



**US Army Corps
of Engineers®**

**LA River Ecosystem Restoration, CA
Preconstruction Engineering and Design Phase**

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LOS ANGELES DISTRICT

SOUTH PACIFIC DIVISION

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Appendix A: Gantt Chart with Cost and Schedule

The US Army Corps of Engineers, Los Angeles District (USACE) and City of Los Angeles, Bureau of Engineering staff have been working cooperatively to define the work to be accomplished under the Preconstruction Engineering and Design (PED) phase of the Los Angeles River Ecosystem Restoration Project (Project). In order to begin the PED phase, USACE and the City of Los Angeles (City) must execute a Design Agreement. The following information is intended to aid the City, Bureau of Engineering, in their preparation of a report to the City Councilmembers for their support in executing the Design Agreement.

1. Work under the Design Agreement

The Design Agreement will govern design activities up through the completion of the first set of Plans and Specifications. This first set of Plans and Specifications will be the design of the first constructed feature of the Project.

The PED phase includes the following:

- a. 100% Design Documentation Report (DDR) and Plans and Specifications (P&S) for a 500-foot-long terraced bank on the west side of the Los Angeles River, at the north end of Reach 8. The exact location will be determined during design.
- b. Initiating long-lead design activities for the restored wetlands and terraced bank at and adjacent to the Los Angeles State Historic Park (a.k.a. Cornfields).

These actions constitute work to be undertaken under the Design Agreement. The approximate location of these features are illustrated in the conceptual rendering in Figure 1-1.

Figure 1-1: Conceptual Rendering of PED Phase of Project



1a. Rationale for Proposed Scope of Activities under Design Agreement

Coordination between USACE and City staff identified the work proposed to be accomplished under the Design Agreement based on funding, schedule, public benefit, existing site conditions, and USACE's initial flood risk considerations. The proposed work provides for achievement of the first set of plans and specifications to complete the PED phase consistent with USACE targets for timing and funding while including other critical work on the design of the second feature (Cornfields) to avoid delays in completion of design and construction of that feature under a future Project Partnership Agreement (PPA).

In accordance with the Integrated Feasibility Report, USACE and the City had planned to undertake design of the Reach 6 features, including Taylor Yard, as the first feature of the Project. However, USACE and City staff identified that the required design costs and time to accomplish the design would be too lengthy and would result in much delay due to limited funding. Federal funds for a PED phase are provided through General Investigations (GI) appropriations rather than Construction General (CG) appropriations. Achievement of plans and specifications for Reach 6 requires substantial hydrologic and hydraulic modeling of all of Reaches 1-6 and other intensive design efforts that would exceed Federal funds typically available from the GI funding line and could take approximately 10 years to complete. In addition, the City indicated its preference that the overall project schedule reflect more time for the City to complete the plan for and undertake required remediation of known hazardous substances at the Taylor Yard site. These factors taken together resulted in the conclusion that certain features in Reaches 7 and 8 could be attainable sooner and should be moved up in the schedule for design.

The team identified that Reaches 7 and 8 can be hydraulically modeled separate from Reaches 1-6 to evaluate flood risk and worked together to identify a location for a visible change to the existing constructed concrete channel bank. USACE and City staff selected a 500-foot section of channel bank in Reach 8 where modeling and design efforts could be completed in a much shorter period of time than Reach 6 would require. Completing the first set of plans and specifications will then allow USACE and the City to enter into a PPA. The specific terraced bank site was selected due to its available construction access, minimal constraints from surrounding infrastructure, and its concrete channel bottom, or invert, which negates the need for scour considerations. The 500 foot long terraced bank design will also inform 2.5 additional miles of terraced bank that is included in the overall project scope for later construction.

USACE and City staff identified the Cornfields feature as the second feature for design and construction. Completion of design of this feature will extend beyond the Design Agreement, but the proposed scope of activities under the Design Agreement includes performing or starting long-lead design activities for this feature necessary to prevent delays in the design and construction of this feature.

2. Cost Share and Project Cost Estimate

This section provides information on the Project cost share and an estimate of required funding.

2a. Cost Share under the Design Agreement

The cost share of the Design Agreement is 50% Federal and 50% non-Federal sponsor (City). USACE guidance indicates that the PED shall be cost shared at the same percentage as construction of the authorized plan. The project cost sharing authorized under WRDA 2016 is 50 percent Federal, 50 percent non-Federal, with the City required to provide all lands, easements, rights of way, and relocations. There are no lands or relocations to be provided by the City during the design phase. The City's share of design costs under the Design Agreement is 50 percent.

2b. Funding Requirements

The current total estimated design cost under the Design Agreement is \$8,100,000. The table in the following section summarizes the cost estimates for each work category. These costs do not include future Project design and implementation costs which will be included in a future Project Partnership Agreement.

COSTS IN \$1,000s						
Work Category / City Fiscal Year	<FY17-18	FY18-19	FY19-20	FY20-21	FY21-22	TOTAL
Design Agreement Execution	150					150
Community Involvement	72	72	72	72	36	324
Preliminary Activities for 500' Terraced Bank	454	1,868	710	360		3392
DDR and P&S for 500' Terraced Bank			590	770	215	1575
Concurrent Activities for Cornfields Feature Design			1,075	175		1250
Project Partnership Agreement (PPA)				100	100	200
Contingency (approx. 17%)	124	330	423	263	69	1209
TOTAL ESTIMATED DESIGN COST	800	2270	2870	1740	420	8,100
COST SHARE						
TOTAL CONTRIBUTION - Federal (50%)	400	1135	1435	870	210	4,050
TOTAL CONTRIBUTION - City of LA (50%)	400	1135	1435	870	210	4,050

3. Major Milestone, Schedule, and Major Activities

The major milestone of the PED Phase is the first set of Plans and Specifications (P&S) for the 500 foot terraced bank in Reach 8. This is scheduled for completion in April 2022. Completion of the P&S allows USACE to enter into a Project Partnership Agreement (PPA) with the City. Execution of the PPA is scheduled after completion of the first set of P&S.

See Appendix A for a Gantt Chart of cost and schedule of activities.

3a. Description of Major Activities

- **Design Agreement Execution:**
 - Execute Design Agreement - The City and USACE will negotiate and sign a Design Agreement in order to initiate the PED phase.
 - Funding Delay: City – this is the expected delay between signing the design agreement and receipt of initial funds from the City.
- **Community Involvement:**
 - Community Meeting Participation – USACE will support community meetings hosted by the City. The budget included in this letter funds participation from three Project subject matter experts for two days per month for the duration of the PED phase. This assumes a half day for preparation, one day for the event, and half day for debrief per person per month.
- **Preliminary Activities for 500 Foot Terraced Bank:**
 - Update Project Management Plan – at the onset of the PED phase, USACE will update its Project Management Plan.
 - City: Provide Bridge As-Built Plans, Design Documentation, and Geotechnical Data Reports – As soon as the design agreement is signed, the City should provide USACE with all available information such as as-built plans of bridges and other existing features within Reaches 7 and 8. Bridge pier dimensions, exploration conditions, final configurations, and other information from a wide variety of projects will support survey work and hydraulic analysis. Additionally, the City should provide all existing geology, geotechnical, and soils engineering reports within and adjacent to the project areas. This includes reports for design or retrofit of bridges, side drains, retaining walls, railroad improvements, and private developments on private properties adjacent to the project. Files to search should include both City and County Departments of Public Works and Building Safety files as well as those of the railroads and any other applicable sources.
 - Asset Management: Right of Entry (500 Foot Terraced Bank Site only) – USACE’s Asset Management Division will request Rights of Entry (ROE) for the 500 foot terraced bank real estate.
 - Survey: Aerial, Ground, and Cadastral (500 Foot Terraced Bank Site only) – USACE’s Survey Section will perform aerial and ground surveying of the terraced bank site. Additionally, a cadastral survey will be performed.
 - City: HTRW Investigation – the 500 foot terraced bank site is not a known HTRW impact site. The City will investigate for HTRW to verify that there is none present. USACE will review the investigation results. If HTRW is

identified, USACE and City will confer on the course of action.

- Hydrology and Hydraulics: Update LA River Hydrology and Local Hydrology Analysis – USACE’s Hydrology Section will determine the peak flow rates for a full suite of annual chance exceedance probabilities and a hydrograph for the design event with the additional years of gage record available since the completion of the 1991 hydrology update, the increased development within the watershed, and upstream reservoirs. The hydrology needs to be updated in order to accurately evaluate the Risk and Uncertainty and make sure the project does not increase flood risk to the surrounding area. The updated hydrology is also needed to get an accurate water balance for the project which is a key component of making the project successful.
- Funding Delay: USACE – a funding delay is included in the schedule due to the expected FY18 funding shortfall. If the Project is funded with FY18 Work Plan funds, this delay will be reduced. This will bring the major milestone (e.g. complete P&S for 500 foot terraced bank) forward.
- Geotechnical: Review Existing Data to Support Initial Design – USACE’s Geotechnical Branch will conduct an initial desktop study of the 500 foot terraced bank site. This will provide information to develop a scope to support the engineering design. This effort will be based on the information provided to USACE by the City and will provide a basis for the required subsurface exploration, testing, and analysis that is needed to support full engineering design.
- Engineering Design: Preliminary Geometries for Reach 7 and 8 – USACE’s Design Branch will develop preliminary geometries of all Reach 7 and 8 features. These CADD drawings are needed as inputs to the successive hydraulic modeling.
- City: 60% Design of Railroad Trestle – the City will provide to USACE a 60% Design of the railroad trestle required for the Cornfields feature. This design will inform the 2D hydraulic modeling. USACE anticipates the City will coordinate with and obtain the design of the train trestle from or in concert with the affected rail owners, and the City will make this design available to USACE. City costs of the design will be creditable to the City as part of its LERRD obligations under the PPA, subject to a crediting review. If the 60% Design is not available, this will delay the 2D hydraulic model completion.
- Hydrology and Hydraulics: 2D Hydraulic Modeling – USACE’s Hydraulics Section will develop three 2D numeric models: 1) existing condition of all 8 Reaches of ARBOR, 2) proposed 500’ terraced bank and Cornfields feature with all other existing conditions, 3) IFR proposed Reaches 7 and 8 with all other existing conditions.
- Hydrology and Hydraulics: Physical Modeling of Terracing – USACE’s Engineer Research and Development Center will build and test physical models of various terracing concepts of the 500 foot terraced bank at their facility in Vicksburg, Mississippi.
- Environmental Resources: All 500 Foot Terraced Bank Site Activities – USACE’s Environmental Resources Branch (ERB) will coordinate with Engineering Division throughout the design phase, review draft designs, and ensure the plant palette can be supported and proposed benefits achieved. ERB will conduct cultural, endangered species, and habitat surveys of the 500 foot

- terraced bank site. Additionally, a cultural resources inventory will be conducted for the entire 11 mile ARBOR Reach per commitments made in the cultural resources Programmatic Agreement (PA) (2015).
- Hydrology and Hydraulics: Overall Hydraulic Design – USACE’s Hydrology and Hydraulics Branch will consolidate findings from their investigations and develop a hydraulic design to inform the Engineering Design.
 - Geotechnical: Boring, Testing, and Reporting – USACE’s Geotechnical Branch will complete its investigations and reporting on the 500 foot terraced bank site. The full extent of this effort will be based on the amount of information provided by the City. However, a preliminary effort of borings, testing, analysis, and reporting have been included in the current budget estimates. Design data collected as part of the physical models discussed above will be included in development of the geotechnical parameters used for design of the terrace features.
 - Hydrology and Hydraulics: Risk and Uncertainty Analysis – USACE’s Hydrology and Hydraulics Branch will conduct Risk and Uncertainty evaluation to ensure there are no adverse impacts to existing hydraulic conditions. This will be done for both Hydrology and Hydraulics.
- **DDR and P&S for 500 Foot Terraced Bank**
 - Engineering Design: DDR and P&S – USACE’s Engineering Design Branch will design civil, landscape, and structural components of the 500 foot terraced bank. Additionally, the Design Branch will conduct a Value Engineering Study, develop and/or update cost estimates, and write Specifications.
 - Environmental Resources: Environmental Compliance and Support to DDR and P&S – USACE’s Environmental Resources Branch (ERB) will continue to coordinate with Engineering Division throughout design. ERB will draft a Supplemental Environmental Assessment (SEA) to comply with NEPA (National Environmental Policy Act)/CEQA (California Environmental Quality Act). The EA will supplement the 2015 EIS/EIR and will document details of the proposed feature and any impacts of the proposed feature that have changed since the completion of the EIS/EIR. ERB will also coordinate with resource agencies regarding design, environmental commitments, and any necessary consultations and/or permits, in compliance with environmental laws and regulations. ERB will draft environmental sections for the DDRs and review draft DDRs and P&S.
 - All Engineering Division: DQC – An independent team from within USACE’s Engineering Division will complete a District Quality Control (DQC) review of the design.
 - All Engineering Division: ATR & SAR – A team from outside of the South Pacific Division will complete an Agency Technical Review (ATR) of the design. A team from outside of the Department of the Army will complete a Safety Assurance Review.
 - All Engineering Division: BCOES Review – the Biddability, Constructability, Operability, Environmental, and Sustainability Review is the final design review and will be completed by USACE’s Construction Division.
 - Ready to Advertise 500-Foot Terraced Bank – this is the major milestone of the PED phase. It is reached when a full set of Plans and Specifications for the 500 foot terraced bank is complete and USACE is ready to advertise a

construction contract.

- **Concurrent Activities for Cornfields Feature**
 - Asset Management: Right of ntry (Cornfields Only) - USACE's Asset Management Division will request Rights of Entry (ROE) for the Cornfields feature real estate.
 - Geotechnical: Review Existing Data to Support Initial Design - Following the information provided by the City, the Geotechnical Branch will provide constraints and considerations associated with the initial design.
 - Survey: Aerial, Ground, and Cadastral (Cornfields Only) - USACE's Survey Section will perform aerial and ground surveying of the Cornfields feature. Additionally, a cadastral survey will be performed.
 - Environmental Resources: All Cornfields Feature Activities - USACE's Environmental Resources Branch (ERB) will coordinate with Engineering Division throughout the design phase, review draft designs, and ensure the plant palette can be supported and proposed benefits achieved. ERB will conduct cultural, endangered species, and habitat surveys of the Cornfields feature site. ERB will also perform preliminary coordination with resource agencies including local Tribes, U.S. Fish and Wildlife Service, and the Regional Water Quality Control Board.
 - Engineering Design: 25% Design - USACE's Design Branch will develop a 25% design of the Cornfields feature. This level of design is needed to inform the successive Physical Hydraulic Model of Cornfields.
 - City: 90% Design of Railroad Trestle - the City will provide to USACE a 90% Design of the railroad trestle required for the Cornfields feature. This design will inform the Physical Hydraulic Model of Cornfields. USACE anticipates the City will coordinate with and obtain the design of the train trestle from or in concert with the affected rail owners,, and the City will make this design available to USACE. City costs of the design will be creditable to the City as part of its LERRD obligations under the PPA, subject to a crediting review.
 - Hydrology and Hydraulics: Physical Model of Cornfields (Start) – USACE's Engineer Research and Development Center will build and test a physical model of the Cornfields feature at their facility in Vicksburg, Mississippi. This activity is for the Hydraulics Section to start this work. The physical model will include the channel from the railroad crossing north of Cornfields to Main St.
- **Project Partnership Agreement**
 - Update Project Management Plan –the City and USACE will update the existing Project Management Plan prior to executing the PPA.
 - Execute PPA - the City and USACE will negotiate and sign a Project Partnership Agreement in order to initiate the construction phase.

4. Requirements for City of Los Angeles

4a. Design Agreement Preparation

- **Legal advisor concurrence** – the City must confirm to USACE that its legal advisor concurs with the draft Design Agreement included in this package and indicate whether it is requesting any optional language regarding obligation of future

appropriations The Los Angeles District indicates sponsor legal advisor concurrence on the checklist it submits to South Pacific Division. The City must also notify USACE of all proposed signatories for the Design Agreement, the Certificate of Authority, and the Certificate Regarding Lobbying, along with any necessary attestation blocks requested to be added to the agreement – these must be provided to the District. The Los Angeles District will update the documents with these signatories and submit them, unsigned, to South Pacific Division. The sponsor should also confirm with its legal advisor that the proposed signatory for the Self-Certification of Financial Capability for Agreement is the chief fiscal officer or equivalent before the certification is signed and submitted to the District. These actions are required to initiate South Pacific Division's review of the Design Agreement.

- **Letter of Intent** – this letter indicates the sponsor's capability and willingness to enter into the Design Agreement. The City must submit to USACE a new Letter of Intent for the Design Agreement. This is required to initiate South Pacific Division's review of the Design Agreement.
- **Self-Certification of Financial Capability for Agreements** – this certificate is signed by the principal fiscal officer. It indicates that the fiscal officer understands the sponsor's obligations per the agreement and verifies that the City has the financial capability to meet its obligations. USACE will submit a prepared, unsigned version with the DA package to South Pacific Division.
- **Certificate of Authority** – this certificate is typically signed by the principal legal advisor indicating that the person signing the agreement has authority to do so. This is signed at the time the City signs the Design Agreement. USACE will submit a prepared, unsigned version with the DA package to South Pacific Division. The City may identify either the principal legal advisor (the City Attorney) or may request the Corps approve the certificate to be signed by the principal legal advisor for the project, such as a deputy or assistant city attorney.
- **Certificate Regarding Lobbying** – this certificate is signed by the person signing the Design Agreement and addresses lobbying. It is signed when the DA is signed. USACE will submit a prepared, unsigned version with the DA package to South Pacific Division.
- **Design Agreement** – the City and USACE will sign this legally binding document to initiate the design phase subsequent to South Pacific Division approval of the agreement. USACE will submit a prepared, unsigned version with the DA package to South Pacific Division.

4b. Design

- **Funding** – funding will be transferred from the City to USACE in accordance with the Design Agreement. Estimated annual funding requirements for the City and USACE are included in paragraph 2b of this memo.
- **HTRW investigations** - the City will investigate for HTRW to confirm that there is none present at the 500 foot terraced bank site. The City's investigation costs are eligible for credit as part of the City's share of design costs.
- **Submittal of Bridge As-Built Plans, Design Documentation, and Geotechnical Data Reports** – the City should provide USACE with available as-built plans of existing facilities, relevant historical technical documents, and geotechnical reports.
- **Submittal of 60 and 90% design of relocated rail line (trestle)** – the City will

provide to USACE the 60% and 90% designs of the at-grade railroad trestle at the Cornfields feature. These designs are required inputs to USACE’s hydraulic models.

- **Coordination with USACE** – coordination meetings will be held as needed to keep both partners informed of the progress of the design. Changes to the cost estimate and schedule will be communicated as early as practicable. Updates to the PMP will be performed as needed.
- **Design Reviews** – the City should perform reviews of USACE design documents and attend review conferences to resolve concerns.
- **Engage Public** – the City should host public engagement meetings as needed and USACE will support these engagements with participation from the Project’s subject matter experts.
- **Project Partnership Agreement** – the City and USACE will negotiate and execute a Project Partnership Agreement at the conclusion of the PED phase. Just as the Design Agreement initiates the design phase, the Project Partnership Agreement initiates the construction phase.

5. Rough Order of Magnitude for Construction of the 500 Foot Terraced Bank

The rough order of magnitude estimate for construction of the 500 foot terraced bank is \$5,200,000. This is based on cost estimates from the Integrated Feasibility Report. Included in this cost is Engineer During Construction and Construction Management.

5a. Activities That Inform Future Designs

Because the Design to Construction cost ratio is high for the 500 foot terraced bank, it is important to recognize the activities that will inform future designs – that is, the activities that do not solely contribute to the design of the 500 foot terraced bank. See the following table for a summary of these activities.

Activity Name	Cost Estimate	Informed Designs
Hydrology and Hydraulics Branch: Update LA River Hydrology and Local Hydrology Analysis	\$312,000	Reaches 1 - 8
Engineering Design Branch: Preliminary Geometries for Reaches 7 and 8	\$225,000	Reaches 7 & 8
Hydrology and Hydraulics Branch: 2D Hydraulic Model	\$400,000	Reaches 1 - 8
Hydrology and Hydraulics Branch: Physical Modeling of Terracing	\$800,000	2.5 Miles of Terracing
Environmental Resources Branch: All 500 Foot Terraced Bank Site Activities	\$260,000	\$200K is for Cultural Resources Inventory in Reaches 1 – 8
Hydrology and Hydraulics Branch: Risk and Uncertainty Analysis	\$100,000	Reaches 1 - 8

