillito River and the Cañada del Oro. It is from these features that the area derives its name, Tres Rios del Norte (three rivers of the north). The study area is situated within Pima County in the northwestern portion of the Tucson metropolitan area and includes portions of both the City of Tucson and the Town of Marana. Restoration alternatives under evaluation range in cost from \$70-160 million. Groundwater recharge, flood risk reduction, and recreation measures are also being formulated. It is anticipated that the Recommended Plan will include a combination of purposes.

D. Problems and Opportunities. The primary ecosystem problem evident along the study reach of the Santa Cruz River is severe degradation and loss of riparian habitat. While this has occurred to some degree since the late 19th century, it has greatly accelerated in both extent and degree of severity in the last 50 years. Within the study area, it has been estimated that a corridor of 7,000 to 8,000 acres of dense riparian and floodplain riparian fringe habitat existed historically, supported by surface and groundwater flow in close proximity to the river. Increasing withdrawal of surface and groundwater flow to support agriculture and a growing human population gradually changed the Santa Cruz from a river with surface and subsurface flow to a primarily dry channel that flows throughout its length only in response to storm runoff and, most of the year, only in those reaches immediately downstream of effluent outfalls. As a result of this change, stands of native riparian habitat are rare throughout Pima County, particularly in the study area. What remains is in isolated patches, supported entirely by effluent flows, with little physical

connection to nearby habitats. Opportunities to reduce flooding and erosion damages, construct groundwater recharge features, and provide recreation opportunities are also being evaluated. There are potential listed threatened and endangered species and cultural resource sites within and nearby the study area. These are being evaluated and addressed in the EIS.

3. AGENCY TECHNICAL REVIEW PLAN

The District is responsible for ensuring adequate technical review of decision documents. The responsible PDT District of this decision document is the Los Angeles District. The PDT members and their area of expertise are shown in table 1.

Table 1. Project Delivery Team Members

First	Last	Discipline	Phone	Email
Mark	Chatman	Geotech	213-452-3585	Mark.Chatman@usace.army.mil
Chieh	Shih	Hydrology	213-452-3571	Shih.H.Chieh@usace.army.mil
John	Killeen	Archaeology	213-425-3861	John.J.Killeen@usace.army.mil
John	Drake	Project Manager	602-640-2004	John.E.Drake@usace.army.mil
Scott	Estergard	Plan Formulation	602-640-2004	Scott.K.Estergard@usace.army.mil
Phillip	Eng	Cost Estimating	213-452-3744	Phillip.W.Eng@usace.army.mil
Michael	Fink	Environmental Coordinator	602-640-2004	Michael.J.Fink@usace.army.mil
Theodore	Ingersol	Geotech	213-452-3586	Theodore.R.Ingersoll@usace.army.mil
Joseph	Lamb	Economics	213-452-3819	Joseph.J.Lamb@usace.army.mil
Cuong	Ly	Hydraulics	213-452-3566	Cuong.Ly@usace.army.mil
Jay	Pak	Hydrology & Hydraulics	530-756-1104	Jay.H.Pak@usace.army.mil
Steve	Gale	Asset Management	602-640-2004	Steven.R.Gale@usace.army.mil
Christopher	Tu	Design	213-452-3634	Christopher.K.Tu@usace.army.mil

A. General. An ATR Manager from outside of SPD will be designated to lead the ATR process. The proposed scope of work for the ATR Process is provided in Appendix A. In general, the ATR Manager is responsible for providing information necessary for setting up the review, communicating with the Team Leader, providing a summary of critical review comments, collecting grammatical and editorial comments from the ATR team (ATRT), ensuring that the ATRT 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.

B. Team. The ATRT will be comprised of individuals that have not been involved in the development of the decision document and will be chosen based on expertise, experience, and/or skills. It is requested that the ECO-PCX nominate the team members. The members will roughly mirror the composition of the PDT. The ATRT members and their areas of expertise are shown in table 2. The cost engineering team member nomination will be coordinated with the NWW Cost Estimating Directory of Expertise as required.

Table 2. ATR Team Members

First	Last	Discipline	Phone	Email
TBD		ATR Manager/plan formulation		@usace.army.mil
TBD		Civil design		@usace.army.mil
TBD		Biology/NEPA		@usace.army.mil
TBD		Hydraulics/hydrology		@usace.army.mil
TBD		Socio-economics		@usace.army.mil
TBD		Cost engineering ¹		@usace.army.mil
TBD		Real estate/Lands		@usace.army.mil
TBD		Cultural resources		@usace.army.mil
TBD		Geotechnical engineering		@usace.army.mil

¹The cost engineering team member nomination will be coordinated with the NWW Cost Estimating Directory of Expertise as required. The Directory will decide if the cost estimate will need to be reviewed by Directory Staff.

C. Timing and Schedule. This feasibility study began in 2001. Past reviews were conducted in accordance with the SPD Quality Management Plan. As such, the Albuquerque District performed a review of the draft report prior to the Alternative Formulation Briefing in June 2004. Study progress slowed following that milestone due to lack of study funding. Additional policy review will occur in conjunction with completion of the Draft Report in the form of an In Progress Review.

(1) The ATR process for this document followed the timeline below.

Review Milestone	ATR Team Involvement	Scheduled/Actual Date
SPD Planning Milestone F1		August 2001
ATR of Draft F3 Report	X (partial team)	July 2002
SPD Planning Milestone F3/Feasibility Scoping Meeting	X (partial team)	August 2002
ATR of Draft F4 Report	X	May 2004
SPD Planning Milestone F4a/Alternative Formulation Briefing (AFB)	X	June 2004
AFB Policy Memo Issued		August 2004
ATR of Draft Report	X	May 2009
IEPR		May 2009
In Progress Review (IPR)	X	March-April 2009
Public Review of Draft Report		September 2009
Civil Works Review Board (CWRB)	X	December 09
State and Agency Review of Draft Report		January 2010
ATR of Final Report	X	March 2010
Final Report Submission		June 2010

(2) Throughout the study, the team held planning briefings to ensure planning quality. Senior staff and subject matter experts from the PDT District and members of the vertical team attended the briefings and provided comments on the product to date.

4. INDEPENDENT EXTERNAL PEER REVIEW PLAN

A. General. This decision document will present the details of a feasibility study undertaken to solve a water resource problem as described in Section II. An IEPR will be conducted for the following reasons:

- (1) Cost – The total project cost will exceed \$45 Million. Estimated implementation cost is \$70 and 175M.
- (2) Environmental Impact Statement – The study will produce an EIS.

B. IEPR Method. The IEPR will focus on the formulation of the restoration plan and will address river restoration principles, groundwater recharge, hydraulics and hydrology analysis pertaining to bank stabilization and ecology. The review panel will be composed of individuals with expertise in arid region riverine systems ecology, groundwater recharge, geotechnical engineering, hydraulic and hydrology modeling, and effluent water supply. 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.

The IEPR will be conducted by a contractor and managed by the ECO-PCX. The ECO-PCX will follow the process established in EC 1105-2-410 in managing the IEPR.

C. Timing and Schedule. The IEPR will be conducted after ATR and concurrently with the public and agency review of the draft PIR. The IEPR is scheduled to begin January 2009 at an estimated cost of \$100,000. Following is the draft schedule for the IEPR:

Task	Schedule
ECO-PCX Prepares IEPR Scope of Work	March 2009
IEPR Contract Awarded	May 2009
IEPR Review Initiated	May 2009
Final IEPR Report Submitted	June 2009
PDT Submits Clarifying Questions to Contractor	June 2009
Contractor Submits Responses to Clarifying Questions	July 2009

5. PUBLIC AND AGENCY REVIEW

A. Release of the draft document for public review will occur after issuance of the AFB policy guidance memo and concurrence by HQUSACE. Whenever feasible and appropriate, the District will make the draft decision document available to the public for comment at the same time it is submitted for review (or during the review process) and sponsor a public meeting where oral presentations on scientific issues can be made to the reviewers by interested members of the public. ATR and IEPR reviewers will be provided with all public comments.

B. Public review of this document will begin approximately one month after the completion of the ATR process and issuance of the HQUSACE policy guidance memo. The estimated time frame for this review is September 2009. The period will last 30 days. There may be possible

C. The public review of necessary State or Federal permits will also take place during this period.

D. A formal State and Agency review will occur after the release of the final report is approved by the Civil Works Review Board. However, intensive coordination with these agencies will occur concurrently with the planning process. There may be possible coordinating parties' regarding this project but no specific issues have been raised to date.

E. Upon completion of the review period, comments will be consolidated in a matrix and addressed, if needed. A summary of the comments and resolutions will be included in the document.

6. MODEL CERTIFICATION

A. General. Most of the models to be employed in the study have either been developed by or for the USACE.

(1) Engineering Computational Models:

- **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.
- **HEC-FDA:** This model, developed by the Corps' Hydrological Engineering Center, will assist the PDT in applying risk analysis methods for flood damage reduction studies as required by EM 1110-2-1419. This program:
 - Provides a repository for both the economic and hydrologic data required for the analysis
 - Provides the tools needed to understand the results
 - Calculates the Expected Annual Damages and the Equivalent Annual Damages
 - Computes the Annual Exceedence Probability and the Conditional Non-Exceedence
 - Probability
 - Implements the risk-based analysis procedures contained in EM 1110-2-1619
- **HEC-RAS:** The function of this model is to complete one-dimensional hydraulic calculations for a full network of natural and man made channels. HEC-RAS major capabilities are:
 - User interface
 - Hydraulic Analysis
 - Data storage and Management
 - Graphics and reporting

(2) Ecosystem Output Models

- **Arizona Riverine Functional Assessment Tool:** The functional assessment was designed to evaluate the future changes in quantity (acres) and quality (functional capacity) of riverine, wetland and terrestrial riparian strand ecosystems. The

functional assessment tool is based upon a Habitat Evaluation Procedures-like approach to assessing the functional capacity of a wetland using standard wetland assessment protocols typically deployed in the regulatory arena. Referred to as the Hydrogeomorphic Approach or HGM, an assessment model is developed and serves as a simple representation of functions performed by a wetland ecosystem. The functional models developed in HGM define the relationships between one or more characteristics/processes of the wetland ecosystem (or surrounding landscape) and the functional capacity of a wetland ecosystem. Functional capacity is simply the ability of a wetland to perform a function as it compares to the level of performance in reference standard wetlands.

B. Method. In accordance with the EC 1105-2-407, Planning Models Improvement Program: Model Certification, the Engineering models will be approved for use through the SET program.

The HGM methodology has been approved by the Corps for use but the specific application of the Arizona Riverine Functional Assessment Tool is not. This model is considered to be a Class 2 Model or “an existing model that are (or may be) used for multiple ecosystem restoration projects, and has already been subjected to a rigorous peer review of the underpinning theory or computational accuracy, typically through some review process external to the Corps”. In accordance with CECW-CP Memo “Policy Guidance on Certification of Ecosystem Output Models” dated 13 August 2008; the District intends to submit a Model Assessment to the ECO-PCX to substantiate the theoretical soundness and computational accuracy of the model. The ECO-PCX will determine the level of review and certification based on the assessment.

7. PCX COORDINATION

The lead PCX for this document is the National Ecosystem Planning Center of Expertise (ECO-PCX). This review plan will be submitted through the PDT District Planning Chief to the PCX Director, Rayford Wilbanks, for review and eventual concurrence. The ECO-PCX will coordinate with the Flood Risk Management PCX and the Planning Center of Expertise for Water Management and Reallocation Studies. The ECO-PCX will manage the review of the ATRT and the IEPR. The approved review plan will be posted to the Los Angeles District website. Any public comments on the review plan will be collected by the Office of Water Project Review (OWPR) and provided to the PDT District for resolution and incorporation if needed.

A. Points of Contact

Questions about this Review Plan may be directed to Mr. Scott Estergard, Los Angeles District Project Delivery Team Planning contact, at (602) 640-2004, or scott.k.estergard@usace.army.mil or to the Eco-PCX, Ms. Jodi Staebell, at (309) 794-5448, or Jodi.K.Staebell@usace.army.mil.

8. APPROVAL

The PDT will carry out the review plan as described. The Team Leader will submit the plan to the PDT District Planning Chief for approval. Coordination with PCX will occur through the PDT District Planning Chief. Signatures by the individuals below indicate approval of the plan as proposed.

(Note: See attached Approval Memorandum)

Date

Date

Date

Date



DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1399

12 JUN 2009

CESPD-PDC

MEMORANDUM FOR Commander, Los Angeles District, ATTN: CESPL-PD-WA,
Mr. Eduardo Demesa

Subject: Los Angeles District Review Plan Approvals

1. The Review Plans submitted are in accordance with Engineering Circular (EC) 1105-2-410, Review of Decision Documents, dated 22 August 2008, and the South Pacific Division, Planning and Policy Division and Los Angeles District Support Team have reviewed the Review Plans that have been submitted. The South Pacific Division approves the following Review Plans:

- a. Santa Cruz River (Tres Rios Del Norte), Pima County, Arizona, Ecosystem Restoration Feasibility Study. National Ecosystem Planning Center of Expertise (ECO-PCX), Mississippi Valley Division, has reviewed the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC. ECO-PCX concurs contingent on model certification of the Arizona Riverine Functional Assessment Tool will be required.
- b. Little Colorado River at Winslow, Navajo County, Arizona, Flood Risk Management Feasibility Study. The National Flood Risk Management Planning Center of Expertise (FRM-PCX), South Pacific Division, has reviewed the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC.
- c. Agua Fria - Trilby Wash, Maricopa County, Arizona, Flood Risk Management And Ecosystem Restoration Feasibility Study. The National Flood Risk Management Planning Center of Expertise (FRM-PCX), South Pacific Division, has reviewed the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC.
- d. Aliso Creek Mainstem, California, Ecosystem Restoration Feasibility Study. National Ecosystem Planning Center of Expertise (ECO-PCX), Mississippi Valley Division, has reviewed the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC. The ECO-PCX concurs contingent on model certification of the Combined Habitat Assessment Protocols (CHAP) will be required.
- e. San Diego County, California, Shoreline Protection (Oceanside) Feasibility Study. National Coastal Storm Damage Reduction (CSDR-PCX), North Atlantic Division, has review the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC. CSDR-PCX does recommend that additional funding be allocated to IEPR, as the budget in the RP would not be sufficient to address this peer review activity.

f. Carpinteria, California, Storm Damage and Shoreline Protection Feasibility Study. National Coastal Storm Damage Reduction (CSDR-PCX), North Atlantic Division, has review the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC. CSDR-PCX does recommend that additional funding be allocated to IEPR, as the budget in the RP would not be sufficient to address this peer review activity

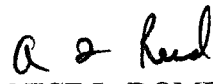
g. San Clemente, California, Storm Damage and Shoreline Protection Feasibility Study. National Coastal Storm Damage Reduction (CSDR-PCX), North Atlantic Division, has review the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC. CSDR-PCX does recommend that additional funding be allocated to IEPR, as the budget in the RP would not be sufficient to address this peer review activity.

h. Pismo Beach, California, Continuing Authorities Program (CAP) 103 Study. National Coastal Storm Damage Reduction (CSDR-PCX), North Atlantic Division, has review the Review Plan (RP) and concurs that the RP satisfies peer review policy requirements outlined in the above referenced EC.

2. With this MSC approval the Review Plans will be made available for public comment via the internet and the comments received will be incorporated into future revisions of the Review Plans. The Review Plans have been coordinated with the applicable Planning Centers of Expertise (PCX).

3. The Review Plans above include independent external peer review.

4. I hereby approve the above Review Plans, which are subject to change as study circumstances require. This is consistent with study development under the Project Management Business Process. Subsequent revisions to these Review Plans after public comment or during project execution will require new written approval from this office.

for 
JANICE L. DOMBI
Colonel, EN
Commanding