



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

Little Colorado River Feasibility Study Report

APPENDIX E Cost Engineering

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Table of Contents

1.0 OVERVIEW.....	1
1.1 GENERAL	1
1.2 PURPOSE	1
1.3 REAL ESTATE COST	5
1.4 ALTERNATIVES MODIFICATION.....	5
2.0 SUMMARY	7
2.1 UNIT COST BASIS.....	7
2.1.1 <i>Direct Cost</i>	7
2.1.2 <i>Quantity and Material Analysis</i>	7
2.1.3 <i>Equipment Selection</i>	8
2.1.4 <i>Sales Tax</i>	8
2.1.5 <i>Fuel Adjustments</i>	8
2.2 INDIRECT COSTS	8
2.3 IMPROVEMENTS	8
2.4 RESTORATION COSTS	11
2.5 CONTRACTOR MARKUPS	11
2.6 OWNER COST	12
2.6.1 <i>Planning, Engineering and Design (PED)</i>	12
2.6.2 <i>Construction Management or Supervision & Administration (S&A)</i>	12
2.7 FEDERAL AND NON-FEDERAL PERCENT BREAKDOWN	12
2.8 ABBREVIATED COST RISK ANALYSES	12
2.9 SCHEDULE OF WORK.....	12
3.0 Synopsis.....	13

List of Attachments

Attachment 1 MCACES Construction Cost Estimate Alternative 1.1

Attachment 2 MCACES Construction Cost Estimate Alternative 3.1

Attachment 3 MCACES Construction Cost Estimate Alternative 8

Attachment 4 MCACES Construction Cost Estimate Alternative 9

Attachment 5 MCACES Construction Cost Estimate Alternative 10

Attachment 6 Current Working Estimate Summary Alternatives 1.1, 3.1, 7, 8, 9, and 10

Attachment 7 Abbreviated Cost Risk Analyses (Input and Results and Risk Register and Matrix for Alternative 1.1, 3.1, 7, 8, 9, and 10)

Attachment 8 Optimization Work for Economics Section – Figures and TPCs for Alternatives 10.1, 10.2, 10.3, & 10.4

List of Figures

Figure 1 – Utility Locations

Figure 2 – Disposal and Borrow Locations

1.0 OVERVIEW

The study area is located in the City of Winslow and surrounding areas, west-central Navajo County, Arizona (AZ), within the middle of the Little Colorado River (LCR) Watershed. The LCR originates 160 miles upstream of Winslow, AZ, in the White Mountains, south of Springerville, AZ, and continues for another 155 miles downstream of Winslow. The study area encompasses the floodplain of the LCR from the vicinity of the Clear Creek confluence to the north terminus of the Winslow Levee. The study area includes the majority of the City of Winslow, including the Ruby Wash Diversion Levee (RWDL) and the Ruby Wash Levee. Figure 1 present a map showing a listing of known utilities within the project area from various sources and some field verified in November 2013 during a site visit by the Cost Engineer. Figure 2 shows disposal and borrow locations identified during the aforementioned site visit by the non-federal sponsor.

1.1 General

This appendix was updated in September and December 2015 as well as May 2016. In September 2015, the GIS figures were updated and the naming convention for the array of alternatives were updated. Finally, in December 2015, Cost Engineering received updated LERRDs costs, consequently, all cost engineering products were updated and presented herein. Lastly, in May 2016, the GIS figures were updated and the optimized development of Alternative 10 were included.

1.2 Purpose

This appendix discusses the cost engineering assumptions and construction methodology utilized in preparing the current working estimates (CWE's) for this smart planning feasibility level study. After the initial development of the six alternatives, Alternative 10 was optimized by developing four additional alternatives. Damages reduced for smaller and larger scale levees were evaluated using the Alternative 10.1 reflects a design for the 1% ACE. Three additional levels of flood containment as measured by the ACE probability were selected for evaluation. These designs correspond with rebuilding the levees three feet above the 4%, 2% and 0.5% ACE water surface elevation. Alternatives 1.1, 3.1, 7, 8, 9, 10.1, 10.2, 10.3 and 10.4 were evaluated as potential long-term solutions to address the following:

- The City of Winslow, the surrounding community, critical infrastructure, and cultural/historic resources are subject to significant flood-risk, flood related damages, and life, safety and health impacts.
- Locally Identified Problem - the de-accreditation of the Winslow Levee by FEMA has resulted in 2,700 properties being placed within the mapped 100-year floodplain, thus requiring flood insurance.

Alternatives 1, 2, 3, 4, 5 and 6 have been eliminated from further consideration. Alternative 11 is the No Action Alternative. Note that all alternatives include an improved flood warning system. The alternatives under consideration are as follows:

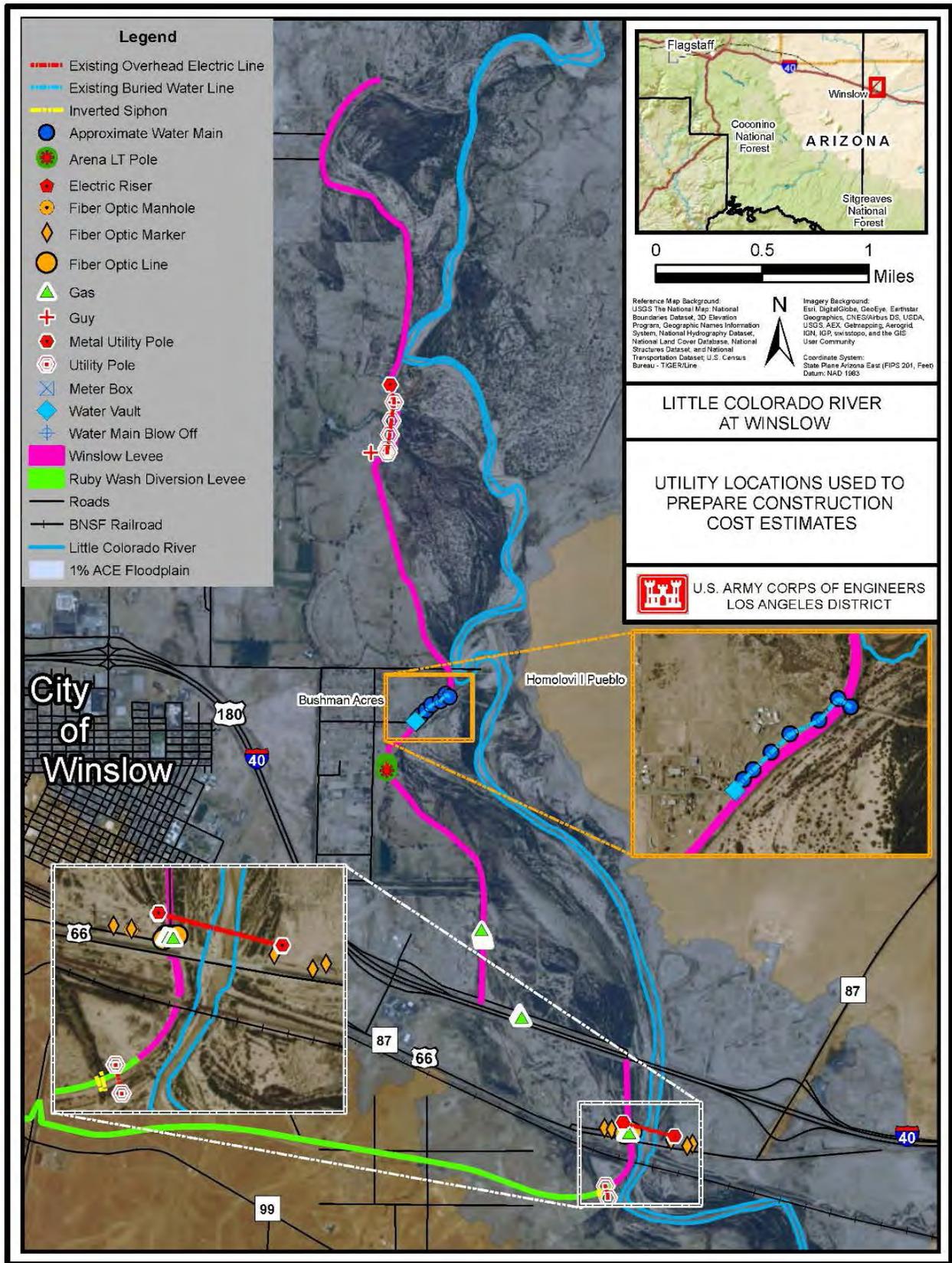


Figure 1 – Utility Locations

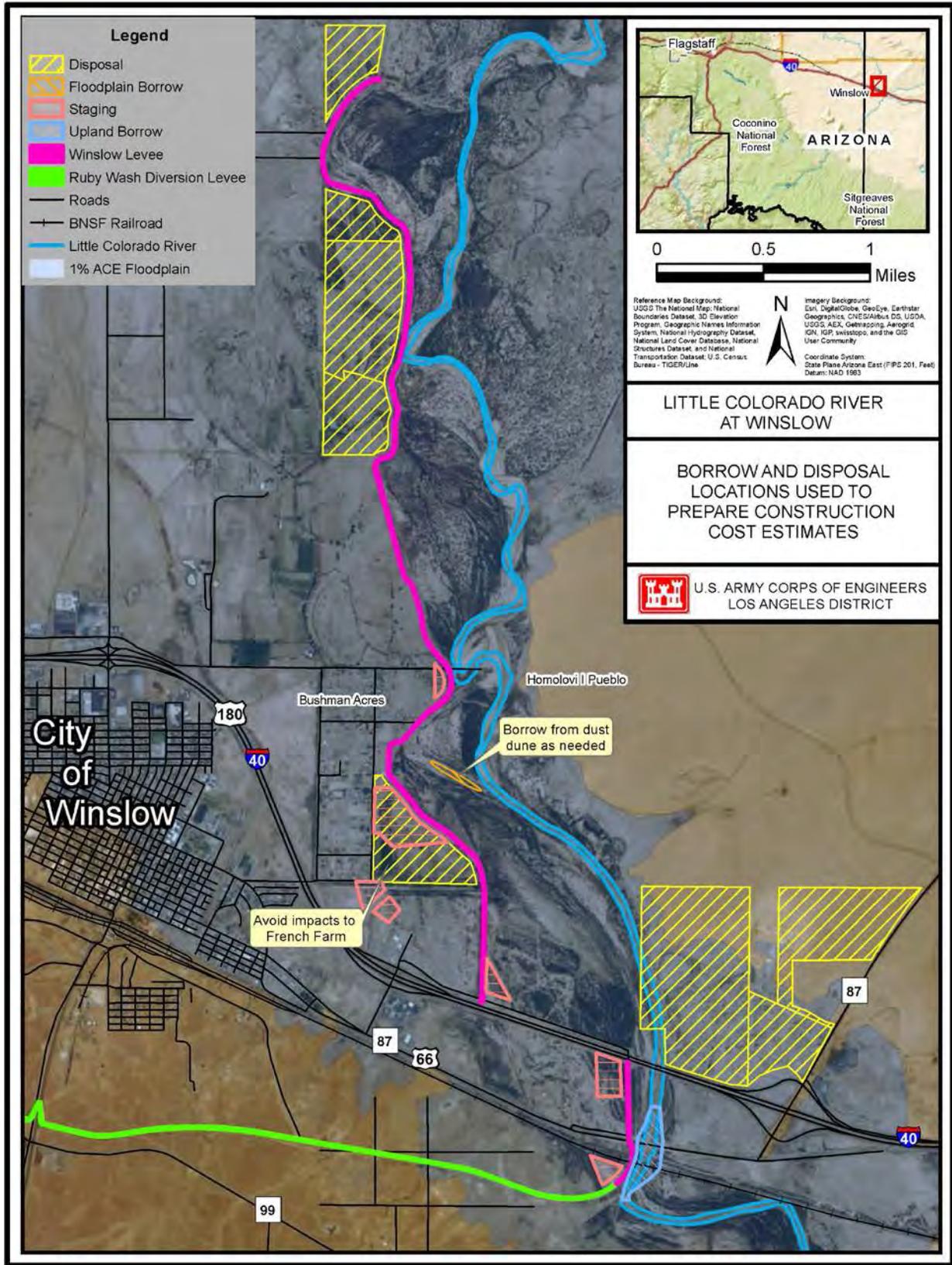


Figure 2 – Disposal and Borrow Locations

- **Alternative 1.1 – Rebuild Winslow Levee:** Rebuild the Winslow Levee and the eastern end of the Ruby Wash Diversion Levee (RWDL) along their current alignments, construct a new levee parallel to I-40, and improve conveyance under the BNSF Railroad Bridge; project designed to contain the 1% ACE¹ flood (See Figure 3 - Alternative 1.1 Rebuilds Winslow Levee, New Levee Parallel to I-40, Conveyance Improvements).
- **Alternative 3.1 – Rebuild and Setback Winslow Levee:** Rebuild part of the Winslow Levee along its current alignment, set back part of the Winslow Levee, remove the original Winslow Levee in the setback areas, rebuild the eastern end of the RWDL along its current alignment, construct a new levee parallel to I-40, and improve conveyance under the BNSF Railroad Bridge; project designed to contain the 1% ACE flood.
- **Alternative 7 – Nonstructural Measures:** Employ nonstructural flood risk management measures for residences located north of I-40 only, no levee or conveyance improvements.
- **Alternative 8 – Rebuild Winslow Levee with Setback at Homolovi I:** Rebuild most of the Winslow Levee along its current alignment, set back a short segment of the Winslow Levee across the LCR from the Homolovi I Pueblo, remove the original Winslow Levee in the setback area, rebuild the eastern end of the RWDL, construct a new levee parallel to I-40, and improve conveyance under the BNSF Railroad Bridge; project designed to contain the 1% ACE flood.
- **Alternative 9 - Levee Increment 1:** Rebuild the eastern end of the RWDL at its existing height, no improvements to the Winslow Levee, no conveyance improvements, and use of nonstructural measures for residences north of I-40. This alternative would reduce the risk of flooding for events up to the 36-year flood (LCR flows up to 44,780 cfs).
- **Alternative 10/10.1 - Levee Increments 1 & 2 to contain the 1% ACE Flood:** Rebuild the Winslow Levee from the RWDL downstream to a point 0.8 of a mile north of North Road (STA 32,000), no improvements to the Winslow Levee downstream of STA 32,000, set back a short segment of the Winslow Levee across the LCR from the Homolovi I Pueblo, remove the original Winslow Levee in the setback area, rebuild the eastern end of the RWDL, construct a new levee parallel to I-40, improve conveyance under the BNSF Railroad Bridge, and employ nonstructural measures for residences downstream of North Road. Alternative 10 would provide structural measures to address the flood risk for the most densely developed portions of Winslow, with use of nonstructural measures to reduce the risk further downstream; project designed to contain the 1% ACE flood.
- **Alternative 10.2 - Levee Increments 1 & 2 to contain the 4% ACE Flood:** Rebuild the Winslow Levee from the RWDL downstream to a point 0.8 of a mile north of North Road (HEC-RAS model STA 32,000), no improvements to the Winslow Levee downstream of STA 32,000, set back a short segment of the Winslow Levee across the LCR from the Homolovi I Pueblo, remove the original Winslow Levee in the setback area, rebuild the

¹ 1% annual change of exceedance flood, equivalent to the “100-year” flood.

eastern end of the RWDL, and construct a new levee parallel to I-40. New levee construction would be designed to provide three feet of height above the 4% ACE water surface elevation. The additional levee height would increase the assurance that the designated flood can be contained.

- **Alternative 10.3 - Levee Increments 1 & 2 to contain the 2% ACE Flood:** Rebuild the Winslow Levee from the RWDL downstream to a point 0.8 of a mile north of North Road (STA 32,000), no improvements to the Winslow Levee downstream of STA 32,000, set back a short segment of the Winslow Levee across the LCR from the Homolovi I Pueblo, remove the original Winslow Levee in the setback area, rebuild the eastern end of the RWDL, construct a new levee parallel to I-40, improve conveyance under the BNSF Railroad Bridge. New levee construction would be designed to provide three feet of height above the 2% ACE water surface elevation. The additional levee height would increase the assurance that the designated flood can be contained. Alternative 10.3 does not include nonstructural measures other than implementation of a flood warning system.
- **Alternative 10.4 - Levee Increments 1 & 2 to contain the 0.5% ACE Flood:** Rebuild the Winslow Levee from the RWDL downstream to a point 0.8 of a mile north of North Road (STA 32,000), no improvements to the Winslow Levee downstream of STA 32,000, set back a short segment of the Winslow Levee across the LCR from the Homolovi I Pueblo, remove the original Winslow Levee in the setback area, rebuild the eastern end of the RWDL, construct a new levee parallel to I-40, improve conveyance under the BNSF Railroad Bridge. New levee construction would be designed to provide three feet of height above the 0.5% ACE water surface elevation. The additional levee height would increase the assurance that the designated flood can be contained.
- **Alternative 11 – No Action Alternative:** The no action alternative is synonymous with the without-project condition. No federal action would be undertaken to address the flood risk for the Winslow community. With the “No Action Alternative”, the flood risk in the Winslow area is expected to remain essentially unchanged over the next 50 years.

The ten alternatives listed above comprise the focused array of alternatives, from which Alternative 10.1 has been designated as the Tentatively Selected Plan (TSP).

For additional detail and drawings relating to these ten alternatives, please refer to the Main Report and Design Appendix.

1.3 Real Estate Cost

The cost for Alternatives 1.1, 3.1, 7, 8, 9, 10, 10.1, 10.2, 10.3 and 10.4 were developed by the U.S. Army Corps of Engineers (USACE) Los Angeles District’s (LAD or Corps LA) Asset Management Division and Planning Division (PD) in January 2014. Further updates will be made as we proceed with the TSP.

1.4 Alternatives Modification

The economic evaluation indicated that Alternative 10 has the greatest Net Economic Development (NED) benefits of the six alternatives in the focused array. Further evaluation

showed that the structure-raising nonstructural components of Alternative 10 are not economically justified. Thus, deletion of these structure-raising nonstructural measures further increased the NED benefits of Alternative 10.

The study team evaluated three additional scales of Alternative 10 (levee heights) to determine whether further optimization (maximization) of NED benefits can be achieved with different levels of flood risk reduction. These alternatives are differentiated based on conveyance capacity and targeted project performance. In particular, the scales are designed to convey flows associated with a specific probability of flood event (e.g., 1% ACE), with an additional 3 feet of levee height included to increase the assurance these flows can be contained when accounting for uncertainties. In order to differentiate the four different levels of flood risk reduction, Alternative 10 (with the structure-raising nonstructural measures deleted) was renumbered as Alternative 10.1. All four scales of Alternative 10 have been numbered as follows:

<u>Alternative</u>	<u>Levee Height</u>
10.1 - Levee Increments 1 and 2	1% ACE ¹ +3'
10.2 - Levee Increments 1 and 2	4% ACE +3'
10.3 - Levee Increments 1 and 2	2% ACE +3'
10.4 - Levee Increments 1 and 2	0.5% ACE +3'

¹Annual Chance of Exceedance

Cost Engineering has developed total project cost summaries (TPCs) for the three additional scales of Alternative 10/10.1 using the same assumptions used for the first set of cost estimates. The figures and TPCs for these alternatives are presented in Attachment 8.

This cost engineering assessment is compliant with ER 1110-2-1302 - Civil Works Cost Engineering and ETL 1110-2-573 – Construction Cost Estimating Guide for Civil Works both dated September 2008.

2.0 SUMMARY

The following sections apply to all ten alternatives, except where noted.

2.1 Unit Cost Basis

2.1.1 Direct Cost

Labor rates used to develop the estimate were provided from the latest Davis-Bacon Wage Rates (August 2013).

Equipment rates are based on the Department of the Army EP 1110-1-8 “Construction Equipment Ownership and Expense Schedule”, 2011 Region 7 (May 2012).

Crews were developed for project specific applications and are listed in the crew database.

2.1.2 Quantity and Material Analysis

Quantities were submitted by the Corps LA Civil Design Section A (Civil Design) and refined by the Corps LA Cost Engineering and Specifications Section (Cost Engineering).

The quantities include waste/loss factors for the project materials as listed below.

It is assumed that all existing basaltic rip-rap will be salvaged and reused. Any additional quantities of basaltic rip-rap would be purchased from a local quarry and delivered to the project site. Quotes were obtained from the local quarry where the existing rip-rap was secured.

It was assumed that all existing sandstone will be salvaged and stockpiled at strategic locations along the new levee alignment for future use during flood fighting activities. This material would not be disposed of since it is considered a commodity.

There is limited geotechnical exploration data but the Los Angeles District (LAD) Geotechnical section has assumed the classification of the levee material to consist of silty sand material.

Additional geotechnical information and test pit or borings would provide information to better describe the materials beneath the foundation for all of the alternatives being considered. This should be done prior to formulating a final design.

For internal drainage purposes, the existing reinforced concrete boxes (RCB) were assumed to be demolished and replaced with new structures and gates. Quotes were secured for new RCB's and gates.

Materials for soil cement were assume to be purchased locally and verified with local vendors that supply them. Quotes were secured for soil cement material costs.

A quote for grout used for the grouted rip-rap was secured from a local vendor.

Quotes for sand and gravel needed for the operation and maintenance (O&M) road atop the levee, the trench drain filter, etc. were secured from a local quarry.

For process water, the non-federal sponsor has confirmed the existence of two groundwater wells that could supply sufficient water throughout construction. One of these wells is privately owned. The City of Winslow has offered the option of tapping into an existing fire hydrant if it is necessary.

Quantities were refined during Agency Technical Review (ATR) and furnished to Cost Engineering on March 4, 2014. These quantities were recalculated due to a change in the scour depth assumption. Originally, the scour depth was assumed from as-built drawings. During ATR, the Corps LA Hydrology and Hydraulics Branch (H&H) provided Civil Design with a baseline scour depth. The Cost Engineer reviewed and verified the quantities furnished and subsequently updated all cost related products.

2.1.3 Equipment Selection

Equipment selection and sizing were developed using the cost estimator's experience.

2.1.4 Sales Tax

Arizona state excise tax of 5.915% has been applied.

2.1.5 Fuel Adjustments

Fuel prices in the equipment database were increased using the most current weekly retail on-highway diesel pricing information from the Independent Statistics & Analysis U.S. Energy Information Administration as well as other internet resources such as GasBuddy.com, which presents gas pricing in and around the project study area:

1. Gasoline = \$3.83 per gallon (Avg. for Winslow, Arizona)
2. Diesel Fuel (Off-highway) = \$3.15 per gallon (Avg. for Arizona)
3. Diesel Fuel (On-highway) = \$3.71 per gallon (Avg. for Arizona)

2.2 Indirect Costs

Project Management provided the following information for each alternative:

1. Lands, Easements, Right-of-way, Relocation, and Disposal areas (LERRDs)
2. Pre-construction, Engineering, and Design (PED)
3. Supervision and Administration during Construction (S&A)

2.3 Improvements

The following assumptions were utilized in developing the cost estimates for each of the alternatives under consideration.

The Planning Division Study management has determined that the best time to construct this project would occur from May through October of any given year six months per year.

Civil Design originally assumed scour depths based upon as-built drawings. The sediment transport analysis was conducted to determine the aggradation and degradation for the various discharge frequency events. The analysis detailed in previous sections does include local scour. Based on the 1980 LCR Feasibility Report (Reference P), the design scour depth of the Winslow Levee varies from 10 to 15 feet for the reaches where the river is susceptible to sharp bends and impingement. A scour depth of 5 feet was recommended for the reaches of the levee that were not in contact with the main channel of the river. For the alternatives described in this appendix, 15 feet was used as the scour depth for the levee design along the entire length because impingement locations have historically moved and to be conservative. A scour analysis is recommended for the tentatively selected plan to verify the previous analysis from 1980.

The cost estimates assume crews working concurrently 7 days a week for six months in any given year. Therefore, overtime for working Saturdays and Sundays is accounted for in the estimate.

On the landward side of the levee, it is assumed that the creation of a 50-foot wide corridor for working space purposes and creation of a two lane access road will be necessary.

On the riverside of the levee, it is assumed that the creation of a 25-foot wide corridor for working space as well as a two lane access road for installation of soil cement and grouted rip rap will be necessary.

The cost estimates assumed that the channel and canal excavation would occur concurrently during levee demolition and rebuilding construction activities.

For channel excavation, the cost estimates assumed the use of conventional earth work crews and equipment. For levee demolition, the cost estimates assumed the use of conventional earthwork equipment including excavator, water truck, dozer, and standby crane in the event big objects such as car bodies and big rocks need to be loaded on trucks for disposal at a local landfill.

The Cost Engineer contacted an earthwork vendor familiar with the Winslow project area in development of the demolition production rate and crew makeup as well as for reconstruction of the levee system. The earthwork vendor stated that it would not be a problem securing a fleet of scrapers as well as other conventional earthwork equipment in a remote area such as Winslow.

For channel and canal excavation, water diversion was assumed to be accomplished through the construction zone via a 36" corrugated metal pipe (CMP) anchored above ground, which affords flexibility in moving it around as well as to allow transport of sensitive fish species. It was assumed that a coffer dam would need to be constructed in conjunction with the CMP. The construction area would also be dewatered in order to use conventional earthwork equipment. A dewatering vendor familiar with the project site was contacted in developing dewatering costs.

For levee system rebuilding, it was assumed that a contractor would use of fleet of 10 scrapers, a water truck, and related equipment operators.

Corps LA Geotechnical Branch (Geotech) required creation of a trench drain instead of the installation of relief wells. This requirement allowed for excess excavation materials to be reused for rebuilding of the levee system. Excess material will also be acquired from the creation of a concrete V-ditch channel. The trench drain would run the entire length of the levee system. The concrete V-ditch, on the other hand, would run lengths as developed by Civil Design (i.e. they do not run full length of levee system). There will be a need to bring in additional material from the BNSF Railroad Bridge excavation area.

Cost Engineering secured all related material quotes from local vendors. For the reinforced concrete boxes (RCBs) needed for interior drainage, quotes for replacements and new gates were acquired.

Updated quantities developed by Civil Design and furnished to Cost Engineering on March 4, 2014 were verified by the Cost Engineer. Other measurements (i.e. hauling routes, distances for scraper travel, acreages, etc.) were made using Google Earth.

All relevant GIS/Mapping products provided by PD and PM were used in the development of all cost estimates.

If special status fish species are present within the project reach, fish work (netting, capture and relocation etc.) would likely be required for the reaches where the levee system is immediately adjacent to the active channel. It was assumed at the time cost was developed that in-water construction would be required in as many as three locations, depending on the alternative. The costs would be approximately \$20,000 per site. Monitoring and maintenance of the block netting for all three sites may require weekly site visits at \$2,500 per visit. Alternative 9 has one spot for in-water construction and Alternatives 10.1, 10.2, 10.3, and 10.4 have two sites for in-water construction.

Water quality testing could be required for in-water work at the railway bridge, and the two spots upstream where the levee system contacts the active channel. Water quality testing would include temperature, dissolved oxygen, pH, and turbidity. It was assumed that the contractor could take readings at all three sites per visit. Weekly site visits are assumed to cost \$2,500/visit times the duration of in-water construction work.

Storm Water Pollution Prevention Plans (SWPPPs) would be prepared for all alternatives with the exception of the non-structural alternative. Given the scope of the project, the cost of acquiring a SWPPP was assumed to be \$20,000. Alternative 9 should be less expensive since the construction footprint is limited. The assumed SWPPP cost for Alternative 9 is \$10,000.

The Cost Engineer worked with the Study Management and PM to secure LERRDS costs. Costs for the CWBS code of accounts 01 and 02 are presented in the CWE's.

As requested by the cultural resources point of contact (POC) on the Project Delivery Team (PDT), the Cost Engineer applied 1% of construction costs to account for any potential impacts to cultural resources.

Dust control and traffic control during construction are accounted for in all of the estimates.

During ATR, the real estate POC furnished the Cost Engineer with updated utility costs. The Economics Section provided the Cost Engineer with updated non-structural costs on March 7, 2014. The Current Working Cost Estimates reflect these changes.

2.4 Restoration Costs

There are two fish species of special concern, one federally-listed endangered fish, one federally-listed threatened fish, one federally-listed endangered bird, and one federally-listed threatened bird that have the potential to inhabit the section of the Little Colorado River (LCR) within the Winslow Levee study area. In the aforementioned order, these species include: flannelmouth sucker (flannelmouth) and the bluehead sucker, Zuni bluehead sucker, Little Colorado River spinedace (spinedace), Southwestern willow flycatcher (flycatcher), and yellow-billed cuckoo. From May 6-29, 2014, Arizona Game and Fish Department (AZGFD) conducted fish surveys for the spinedace, flannelmouth, Zuni bluehead sucker and the bluehead sucker along the LCR within the study area. Also surveys were conducted by the AZGFD for the presence of the flycatcher within the proposed study area using standardized survey methodology.

During the fish survey, three individual flannelmouth suckers, a species of special concern, were detected. Besides the flannelmouth, no other fish species listed above were detected. During the three established survey periods for the flycatcher, none were detected. Although the flycatcher was not present within the project area in 2014, future surveys would need to be conducted to verify presence/absence of this species prior to construction of the proposed project. Surveys for the yellow-billed cuckoo, listed as threatened in October 2014, have yet to be conducted. Surveys for this species would be conducted during PED, early enough for consultation with the U.S. Fish and Wildlife Service if the species is detected. Nevertheless, these species are not expected to be in the area because saltcedar is the dominant species in the area, and there is a general lack of habitat known to be associated with cuckoo occupation.

Although there has not been a presence of flycatchers within the proposed project area (and yet to be determined presence of the yellow-billed cuckoo), there is an established and active bird community along with other wildlife that use and live in the existing habitat (including salt cedar) within the project area. To avoid impacts to all wildlife that may use the existing habitat that would be removed during construction, revegetation of native plants is necessary.

The following assumptions were added into the cost estimates: (1) revegetation is required for disturbance to vegetation up to 100 feet away from the active channel; (2) in-water work at railway bridge (area of disturbance ~ 1.5 miles ~ 8,000 feet x 100 x 2 (for both sides) = 40 acres); and (3) in-water work at 2 upstream impingements points (length of impingement points ~1,320 feet x 100 feet (on riverside only) = 3 acres per impingement point). Cost of revegetation is \$30,000/acre.

2.5 Contractor Markups

The Construction Cost Estimates are based on performing the work using the “Invitation for Bid” contract mechanism. These estimates are at a conceptual stage without the benefits of having plans and specifications.

2.6 Owner Cost

The following Owner Costs were included in the development of the CWE's for Alternatives 1.1, 3.1, 7, 8, 9, 10, 10.1, 10.2, 10.3, and 10.4.

2.6.1 Planning, Engineering and Design (PED)

Pre-construction, Engineering and Design (PED), including Engineering during Construction (EDC), Planning, Project Management, and Technical reviews were estimated at 15% of the Construction cost.

2.6.2 Construction Management or Supervision & Administration (S&A)

Construction Management was estimated at 6.7% of the Construction cost with contingency.

2.7 Federal and Non-Federal percent breakdown

Federal and non-federal cost sharing percentages are 65% and 35%, respectively.

2.8 Abbreviated Cost Risk Analyses

On February 6, 2014, Cost Engineering and Specifications Section with assistance from the USACE Walla Walla District Cost Engineering Branch participated in a PDT meeting to prepare a risk register for Alternatives 1.1, 3.1, 7, 8, 9, and 10. The abbreviated cost risk analyses yielded appropriate contingencies which were used to determine the current working cost with contingency (See Attachment 7).

During ATR, the Cost Engineer addressed concerns that arose following DQC from PDT members relating to the abbreviated cost risk analyses. Consequently, the risk register for the abbreviated cost risk analyses was updated on March 7, 2014.

In December 2015 the Cost Engineer received updated real-estate appendix. Subsequently, all cost engineering products were updated including the abbreviated cost risk analyses.

2.9 Schedule of Work

The following assumptions have been made for schedule of work:

- Assumes work schedule: 7 days per week, 10 hours per day, 1.5 hours overtime.
- Assumes levee construction will occur from May to October of any given year.

3.0 Synopsis

In summary, the CWE's for Alternatives 1.1, 3.1, 7, 8, 9, and 10 in 2014 price levels are presented in Table 1.

Table 1. Current Working Estimate Summary

<u>Alternative</u>	<u>Current Working Estimate (\$K)</u>
1.1	\$87,000
3.1	\$92,000
7	\$19,000
8	\$82,000
9	\$21,000
10	\$64,000

Preliminary CWE for Alternatives 10.1, 10.2, 10.3, and 10.4 in 2014 price level are presented in Table 2.

Table 2. Current Working Estimate Summary

<u>Alternative</u>	<u>Current Working Estimate (\$K)</u>
10.1	\$60,000
10.2	\$39,000
10.3	\$59,000
10.4	\$69,000

Attachment 1

**MCACES Construction Cost Estimate
Alternative 1.1**

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
Winslow			36,162,260.33	37,757,968.71	10,620,726.36	38,497,269.56	50,848,377.67
06. Fish & Wildlife Facilities	LS	1.0000	506,451.00	506,451.00	105,430.99	611,881.99	791,399.51
06. Mob/Demob	LS	1.0000	14,751.00	14,751.00	3,070.81	17,821.81	23,050.47
06. Mitigation Costs	LS	1.0000	491,700.00	491,700.00	102,360.19	594,060.19	768,349.04
09. Channels and Canals	LS	1.0000	8,315,215.26	8,615,249.61	2,273,025.25	8,219,762.36	11,410,036.08
09. Mob/Demob	LS	1.0000	250,930.00	250,930.00	76,568.75	250,930.00	327,498.75
09. Clear & Grub - Exclusively for Work Area (Temporary Disposal Site)	LS	1.0000	391,380.65	414,947.42	126,617.00	414,947.42	541,564.43
09. Construction of Berm	LS	1.0000	14,262.56	15,321.84	4,675.30	15,321.84	19,997.15
09. Water Diversion & Control	LS	1.0000	118,286.81	128,221.23	39,125.41	128,221.23	167,346.64
09. Dewatering	LS	1.0000	450,000.00	450,000.00	102,125.97	552,125.97	714,111.92
09. Demolition of Abandoned Bridge Pier	LS	1.0000	5,304.55	6,256.18	1,909.01	6,256.18	8,165.19
09. Salt Cedar Removal	LS	1.0000	703,000.00	703,000.00	0.00	0.00	703,000.00
09. Build acces road with D10 dozer	LS	1.0000	13,105.87	14,417.48	4,399.35	14,417.48	18,816.83
09. Access Road Maintenance with D10 dozer	LS	1.0000	123,707.66	136,088.04	41,525.89	136,088.04	177,613.93
09. Excavation W/in Channel	LS	1.0000	1,252,632.38	1,334,790.61	407,297.84	1,334,790.61	1,742,088.45
09. D10 Dozer at Tempory Disposal Site to Shape/Move Material	LS	1.0000	299,704.85	316,040.93	96,436.69	316,040.93	412,477.62
09. Soil Cement	LS	1.0000	926,806.82	1,020,900.28	205,386.78	1,226,287.06	1,586,062.33
09. Riprap	LS	1.0000	3,640,822.34	3,686,933.13	1,125,030.30	3,686,933.13	4,811,963.43
09. Traffic Control	LS	1.0000	15,345.00	20,662.98	6,305.10	20,662.98	26,968.08
09. Dust Control	LS	1.0000	69,925.77	76,739.47	23,416.27	76,739.47	100,155.74
09. Fish Netting	LS	1.0000	20,000.00	20,000.00	6,102.80	20,000.00	26,102.80
09. Netting Maintenance & Wtr Quality Testing	LS	1.0000	20,000.00	20,000.00	6,102.80	20,000.00	26,102.80
11. Levees & Floodwalls	LS	1.0000	27,340,594.06	28,636,268.10	8,242,270.11	29,665,625.21	38,646,942.08
11. Mob/Demob	LS	1.0000	834,066.00	834,066.00	254,506.79	834,066.00	1,088,572.79
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)	LS	1.0000	188,494.14	200,572.11	61,202.55	200,572.11	261,774.66
11. Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	LS	1.0000	121,286.00	121,286.00	37,009.19	121,286.00	158,295.19
11. Build acces road with D10 dozer (Landward)	LS	1.0000	53,415.90	58,761.64	17,930.52	58,761.64	76,692.16
11. Build acces road with D10 dozer (Riverside)	LS	1.0000	31,450.29	34,597.77	10,557.16	34,597.77	45,154.93
11. Access Road Grading and Maintenance (Landward)	LS	1.0000	56,034.45	62,794.50	19,161.11	62,794.50	81,955.60
11. Access Road Grading and Maintenance (Riverside)	LS	1.0000	56,034.45	62,794.50	19,161.11	62,794.50	81,955.60

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
11. Dewatering*	LS	1.0000	924,000.00	924,000.00	209,698.66	1,133,698.66	1,466,309.81
11. Relocation of Existing RipRap*	LS	1.0000	388,144.60	437,464.40	133,487.83	437,464.40	570,952.23
11. Relocation of Sandstone*	LS	1.0000	76,967.16	86,747.03	26,469.98	86,747.03	113,217.01
11. Demolition of Existing Levee	LS	1.0000	2,923,313.78	3,220,019.54	982,556.35	3,220,019.54	4,202,575.88
11. Trench Drain	LS	1.0000	4,411,886.29	4,545,843.38	1,387,118.06	4,545,843.38	5,932,961.44
11. Rebuilding of Levee	LS	1.0000	3,719,492.96	3,886,016.83	1,185,778.68	3,886,016.83	5,071,795.51
11. Load & Haul Material from Southern Disposal Site	LS	1.0000	91,150.48	99,328.41	30,309.06	99,328.41	129,637.47
11. Access Ramps	LS	1.0000	2,314.03	2,496.54	761.79	2,496.54	3,258.33
11. Filter Fabric*	LS	1.0000	45,276.25	48,003.81	14,647.88	48,003.81	62,651.69
11. 4" Gravel Mulch Slope	LS	1.0000	349,445.90	357,108.68	108,968.10	357,108.68	466,076.78
11. Grouted 24" & 36" Rip-Rap on Sideslopes	LS	1.0000	7,637,386.10	7,740,614.18	2,361,970.01	7,740,614.18	10,102,584.19
11. Soil Cement (U/S)*	LS	1.0000	3,685,303.53	4,069,033.78	818,616.42	4,887,650.20	6,321,617.61
11. Aggregate Base Course (4" layer) - O&M Road*	LS	1.0000	179,968.38	183,965.03	56,135.06	183,965.03	240,100.09
11. Demolition of Existing RCB Box Culvert *	LS	1.0000	97,258.47	113,575.45	34,656.40	113,575.45	148,231.84
11. RCB Box Culverts & Gates for Interior Drainage*	LS	1.0000	854,728.05	859,175.79	262,168.79	859,175.79	1,121,344.58
11. Concrete V-Ditch - Landside*	LS	1.0000	7,153.82	8,303.65	1,995.33	9,345.67	12,124.28
11. Disposal of Waste Materials (Existing Levee Only - BCY)	LS	1.0000	151,303.43	164,323.69	50,141.71	164,323.69	214,465.41
11. Dust Control	LS	1.0000	139,851.54	153,478.93	46,832.54	153,478.93	200,311.47
11. Traffic Control	LS	1.0000	110,349.00	152,892.86	46,653.71	152,892.86	199,546.57
11. Erosion Control at Southern Disposal Site	LS	1.0000	95,875.98	96,642.93	29,489.61	96,642.93	126,132.53
11. Fish Netting	LS	1.0000	40,000.00	40,000.00	12,205.59	40,000.00	52,205.59
11. Netting Maintenance & Wtr Quality Testing	LS	1.0000	40,000.00	40,000.00	12,205.59	40,000.00	52,205.59
11. SWPPP	LS	1.0000	20,000.00	20,000.00	6,102.80	20,000.00	26,102.80
11. As-built Drawings	LS	1.0000	8,643.10	12,360.68	3,771.74	12,360.68	16,132.42

Attachment 2

**MCACES Construction Cost Estimate
Alternative 3.1**

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
Winslow			36,376,927.68	38,200,873.79	10,936,786.65	38,599,204.39	51,005,476.83
06. Fish & Wildlife Facilities	LS	1.0000	488,529.00	488,529.00	101,811.00	590,340.00	763,536.61
06. Mob/Demob	LS	1.0000	14,229.00	14,229.00	2,965.37	17,194.37	22,238.93
06. Mitigation Costs	LS	1.0000	474,300.00	474,300.00	98,845.63	573,145.63	741,297.68
09. Channels and Canals	LS	1.0000	8,991,880.47	9,400,028.32	2,513,429.58	9,005,487.96	12,435,494.52
09. Mob/Demob	LS	1.0000	273,787.00	273,787.00	83,542.96	273,787.00	357,329.96
09. Construction of Berm	LS	1.0000	14,262.56	15,321.84	4,675.28	15,321.84	19,997.12
09. Water Diversion & Control	LS	1.0000	118,286.81	128,221.23	39,125.24	128,221.23	167,346.47
09. Dewatering	LS	1.0000	450,000.00	450,000.00	102,125.97	552,125.97	714,111.18
09. Salt Cedar Removal	LS	1.0000	703,000.00	703,000.00	0.00	0.00	703,000.00
09. Demolition of Abandoned Bridge Pier	LS	1.0000	5,304.55	6,256.18	1,909.00	6,256.18	8,165.18
09. Build acces road with D10 dozer	LS	1.0000	13,105.87	14,417.48	4,399.33	14,417.48	18,816.81
09. Access Road Maintenance with D10 dozer	LS	1.0000	123,707.66	136,088.04	41,525.70	136,088.04	177,613.75
09. Excavation W/in Channel	LS	1.0000	2,597,526.08	2,827,700.69	862,840.37	2,827,700.69	3,690,541.06
09. Soil Cement	LS	1.0000	926,806.82	1,020,900.28	206,333.66	1,227,233.95	1,587,285.36
09. Riprap	LS	1.0000	3,640,822.34	3,686,933.13	1,125,025.28	3,686,933.13	4,811,958.41
09. Traffic Control	LS	1.0000	15,345.00	20,662.98	6,305.07	20,662.98	26,968.05
09. Dust Control	LS	1.0000	69,925.77	76,739.47	23,416.17	76,739.47	100,155.63
09. Fish Netting	LS	1.0000	20,000.00	20,000.00	6,102.77	20,000.00	26,102.77
09. Netting Maintenance & Wtr Quality Testing	LS	1.0000	20,000.00	20,000.00	6,102.77	20,000.00	26,102.77
11. Levees & Floodwalls	LS	1.0000	26,896,518.21	28,312,316.46	8,321,546.07	29,003,376.42	37,806,445.70
11. Mob/Demob	LS	1.0000	824,631.00	824,631.00	251,626.67	824,631.00	1,076,257.67
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	LS	1.0000	195,690.32	207,473.71	63,308.22	207,473.71	270,781.93
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Setback Only	LS	1.0000	132,090.97	140,044.76	42,733.05	140,044.76	182,777.80
11. Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	LS	1.0000	116,994.00	116,994.00	35,699.37	116,994.00	152,693.37
11. Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	LS	1.0000	489,225.81	518,684.28	158,270.55	518,684.28	676,954.83
11. D10 Dozer at Tempory Disposal Site to Shape/Move Material	LS	1.0000	247,161.54	260,633.63	79,529.36	260,633.63	340,162.98
11. Build acces road with D10 dozer (Landside)	LS	1.0000	53,104.41	58,418.99	17,825.88	58,418.99	76,244.87
11. Build acces road with D10 dozer (Riverside)	LS	1.0000	22,757.45	25,034.97	7,639.13	25,034.97	32,674.10

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
11. Access Road Grading and Maintenance (Landside)	LS	1.0000	112,068.90	125,589.00	38,322.04	125,589.00	163,911.04
11. Access Road Grading and Maintenance (Riverside)	LS	1.0000	112,068.90	125,589.00	38,322.04	125,589.00	163,911.04
11. Dewatering*	LS	1.0000	924,000.00	924,000.00	209,698.66	1,133,698.66	1,466,308.28
11. Relocation of Existing RipRap*	LS	1.0000	339,361.45	382,482.59	116,710.17	382,482.59	499,192.76
11. Relocation of Sandstone*	LS	1.0000	76,967.16	86,747.03	26,469.86	86,747.03	113,216.89
11. Concrete V-Ditch - Landside*	LS	1.0000	7,297.49	8,464.90	2,032.84	9,544.07	12,380.88
11. Demolition of Existing Levee	LS	1.0000	2,663,761.59	2,934,123.74	895,314.15	2,934,123.74	3,829,437.89
11. Trench Drain	LS	1.0000	4,256,892.01	4,386,143.03	1,338,381.15	4,386,143.03	5,724,524.17
11. Rebuilding of Levee	LS	1.0000	3,727,258.48	3,894,130.02	1,188,249.03	3,894,130.02	5,082,379.05
11. Loading & Hauling of Existing Levee (Offset Portions Only)	LS	1.0000	990,581.15	1,080,652.88	329,748.81	1,080,652.88	1,410,401.68
11. Access Ramps	LS	1.0000	2,314.03	2,496.54	761.79	2,496.54	3,258.33
11. Filter Fabric*	LS	1.0000	50,779.52	53,838.61	16,428.23	53,838.61	70,266.84
11. 4" Gravel Mulch Slope	LS	1.0000	333,038.08	340,341.07	103,851.17	340,341.07	444,192.23
11. Grouted 24" & 36" Rip-Rap on Sideslopes	LS	1.0000	6,039,571.15	6,127,725.41	1,869,805.00	6,127,725.41	7,997,530.41
11. Soil Cement (U/S)*	LS	1.0000	2,149,633.46	2,376,345.94	480,282.13	2,856,628.07	3,694,718.47
11. Aggregate Base Course (4" layer) - O&M Road*	LS	1.0000	167,219.24	170,932.76	52,158.17	170,932.76	223,090.93
11. Demolition of Existing RCB Box Culvert *	LS	1.0000	97,258.47	113,575.45	34,656.24	113,575.45	148,231.69
11. RCB Box Culverts & Gates for Interior Drainage*	LS	1.0000	854,728.05	859,175.79	262,167.62	859,175.79	1,121,343.41
11. Demolition of Existing Levee - Setback Portions Lft in Place for Flood Protection	LS	1.0000	1,132,675.25	1,289,709.16	393,539.93	1,289,709.16	1,683,249.10
11. Disposal of Waste Materials (Existing Levee Only - BCY)	LS	1.0000	134,526.69	146,223.79	44,618.51	146,223.79	190,842.30
11. Dust Control	LS	1.0000	209,777.31	230,218.40	70,248.50	230,218.40	300,466.89
11. Erosion Control at Northern Disposal Site	LS	1.0000	159,804.24	161,082.57	49,152.50	161,082.57	210,235.07
11. Traffic Control	LS	1.0000	164,637.00	228,452.80	69,709.75	228,452.80	298,162.54
11. Fish Netting	LS	1.0000	40,000.00	40,000.00	12,205.54	40,000.00	52,205.54
11. Netting Maintenance & Wtr Quality Testing	LS	1.0000	40,000.00	40,000.00	12,205.54	40,000.00	52,205.54
11. SWPPP	LS	1.0000	20,000.00	20,000.00	6,102.77	20,000.00	26,102.77
11. As-built Drawings	LS	1.0000	8,643.10	12,360.68	3,771.72	12,360.68	16,132.40

Attachment 3

**MCACES Construction Cost Estimate
Alternative 8**

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
Winslow			33,811,411.88	35,330,914.95	9,920,897.07	35,995,066.98	47,589,057.53
06. Fish & Wildlife Facilities	LS	1.0000	463,500.00	463,500.00	96,755.50	560,255.50	724,643.36
06. Mob/Demob	LS	1.0000	13,500.00	13,500.00	2,818.12	16,318.12	21,106.12
06. Mitigation Costs	LS	1.0000	450,000.00	450,000.00	93,937.37	543,937.37	703,537.24
09. Channels and Canals	LS	1.0000	8,315,215.26	8,615,249.61	2,273,380.57	8,219,922.45	11,410,491.78
09. Mob/Demob	LS	1.0000	250,930.00	250,930.00	76,576.35	250,930.00	327,506.35
09. Clear & Grub - Exclusively for Work Area (Temporary Disposal Site)	LS	1.0000	391,380.65	414,947.42	126,629.58	414,947.42	541,577.00
09. Construction of Berm	LS	1.0000	14,262.56	15,321.84	4,675.77	15,321.84	19,997.61
09. Water Diversion & Control	LS	1.0000	118,286.81	128,221.23	39,129.30	128,221.23	167,350.53
09. Dewatering	LS	1.0000	450,000.00	450,000.00	102,125.97	552,125.97	714,128.50
09. Demolition of Abandoned Bridge Pier	LS	1.0000	5,304.55	6,256.18	1,909.20	6,256.18	8,165.38
09. Salt Cedar Removal	LS	1.0000	703,000.00	703,000.00	0.00	0.00	703,000.00
09. Build acces road with D10 dozer	LS	1.0000	13,105.87	14,417.48	4,399.79	14,417.48	18,817.27
09. Access Road Maintenance with D10 dozer	LS	1.0000	123,707.66	136,088.04	41,530.01	136,088.04	177,618.06
09. Excavation W/in Channel	LS	1.0000	1,252,632.38	1,334,790.61	407,338.29	1,334,790.61	1,742,128.90
09. D10 Dozer at Tempory Disposal Site to Shape/Move Material	LS	1.0000	299,704.85	316,040.93	96,446.27	316,040.93	412,487.20
09. Soil Cement	LS	1.0000	926,806.82	1,020,900.28	205,546.87	1,226,447.15	1,586,306.23
09. Riprap	LS	1.0000	3,640,822.34	3,686,933.13	1,125,142.04	3,686,933.13	4,812,075.17
09. Traffic Control	LS	1.0000	15,345.00	20,662.98	6,305.73	20,662.98	26,968.71
09. Dust Control	LS	1.0000	69,925.77	76,739.47	23,418.60	76,739.47	100,158.06
09. Fish Netting	LS	1.0000	20,000.00	20,000.00	6,103.40	20,000.00	26,103.40
09. Netting Maintenance & Wtr Quality Testing	LS	1.0000	20,000.00	20,000.00	6,103.40	20,000.00	26,103.40
11. Levees & Floodwalls	LS	1.0000	25,032,696.62	26,252,165.34	7,550,761.00	27,214,889.04	35,453,922.39
11. Mob/Demob	LS	1.0000	764,626.00	764,626.00	233,341.05	764,626.00	997,967.05
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor & Setback Area)	LS	1.0000	204,309.26	217,400.60	66,344.18	217,400.60	283,744.79
11. Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	LS	1.0000	111,000.00	111,000.00	33,873.89	111,000.00	144,873.89
11. Salt Cedar Removal (Setback Area)	LS	1.0000	17,464.00	17,464.00	5,329.49	17,464.00	22,793.49
11. Build acces road with D10 dozer (Landward)	LS	1.0000	52,134.55	57,352.06	17,502.14	57,352.06	74,854.19
11. Build acces road with D10 dozer (Riverside)	LS	1.0000	21,021.71	23,125.52	7,057.22	23,125.52	30,182.74
11. Access Road Grading and Maintenance (Landward)	LS	1.0000	56,034.45	62,794.50	19,163.01	62,794.50	81,957.51

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
11. Access Road Grading and Maintenance (Riverside)	LS	1.0000	56,034.45	62,794.50	19,163.01	62,794.50	81,957.51
11. Dewatering*	LS	1.0000	924,000.00	924,000.00	209,698.66	1,133,698.66	1,466,343.86
11. Relocation of Existing RipRap*	LS	1.0000	339,361.45	382,482.59	116,722.28	382,482.59	499,204.87
11. Relocation of Sandstone*	LS	1.0000	76,967.16	86,747.03	26,472.61	86,747.03	113,219.64
11. Demolition of Existing Levee	LS	1.0000	2,644,775.21	2,913,210.31	889,024.91	2,913,210.31	3,802,235.22
11. Trench Drain	LS	1.0000	4,282,398.07	4,412,441.46	1,346,545.55	4,412,441.46	5,758,987.01
11. Rebuilding of Levee	LS	1.0000	3,383,506.48	3,534,988.04	1,078,772.93	3,534,988.04	4,613,760.98
11. Load & Haul Material from Southern Disposal Site	LS	1.0000	7,196.09	7,841.72	2,393.06	7,841.72	10,234.78
11. Setback Portion of Levee	LS	1.0000	377,599.20	408,737.23	124,734.41	408,737.23	533,471.65
11. Access Ramps	LS	1.0000	2,314.03	2,496.54	761.87	2,496.54	3,258.41
11. Filter Fabric*	LS	1.0000	44,202.47	46,865.34	14,301.90	46,865.34	61,167.25
11. 4" Gravel Mulch Slope	LS	1.0000	344,006.26	351,549.76	107,282.50	351,549.76	458,832.26
11. Grouted 24" & 36" Rip-Rap on Sideslopes	LS	1.0000	6,216,628.31	6,306,882.10	1,924,672.34	6,306,882.10	8,231,554.44
11. Soil Cement (U/S)*	LS	1.0000	3,382,266.90	3,734,233.20	751,846.16	4,486,079.35	5,802,366.30
11. Aggregate Base Course (4" layer) - O&M Road*	LS	1.0000	176,111.55	180,022.55	54,937.51	180,022.55	234,960.06
11. Demolition of Existing RCB Box Culvert *	LS	1.0000	97,258.47	113,575.45	34,659.84	113,575.45	148,235.29
11. RCB Box Culverts & Gates for Interior Drainage*	LS	1.0000	854,728.05	859,175.79	262,194.83	859,175.79	1,121,370.62
11. Concrete V-Ditch - Landside*	LS	1.0000	8,084.72	9,384.01	2,255.77	10,562.88	13,703.68
11. Disposal of Waste Materials (Existing Levee Only - BCY)	LS	1.0000	133,948.18	145,599.65	44,432.67	145,599.65	190,032.32
11. Dust Control	LS	1.0000	139,851.54	153,478.93	46,837.19	153,478.93	200,316.12
11. Traffic Control	LS	1.0000	110,349.00	152,892.86	46,658.34	152,892.86	199,551.21
11. Erosion Control at Southern Disposal Site	LS	1.0000	95,875.98	96,642.93	29,492.54	96,642.93	126,135.46
11. Fish Netting	LS	1.0000	40,000.00	40,000.00	12,206.81	40,000.00	52,206.81
11. Netting Maintenance & Wtr Quality Testing	LS	1.0000	40,000.00	40,000.00	12,206.81	40,000.00	52,206.81
11. SWPPP	LS	1.0000	20,000.00	20,000.00	6,103.40	20,000.00	26,103.40
11. As-built Drawings	LS	1.0000	8,643.10	12,360.68	3,772.11	12,360.68	16,132.79

Attachment 4

**MCACES Construction Cost Estimate
Alternative 9**

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
Winslow			590,583.61	629,519.74	190,201.01	648,069.86	850,377.81
06. Fish & Wildlife Facilities	LS	1.0000	30,900.00	30,900.00	6,472.04	37,372.04	48,665.43
06. Mob/Demob	LS	1.0000	900.00	900.00	188.51	1,088.51	1,417.44
06. Mitigation Costs	LS	1.0000	30,000.00	30,000.00	6,283.53	36,283.53	47,247.99
11. Levees & Floodwalls	LS	1.0000	559,683.61	598,619.74	183,728.98	610,697.82	801,712.37
11. Mob/Demob	LS	1.0000	23,143.00	23,143.00	7,267.42	23,143.00	30,410.42
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)	LS	1.0000	10,574.06	11,251.61	3,533.26	11,251.61	14,784.86
11. Clear & Grub - Exclusively for Work Area (Riverside - 20' wide corridor)	LS	1.0000	4,597.42	4,892.00	1,536.20	4,892.00	6,428.20
11. Build acces road with D10 dozer (Landside)	LS	1.0000	3,092.69	3,402.20	1,068.37	3,402.20	4,470.57
11. Build acces road with D10 dozer (Riverside)	LS	1.0000	1,322.72	1,455.10	456.93	1,455.10	1,912.03
11. Access Road Grading and Maintenance (Landside)	LS	1.0000	8,405.17	9,419.17	2,957.83	9,419.17	12,377.01
11. Access Road Grading and Maintenance (Riverside)	LS	1.0000	8,405.17	9,419.17	2,957.83	9,419.17	12,377.01
11. Dewatering*	LS	1.0000	52,000.00	52,000.00	12,078.08	64,078.08	83,441.74
11. Temporary Access Ramp	LS	1.0000	1,157.02	1,248.27	391.98	1,248.27	1,640.25
11. Relocation of Sandstone*	LS	1.0000	76,967.16	86,747.03	27,240.52	86,747.03	113,987.55
11. Demolition of Existing Levee	LS	1.0000	5,982.48	6,669.31	2,094.31	6,669.31	8,763.62
11. Trench Drain	LS	1.0000	168,863.16	174,925.03	54,930.39	174,925.03	229,855.42
11. Rebuilding of Levee	LS	1.0000	46,031.42	48,028.20	15,081.94	48,028.20	63,110.14
11. Filter Fabric*	LS	1.0000	1,966.58	2,085.05	654.75	2,085.05	2,739.81
11. 4" Gravel Mulch Slope*	LS	1.0000	9,530.55	9,891.40	3,106.12	9,891.40	12,997.52
11. Grouted 24" & 36" Rip-Rap on Sideslopes	LS	1.0000	25,359.99	25,659.65	8,057.71	25,659.65	33,717.35
11. Aggregate Base Course (4" layer) - O&M Road*	LS	1.0000	11,998.95	12,265.41	3,851.62	12,265.41	16,117.03
11. Disposal of Waste Materials (Existing Levee Only - BCY)	LS	1.0000	1,301.64	1,404.30	440.98	1,404.30	1,845.29
11. Disposal of Waste Materials (All Other Excess Material)	LS	1.0000	2,104.46	2,270.43	712.97	2,270.43	2,983.40
11. Dust Control	LS	1.0000	61,534.68	67,530.73	21,206.17	67,530.73	88,736.90
11. Traffic Control	LS	1.0000	16,702.20	22,551.98	7,081.83	22,551.98	29,633.81
11. SWPPP	LS	1.0000	10,000.00	10,000.00	3,140.22	10,000.00	13,140.22
11. As-built Drawings	LS	1.0000	8,643.10	12,360.68	3,881.53	12,360.68	16,242.21

Attachment 5

**MCACES Construction Cost Estimate
Alternative 10**

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
Winslow			24,885,778.96	25,980,819.10	7,213,121.15	26,373,496.60	35,054,872.92
06. Fish & Wildlife Facilities	LS	1.0000	309,000.00	309,000.00	64,720.35	373,720.35	483,438.86
06. Mob/Demob	LS	1.0000	9,000.00	9,000.00	1,885.06	10,885.06	14,080.74
06. Mitigation Costs	LS	1.0000	300,000.00	300,000.00	62,835.29	362,835.29	469,358.12
09. Channels and Canals	LS	1.0000	8,315,215.26	8,615,249.61	2,275,156.20	8,220,601.99	11,412,766.84
09. Mob/Demob	LS	1.0000	250,930.00	250,930.00	76,619.05	250,930.00	327,549.05
09. Clear & Grub - Exclusively for Work Area (Temporary Disposal Site)	LS	1.0000	391,380.65	414,947.42	126,700.19	414,947.42	541,647.61
09. Construction of Berm	LS	1.0000	14,262.56	15,321.84	4,678.38	15,321.84	20,000.22
09. Water Diversion & Control	LS	1.0000	118,286.81	128,221.23	39,151.11	128,221.23	167,372.35
09. Dewatering	LS	1.0000	450,000.00	450,000.00	102,125.97	552,125.97	714,221.61
09. Demolition of Abandoned Bridge Pier	LS	1.0000	5,304.55	6,256.18	1,910.26	6,256.18	8,166.44
09. Salt Cedar Removal	LS	1.0000	703,000.00	703,000.00	0.00	0.00	703,000.00
09. Build acces road with D10 dozer	LS	1.0000	13,105.87	14,417.48	4,402.24	14,417.48	18,819.72
09. Access Road Maintenance with D10 dozer	LS	1.0000	123,707.66	136,088.04	41,553.17	136,088.04	177,641.22
09. Excavation W/in Channel	LS	1.0000	1,252,632.38	1,334,790.61	407,565.42	1,334,790.61	1,742,356.04
09. D10 Dozer at Tempory Disposal Site to Shape/Move Material	LS	1.0000	299,704.85	316,040.93	96,500.05	316,040.93	412,540.98
09. Soil Cement	LS	1.0000	926,806.82	1,020,900.28	206,226.41	1,227,126.69	1,587,392.09
09. Riprap	LS	1.0000	3,640,822.34	3,686,933.13	1,125,769.43	3,686,933.13	4,812,702.56
09. Traffic Control	LS	1.0000	15,345.00	20,662.98	6,309.24	20,662.98	26,972.23
09. Dust Control	LS	1.0000	69,925.77	76,739.47	23,431.65	76,739.47	100,171.12
09. Fish Netting	LS	1.0000	20,000.00	20,000.00	6,106.81	20,000.00	26,106.81
09. Netting Maintenance & Wtr Quality Testing	LS	1.0000	20,000.00	20,000.00	6,106.81	20,000.00	26,106.81
11. Levees & Floodwalls	LS	1.0000	16,261,563.69	17,056,569.50	4,873,244.60	17,779,174.25	23,158,667.22
11. Mob/Demob	LS	1.0000	496,793.00	496,793.00	151,690.95	496,793.00	648,483.95
11. Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor & Setback Area)	LS	1.0000	139,347.74	148,276.60	45,274.83	148,276.60	193,551.43
11. Clear & Grub (Riverside - Tamarisk - 20 Foot Corridor)	LS	1.0000	74,000.00	74,000.00	22,595.19	74,000.00	96,595.19
11. Salt Cedar Removal (Setback Area)	LS	1.0000	17,464.00	17,464.00	5,332.46	17,464.00	22,796.46
11. Build acces road with D10 dozer (Landside)	LS	1.0000	33,151.73	36,469.48	11,135.60	36,469.48	47,605.08
11. Build acces road with D10 dozer (Riverside)	LS	1.0000	14,273.96	15,702.47	4,794.60	15,702.47	20,497.06
11. Access Road Grading and Maintenance (Landside)	LS	1.0000	39,224.11	43,956.15	13,421.59	43,956.15	57,377.74

Description	UOM	Quantity	BareCost	DirectCost	ContractMarkup	CostToPrime	ProjectCost
11. Access Road Grading and Maintenance (Riverside)	LS	1.0000	39,224.11	43,956.15	13,421.59	43,956.15	57,377.74
11. Dewatering*	LS	1.0000	924,000.00	924,000.00	209,698.66	1,133,698.66	1,466,535.04
11. Relocation of Existing RipRap*	LS	1.0000	137,255.88	154,696.37	47,235.04	154,696.37	201,931.41
11. Relocation of Sandstone*	LS	1.0000	76,967.16	86,747.03	26,487.37	86,747.03	113,234.40
11. Demolition of Existing Levee	LS	1.0000	1,370,867.17	1,510,005.22	461,065.51	1,510,005.22	1,971,070.74
11. Trench Drain	LS	1.0000	2,787,482.33	2,872,118.16	876,973.55	2,872,118.16	3,749,091.70
11. Rebuilding of Levee	LS	1.0000	1,878,479.40	1,962,580.02	599,254.86	1,962,580.02	2,561,834.88
11. Load & Haul Material from Southern Disposal Site	LS	1.0000	294,324.27	320,883.25	97,978.60	320,883.25	418,861.86
11. Setback Portion of Levee	LS	1.0000	381,998.00	413,452.11	126,243.61	413,452.11	539,695.71
11. Access Ramps	LS	1.0000	2,314.03	2,496.54	762.29	2,496.54	3,258.83
11. Filter Fabric*	LS	1.0000	20,571.68	21,810.97	6,659.77	21,810.97	28,470.74
11. 4" Gravel Mulch Slope	LS	1.0000	226,323.99	231,286.91	70,621.23	231,286.91	301,908.14
11. Grouted 24" & 36" Rip-Rap on Sideslopes	LS	1.0000	3,503,538.08	3,551,804.71	1,084,509.27	3,551,804.71	4,636,313.99
11. Soil Cement (U/S)*	LS	1.0000	2,287,339.01	2,532,900.98	511,657.30	3,044,558.27	3,938,393.45
11. Aggregate Base Course (4" layer) - O&M Road*	LS	1.0000	97,285.65	99,446.12	30,364.91	99,446.12	129,811.04
11. Demolition of Existing RCB Box Culvert *	LS	1.0000	97,258.47	113,575.45	34,679.17	113,575.45	148,254.61
11. RCB Box Culverts & Gates for Interior Drainage*	LS	1.0000	854,728.05	859,175.79	262,341.03	859,175.79	1,121,516.82
11. Concrete V-Ditch - Landside*	LS	1.0000	8,542.79	9,916.18	2,388.98	11,164.97	14,486.74
11. Disposal of Waste Materials (Existing Levee Only - BCY)	LS	1.0000	118,617.71	129,060.08	39,407.25	129,060.08	168,467.33
11. Dust Control	LS	1.0000	97,896.08	107,435.25	32,804.32	107,435.25	140,239.57
11. Traffic Control	LS	1.0000	77,776.20	107,556.91	32,841.46	107,556.91	140,398.37
11. Erosion Control at Southern Disposal Site	LS	1.0000	95,875.98	96,642.93	29,508.98	96,642.93	126,151.91
11. Fish Netting	LS	1.0000	20,000.00	20,000.00	6,106.81	20,000.00	26,106.81
11. Netting Maintenance & Wtr Quality Testing	LS	1.0000	20,000.00	20,000.00	6,106.81	20,000.00	26,106.81
11. SWPPP	LS	1.0000	20,000.00	20,000.00	6,106.81	20,000.00	26,106.81
11. As-built Drawings	LS	1.0000	8,643.10	12,360.68	3,774.22	12,360.68	16,134.90

Attachment 6

**Current Working Estimate Summary
Alternatives 1.1, 3.1, 7, 8, 9, and 10**

ALTERNATIVE SUMMARY SHEET	DATE PREPARED: 12/15/2015
LITTLE COLORADO RIVER-CITY OF WINSLOW, ARIZONA	PRICE LEVEL: MARCH 2014
PRELIMINARY FEASIBILITY COST ESTIMATE - DRAFT	

CODE OF ACCTS	DESCRIPTION	COST	CONTINGENCY ¹ %	CONTINGENCY	TOTAL COST	NOTES
ALTERNATIVE 1.1 - REBUILD WINSLOW LEVEE						
01	Lands and Damages ²	\$121,338	43.44%	\$52,709	\$174,047	
02	Relocations - Utilities ³	\$848,625	43.44%	\$368,643	\$1,217,268	
06	Fish and Wildlife Facilities ⁵	\$791,400	37.41%	\$296,063	\$1,087,462	
09	Channels & Canals	\$11,410,036	37.41%	\$4,268,494	\$15,678,531	
11	Levees & Floodwalls	\$38,646,942	37.41%	\$14,457,821	\$53,104,763	
22	Cultural Resources ⁶	\$508,484	43.44%	\$220,885	\$729,369	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$7,703,529	37.41%	\$2,881,890	\$10,585,419	
31	Construction Management (S&A) - 6.7% ⁸	\$3,440,910	37.41%	\$1,287,244	\$4,728,154	
	TOTAL PROJECT COST	\$63,471,263		\$23,833,750	\$87,305,013	

ALTERNATIVE 3.1 - REBUILD AND SETBACK WINSLOW LEVEE						
01	Lands and Damages ²	\$121,338	41.15%	\$49,931	\$171,269	
02	Relocations - Utilities ³	\$868,625	41.15%	\$357,439	\$1,226,064	
02	Relocations - Property Relocation	\$2,920,613	41.07%	\$1,199,496	\$4,120,109	
06	Fish and Wildlife Facilities ⁵	\$763,537	37.44%	\$285,868	\$1,049,405	
09	Channels and Canals	\$12,435,495	37.44%	\$4,655,849	\$17,091,344	
11	Levees & Floodwalls	\$37,806,446	37.44%	\$14,154,733	\$51,961,179	
22	Cultural Resources ⁶	\$510,055	41.15%	\$209,888	\$719,942	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$7,727,330	37.44%	\$2,893,112	\$10,620,442	
31	Construction Management (S&A) - 6.7% ⁸	\$3,451,541	37.44%	\$1,292,257	\$4,743,797	
	TOTAL PROJECT COST	\$66,604,978		\$25,098,573	\$91,703,551	

ALTERNATIVE 7 - NONSTRUCTURAL MEASURES						
01	Lands and Damages ²	\$0	0.00%	\$0	\$0	
02	Relocations - Utilities ³	\$0	0.00%	\$0	\$0	
02	Relocations - Nonstructural Measures (Floodproofing) ⁴	\$13,694,306	40.00%	\$5,477,722	\$19,172,028	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$0	0.00%	\$0	\$0	
31	Construction Management (S&A) - 6.7% ⁸	\$0	0.00%	\$0	\$0	
	TOTAL PROJECT COST	\$13,694,306		\$5,477,722	\$19,172,028	

ALTERNATIVE 8 - REBUILD WINSLOW LEVEE WITH SETBACK AT HOMOLOVI I						
01	Lands and Damages ²	\$121,338	43.29%	\$52,527	\$173,865	
02	Relocations - Utilities ³	\$848,625	43.29%	\$367,370	\$1,215,995	
06	Fish and Wildlife Facilities ⁵	\$724,643	37.30%	\$270,292	\$994,935	
09	Channels and Canals	\$11,410,492	37.30%	\$4,256,113	\$15,666,605	
11	Levees & Floodwalls	\$35,453,922	37.30%	\$13,224,313	\$48,678,235	
22	Cultural Resources ⁶	\$475,891	43.29%	\$206,013	\$681,904	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$7,209,742	37.30%	\$2,689,234	\$9,898,976	
31	Construction Management (S&A) - 6.7% ⁸	\$3,220,352	37.30%	\$1,201,191	\$4,421,543	
	TOTAL PROJECT COST	\$59,465,005		\$22,267,053	\$81,732,058	

ALTERNATIVE 9 - LEVEE INCREMENT 1						
01	Lands and Damages ²	\$121,338	40.01%	\$48,547	\$169,885	
02	Relocations - Utilities ³	\$300,625	40.01%	\$120,280	\$420,905	
02	Relocations - Nonstructural Measures (Floodproofing) ⁴	\$13,694,306	40.01%	\$5,479,092	\$19,173,398	
06	Fish and Wildlife Facilities ⁵	\$48,665	39.40%	\$19,174	\$67,840	
11	Levees & Floodwalls	\$801,712	39.40%	\$315,875	\$1,117,587	
22	Cultural Resources ⁶	\$8,504	40.01%	\$3,402	\$11,906	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$128,832	39.40%	\$50,760	\$179,592	
31	Construction Management (S&A) - 6.7% ⁸	\$57,545	39.40%	\$22,673	\$80,218	
	TOTAL PROJECT COST	\$15,161,528		\$6,059,803	\$21,221,331	

ALTERNATIVE 10 - LEVEE INCREMENTS 1 & 2						
01	Lands and Damages ²	\$121,338	40.86%	\$49,579	\$170,917	
02	Relocations - Utilities ³	\$608,625	40.86%	\$248,684	\$857,309	
02	Relocations - Nonstructural Measures (Floodproofing) ⁴	\$3,016,469	40.86%	\$1,232,529	\$4,248,998	
06	Fish and Wildlife Facilities ⁵	\$483,439	36.61%	\$176,987	\$660,426	
09	Channels and Canals	\$11,412,767	36.61%	\$4,178,214	\$15,590,981	
11	Levees & Floodwalls	\$23,158,667	36.61%	\$8,478,388	\$31,637,055	
22	Cultural Resources ⁶	\$350,549	40.86%	\$143,234	\$493,783	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$5,310,813	36.61%	\$1,944,289	\$7,255,102	
31	Construction Management (S&A) - 6.7% ⁸	\$2,372,163	36.61%	\$868,449	\$3,240,612	
	TOTAL PROJECT COST	\$46,834,830		\$17,320,353	\$64,155,183	

Notes	
1	Abbreviated CSRA's developed by Walla Walla District. Net meeting occurred with PDT on February 6, 2014. Risk Register revised on December 15, 2015
2	Lands and Damages provided by Real Estate and Study Management on December 8, 2015.
3	Utility Costs developed by Real Estate Appendix G Real Estate Plan sent out on December 8, 2015 only for the following utilities as part of the overall cost : Inverted Siphons; City of Winslow 6" potable Homolovi water line; 4.5" High Pressure Gas Line; "line on wooden utility poles".
4	Relocations – These Nonstructural measures are flood proofing options. These costs were developed by Economics Section (Revised March 7, 2014).
5	Fish and Wildlife Facilities - Mitigation costs due to impacts to Tamarask coordinated this through PD Environmental Resources. See ERB's calcs dated February 3, 2014.
6	Instructed by PM, Study Management, and Cultural Resources POC to assume 1% of total construction costs to account for impacts of construction to cultural resources.
7	PED developed from judgement and experience.
8	S&A developed from judgement and experience.

Attachment 7

**Abbreviated Cost Risk Analyses
(Input and Results and Risk Register and Matrix for Alternative 1.1, 3.1, 7, 8,
9, and 10)**

ALTERNATIVE 1.1 - REBUILD WINSLOW LEVEE

Total Construction Contract Cost = \$ 50,848,378

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
01	LANDS AND DAMAGES	Real Estate	\$ 121,338	40.00%	\$ 48,535	\$ 169,873.20
02	RELOCATIONS	Utilities	\$ 848,625	40.00%	\$ 339,450	\$ 1,188,075.00
22	CULTURAL RESOURCES	Cultural Resources	\$ 508,484	50.00%	\$ 254,242	\$ 762,726.00
1	06 FISH AND WILDLIFE FACILITIES	Mitigation	\$ 791,400	43.54%	\$ 344,580	\$ 1,135,979.64
2	06 FISH AND WILDLIFE FACILITIES	Remove Saltcedar	\$ 703,000	25.37%	\$ 178,384	\$ 881,384.33
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	Conveyance Improvements	\$ 10,707,036	31.22%	\$ 3,343,252	\$ 14,050,288.03
4	11 LEVEES AND FLOODWALLS	Construct New Levees	\$ 4,190,120	39.78%	\$ 1,666,647	\$ 5,856,766.82
5	11 LEVEES AND FLOODWALLS	Rebuild Existing Levees	\$ 34,456,822	39.15%	\$ 13,488,780	\$ 47,945,602.37
6		Remaining Construction Items	\$ -	0.0%	\$ -	\$ -
7	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 7,703,529	37.41%	\$ 2,881,779	\$ 10,585,307.91
8	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 3,440,910	37.41%	\$ 1,287,195	\$ 4,728,104.72

Totals								
	Real Estate / Cultural Resources	\$	1,478,447	43.44%	\$	642,227	\$	2,120,674.20
	Total Construction Estimate	\$	50,848,378	37.41%	\$	19,021,644	\$	69,870,021
	Total Planning, Engineering & Design	\$	7,703,529	37.41%	\$	2,881,779	\$	10,585,308
	Total Construction Management	\$	3,440,910	37.41%	\$	1,287,195	\$	4,728,105
	Total	\$	63,471,264		\$	23,832,844	\$	87,304,108

ALTERNATIVE 3.1 - REBUILD AND SETBACK WINSLOW LEVEE

Total Construction Contract Cost = \$ 51,005,477

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ 121,338	40.00%	\$ 48,535	\$ 169,873.20
	02 RELOCATIONS	Utilities	\$ 868,625	40.00%	\$ 347,450	\$ 1,216,075.00
	02 RELOCATIONS	Property Relocation	\$ 2,920,613	40.00%	\$ 1,168,245	\$ 4,088,858.20
	22 CULTURAL RESOURCES	Cultural Resources	\$ 510,055	50.00%	\$ 255,028	\$ 765,082.50
1	06 FISH AND WILDLIFE FACILITIES	Mitigation	\$ 763,537	43.54%	\$ 332,448	\$ 1,095,985.07
2	06 FISH AND WILDLIFE FACILITIES	Remove Saltcedar	\$ 703,000	25.37%	\$ 178,384	\$ 881,384.33
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	Conveyance Improvements	\$ 11,732,495	31.22%	\$ 3,663,449	\$ 15,395,943.95
4	11 LEVEES AND FLOODWALLS	Construct New Levees	\$ 19,584,978	39.78%	\$ 7,790,051	\$ 27,375,029.48
5	11 LEVEES AND FLOODWALLS	Rebuild Existing Levees	\$ 18,221,467	39.15%	\$ 7,133,141	\$ 25,354,608.04
7		Remaining Construction Items	\$ -	0.0%	\$ -	\$ -
8	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 7,727,330	37.44%	\$ 2,893,267	\$ 10,620,597.42
9	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 3,451,541	37.44%	\$ 1,292,326	\$ 4,743,867.21

Totals						
	Real Estate / Cultural Resources	\$	4,420,631	41.15%	\$ 1,819,258	\$ 6,239,888.90
	Total Construction Estimate	\$	51,005,477	37.44%	\$ 19,097,474	\$ 70,102,951
	Total Planning, Engineering & Design	\$	7,727,330	37.44%	\$ 2,893,267	\$ 10,620,597
	Total Construction Management	\$	3,451,541	37.44%	\$ 1,292,326	\$ 4,743,867
	Total	\$	66,604,979		\$ 25,102,326	\$ 91,707,304

ALTERNATIVE 7 - NONSTRUCTURAL MEASURES

Total Construction Contract Cost = \$ 13,694,306

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	02 RELOCATIONS	Non-Structural	\$ 13,694,306	40.00%	\$ 5,477,996	\$ 19,172,301.92
2		Remaining Construction Items	\$ -	0.0%	\$ -	\$ -
3	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ -	40.00%	\$ -	\$ -
4	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ -	40.00%	\$ -	\$ -

Totals						
	Real Estate	\$ -		0.00%	\$ -	\$ -
	Total Construction Estimate	\$ 13,694,306		40.00%	\$ 5,477,996	\$ 19,172,302
	Total Planning, Engineering & Design	\$ -		0.00%	\$ -	\$ -
	Total Construction Management	\$ -		0.00%	\$ -	\$ -
	Total	\$ 13,694,306			\$ 5,477,996	\$ 19,172,302

ALTERNATIVE 8 - REBUILD WINSLOW LEVEE WITH SETBACK AT HOMOLOVI I

Total Construction Contract Cost = \$ 47,589,058

<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
01 LANDS AND DAMAGES	Real Estate	\$ 121,338	40.00%	\$ 48,535	\$ 169,873.20
02 RELOCATIONS	Utilities	\$ 848,625	40.00%	\$ 339,450	\$ 1,188,075.00
22 CULTURAL RESOURCES	Cultural Resources	\$ 475,891	50.00%	\$ 237,946	\$ 713,836.50
1 06 FISH AND WILDLIFE FACILITIES	Mitigation	\$ 724,643	43.54%	\$ 315,514	\$ 1,040,156.95
2 06 FISH AND WILDLIFE FACILITIES	Remove Saltcedar	\$ 703,000	25.37%	\$ 178,384	\$ 881,384.33
3 09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	Conveyance Improvements	\$ 10,707,492	31.22%	\$ 3,343,394	\$ 14,050,886.02
4 11 LEVEES AND FLOODWALLS	Construct New Levees	\$ 5,416,571	39.78%	\$ 2,154,476	\$ 7,571,047.60
5 11 LEVEES AND FLOODWALLS	Rebuild Existing Levees	\$ 30,037,351	39.15%	\$ 11,758,694	\$ 41,796,044.61
6	Remaining Construction Items	\$ (0)	0.0%	\$ -	\$ (0.00)
7 30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 7,209,742	37.30%	\$ 2,689,195	\$ 9,898,936.99
8 31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 3,220,352	37.30%	\$ 1,201,174	\$ 4,421,525.97
Totals					
	Real Estate / Cultural Resources	\$ 1,445,854	43.29%	\$ 625,931	\$ 2,071,784.70
	Total Construction Estimate	\$ 47,589,057	37.30%	\$ 17,750,462	\$ 65,339,520
	Total Planning, Engineering & Design	\$ 7,209,742	37.30%	\$ 2,689,195	\$ 9,898,937
	Total Construction Management	\$ 3,220,352	37.30%	\$ 1,201,174	\$ 4,421,526
	Total	\$ 59,465,005		\$ 22,266,762	\$ 81,731,767

ALTERNATIVE 9 - LEVEE INCREMENT 1

Total Construction Contract Cost = \$ **850,378**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
01	LANDS AND DAMAGES	Real Estate	\$ 121,338	40.00%	\$ 48,535	\$ 169,873.20
02	RELOCATIONS	Utilities	\$ 300,625	40.00%	\$ 120,250	\$ 420,875.00
22	CULTURAL RESOURCES	Cultural Resources	\$ 8,504	50.00%	\$ 4,252	\$ 12,756.00
02	RELOCATIONS	Nonstructural Measures	\$ 13,694,306	40.00%	\$ 5,477,996	\$ 19,172,301.92
1	06 FISH AND WILDLIFE FACILITIES	Mitigation	\$ 48,665	43.54%	\$ 21,189	\$ 69,854.65
2	11 LEVEES AND FLOODWALLS	Rebuild Existing Levees	\$ 801,712	39.15%	\$ 313,846	\$ 1,115,557.96
3		Remaining Construction Items	\$ 0	0.0%	\$ -	\$ 0.00
4	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 128,832	39.40%	\$ 50,758	\$ 179,589.68
5	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 57,545	39.40%	\$ 22,672	\$ 80,216.78

Totals						
	Real Estate / Cultural Resources	\$	14,124,773	40.01%	\$ 5,651,033	\$ 19,775,806.12
	Total Construction Estimate	\$	850,378	39.40%	\$ 335,035	\$ 1,185,413
	Total Planning, Engineering & Design	\$	128,832	39.40%	\$ 50,758	\$ 179,590
	Total Construction Management	\$	57,545	39.40%	\$ 22,672	\$ 80,217
	Total	\$	15,161,528		\$ 6,059,497	\$ 21,221,025

ALTERNATIVE 10 - LEVEE INCREMENTS 1 & 2

Total Construction Contract Cost = \$ 35,054,873

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ 121,338	40.00%	\$ 48,535	\$ 169,873.20
	02 RELOCATIONS	Utilities	\$ 608,625	40.00%	\$ 243,450	\$ 852,075.00
	22 CULTURAL RESOURCES	Cultural Resources	\$ 350,549	50.00%	\$ 175,275	\$ 525,823.50
	02 RELOCATIONS	Non-Structural	\$ 3,016,469	40.00%	\$ 1,206,648	\$ 4,223,116.85
1	06 FISH AND WILDLIFE FACILITIES	Mitigation	\$ 483,439	43.54%	\$ 210,492	\$ 693,931.27
2	06 FISH AND WILDLIFE FACILITIES	Remove Saltcedar	\$ 703,000	25.37%	\$ 178,384	\$ 881,384.33
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	Conveyance Improvements	\$ 10,709,767	31.22%	\$ 3,344,105	\$ 14,053,871.47
4	11 LEVEES AND FLOODWALLS	Construct New Levees	\$ 5,525,929	39.78%	\$ 2,197,974	\$ 7,723,903.16
5	11 LEVEES AND FLOODWALLS	Rebuild Existing Levees	\$ 17,632,738	39.15%	\$ 6,902,671	\$ 24,535,409.40
6		Remaining Construction Items	\$ 0	0.0%	0.00%	\$ - \$ 0.19
7	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 5,310,813	36.61%	\$ 1,944,294	\$ 7,255,107.32
8	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 2,372,163	36.61%	\$ 868,451	\$ 3,240,614.41

Totals						
	Real Estate / Cultural Resources	\$	4,096,981	40.86%	\$	1,673,908 \$ 5,770,888.55
	Total Construction Estimate	\$	35,054,873	36.61%	\$	12,833,627 \$ 47,888,500
	Total Planning, Engineering & Design	\$	5,310,813	36.61%	\$	1,944,294 \$ 7,255,107
	Total Construction Management	\$	2,372,163	36.61%	\$	868,451 \$ 3,240,614
	Total	\$	46,834,830		\$	17,320,280 \$ 64,155,110

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
Project Scope Growth								
							Max Potential Cost Growth	75%
PS-1	Remove Saltcedar	• Design confidence?	• Potential for scope growth, added features and quantities?	Saltcedar removal is intended to improve channel conveyance. H&H models show sufficient removal to improve channel conveyance. Saltcedar removal is also required to expose potential borrow sites depending on the availability of levee fill material.	Unlikely	Marginal	0	
PS-2	Mitigation	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	Vegetation planting to mitigate for construction impacts. Designers are comfortable with current mitigation requirements, but no current surveys have been conducted to measure impacts. Future negotiations with outside agencies will be required to formalize mitigation requirements and could require significant increases. Habitat units removed should equal habitat units restored.	Likely	Significant	3	
PS-3	Conveyance Improvements	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	Excavation of accumulated sediment in the channel bottom. Hydraulic models are fairly well established. Questions remain about excavations around bridge piers and abutments. Design currently is conservative in its cut slopes. Additional armoring around the bridge piers may be required.	Possible	Significant	2	
PS-4	Rebuild Existing Levees	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	Current design scope is sufficient. Scour analysis has not been performed for the levee toe. It is possible scour depths could vary from the assumed and quantities could increase (or decrease).	Possible	Marginal	1	
PS-5	Construct New Levees	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	Current design scope is sufficient. Scour analysis has not been performed for the levee toe. Existing utilities could present an issue. Much of the southern setback is vacant land with minimal utilities, the northern setback has limited structures with most utilities known. Navajo County has stated they would be willing to "take" property in order to enable levee alignment, as a last alternative. Cultural resources could be encountered which could lead to significant costs. Low risk of HTRW around the railroad bridge, otherwise no risks are anticipated.	Possible	Significant	2	
PS-6	Non-Structural	• Potential for scope growth, added features and quantities?	• Potential for scope growth, added features and quantities?	Low potential for prehistoric cultural resources because nonstructural area was once within the active floodplain. River flows and sedimentation would generally bury prehistoric sites. Based on completed records search and nearby Holbrook Levee, the cost risk for cultural resources is low. Little likelihood that more than a few NRHP-eligible structures will be identified. Mitigation would consist of Historic American Building Survey documentation. The total cultural resources mitigation cost is not expected to exceed 1% of the project construction cost. Hydraulic modeling completed for the Homolovi I Pueblo shows no impacts to the site. Coordination is ongoing, and there is a public perception risk regardless of the actual impact. Nonstructural costs can vary due to inaccurate determination of which structures need floodproofing, inaccurate estimates of the amount of elevation needed, and unique characteristics that cause the cost deviate substantially from typical values. Other nonstructural measures include an early warning system. Current plan lacks detail but is relatively minor in cost.	Likely	Marginal	2	

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Acquisition Strategy							
						Max Potential Cost Growth	30%
AS-1	Remove Saltcedar	• Contracting plan firmly established?	• Contracting plan firmly established?	Project location is fairly remote and not conducive to small business or 8a contractors. This work could also be specialized enough to also not be conducive to small business.	Possible	Marginal	1
AS-2	Mitigation	• Contracting plan firmly established?	• Contracting plan firmly established?	Intent is to develop habitat over time and will require habitat evaluation over time, typically requirements outside the capacity of small business.	Possible	Marginal	1
AS-3	Conveyance Improvements	• Contracting plan firmly established?	• Contracting plan firmly established?	Project location is fairly remote and not conducive to small business or 8a contractors. Work will also require heavy construction not typical of small/disadvantage business.	Possible	Marginal	1
AS-4	Rebuild Existing Levees	• Contracting plan firmly established?	• Contracting plan firmly established?	Project location is fairly remote and not conducive to small business or 8a contractors. Work will also require heavy construction not typical of small/disadvantage business.	Possible	Marginal	1
AS-5	Construct New Levees	• Contracting plan firmly established?	• Contracting plan firmly established?	Project location is fairly remote and not conducive to small business or 8a contractors. Work will also require heavy construction not typical of small/disadvantage business.	Possible	Marginal	1
AS-6	Non-Structural	• Contracting plan firmly established?	• Contracting plan firmly established?	Project location is fairly remote and not conducive to small business or 8a contractors. Work will also require heavy construction not typical of small/disadvantage business. Non-structural fixes will happen over an extended period of time.	Possible	Marginal	1

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Construction Elements							
						Max Potential Cost Growth	25%
CE-1	Remove Saltcedar	• Unique construction methods?	• Unique construction methods?	Currently unknown whether heavy equipment or more costly and labor intensive selective removal will be required. Estimate assumes large equipment removal. Based on Arizona Game and Fish Department initial observations, it is possible to even likely individual removal may be required. If present, Southwestern Willow Flycatcher will limit construction window to outside of the April to August breeding season, potentially conflicting with flood windows.	Unlikely	Significant	1
CE-2	Mitigation	• Special equipment or subcontractors needed?	• Special equipment or subcontractors needed?	Cost estimate currently includes efforts for five years of monitoring and re-establishment of plants. In the event of catastrophic events (Acts of God) its not anticipated continued reestablishment would be enforced.	Possible	Marginal	1
CE-3	Conveyance Improvements	• Accelerated schedule or harsh weather schedule?	• Water care and diversion plan? • Accelerated schedule or harsh weather schedule?	Fish passage costs have been included in the cost estimate. Estimate also includes cost for relocation of fish at the impingement points. If present, Southwestern Willow Flycatcher will limit construction window to outside of the April to August breeding season, potentially conflicting with flood windows. Flood events are possible year round (far less likely from April to November) that could impact both construction work and schedule.	Possible	Significant	2
CE-4	Rebuild Existing Levees	• Accelerated schedule or harsh weather schedule?	• Accelerated schedule or harsh weather schedule?	Sections of the levee must be completed in single season to insure continued protection. Based on experience from similar local projects, timely completion of segments has been an issue.	Likely	Significant	3
CE-5	Construct New Levees	• Unique construction methods?	• Potential for construction modification and claims? • Unique construction methods?	Unknown utilities/differing site conditions much more likely when construction on virgin property. Hydraulic gates are required for interior drainage channel requiring "specialized" construction which has been accounted for in the estimate.	Possible	Marginal	1
CE-6	Non-Structural	• Unique construction methods?	• Potential for construction modification and claims? • Unique construction methods?	Working with individual residents/properties present individual challenges. Accelerated schedules and weather concerns may present issues as well.	Likely	Marginal	2

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
Quantities for Current Scope								
							Max Potential Cost Growth	20%
Q-1	Remove Saltcedar	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Additional quantities of Saltcedar may need to be removed to create borrow area for levee construction.	Possible	Significant	2	
Q-2	Mitigation	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Future negotiations with outside agencies will be required to formalize mitigation requirements and could require significant increases. The ultimate mitigation requirements are outside the control of USACE PDT.	Likely	Significant	3	
Q-3	Conveyance Improvements	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	H&H has modeled channel conveyance and is comfortable with their results and quantities. It is possible economic optimization may lead to a lower level of protection, but very unlikely a higher level of protection will be optimized.	Possible	Marginal	1	
Q-4	Rebuild Existing Levees	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Levee cross sections are based on 15 percent design and have potential for possible significant changes to quantities. The latest quantity calcs developed in March 2014 during ATR were based on the 15' scour depth provided by H&H. This scour depth is also supported by 1980 ADWR (Arizona Department of Water Resources) for the same levee. Riprap quantities and grouted stone could be required, pending scour analysis.	Possible	Significant	2	
Q-5	Construct New Levees	• Sufficient investigations to develop quantities?	• Sufficient investigations to develop quantities?	Levee cross sections are based on 15 percent design and have potential for possible significant changes to quantities. Same as Q-4 due to refinement of quantities during ATR. Riprap quantities and grouted stone could be required, pending scour analysis.	Possible	Significant	2	
Q-6	Non-Structural	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Construction quantities depend on the number of houses identified in a given area. Actual quantities will depend on those home owners volunteering to have their houses raised. Inundation area could change which would also impact number of houses affected.	Possible	Marginal	1	

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
Specialty Fabrication or Equipment								
							Max Potential Cost Growth	75%
FE-1	Remove Saltcedar	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Standard construction approach with minimal to no specialized construction anticipated.	Unlikely	Marginal	0	
FE-2	Mitigation	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Standard construction approach with minimal to no specialized construction anticipated.	Unlikely	Marginal	0	
FE-3	Conveyance Improvements	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Standard construction approach with minimal to no specialized construction anticipated.	Unlikely	Marginal	0	
FE-4	Rebuild Existing Levees	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Specialized Hydraulic Gate structure will be constructed. Anticipate qualified contractor will minimize cost impacts.	Possible	Negligible	0	
FE-5	Construct New Levees	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Specialized Hydraulic Gate structure will be constructed. Anticipate qualified contractor with minimal cost impacts.	Possible	Marginal	1	
FE-6	Non-Structural	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	Standard construction approach with minimal to no specialized construction anticipated. In the event homes can't be raised, replacement costs may be required (risk accounted for elsewhere).	Possible	Marginal	1	

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
Cost Estimate Assumptions								
							Max Potential Cost Growth	35%
CT-1	Remove Saltcedar	• Reliability and number of key quotes?	• Reliability and number of key quotes?	Unit costs based on actual costs for similar Saltcedar removal with comparable site locations.	Possible	Marginal	1	
CT-2	Mitigation	• Reliability and number of key quotes?	• Reliability and number of key quotes?	Unit costs have been supplied by Environmental Resources Branch and are based on actual costs and take into account remote site location. Costs/acre are based on current costs. However, total acreage of revegetation is subject to change pending outcome of biological surveys and potential coordination with USFWS. Variable irrigation requirements may require a marginal additional contingency.	Possible	Significant	2	
CT-3	Conveyance Improvements	• Assumptions regarding crew, productivity, overtime?	• Assumptions regarding crew, productivity, overtime?	Estimate assumes conventional construction with diversion and dewatering requirements.	Possible	Marginal	1	
CT-4	Rebuild Existing Levees	• Lack confidence on critical cost items?	• Lack confidence on critical cost items?	Location/suitability/cost of borrow source remains a major concern. Based on quantities from geotechnical design, it is assumed most material in the existing levee could be reused and local excess excavated material could be used.	Possible	Critical	3	
CT-5	Construct New Levees	• Lack confidence on critical cost items?	• Lack confidence on critical cost items?	Location/suitability/cost of borrow source remains a major concern. Based on quantities from geotechnical design, it is assumed most material in the existing levee could be reused and local excess excavated material could be used.	Possible	Critical	3	
CT-6	Non-Structural	• Lack confidence on critical cost items?	• Lack confidence on critical cost items?	Estimate based on costs developed by National Flood Proofing Committee. Prices were not adjusted for a location factor nor do they take into account the possibility structures may need to be replaced in kind rather than merely raised.	Likely	Significant	3	

Little Colorado at Winslow

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 2/6/2014, Revised 12/9/2015

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
External Project Risks								
							Max Potential Cost Growth	40%
EX-1	Remove Saltcedar	• Political influences, lack of support, obstacles?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	
EX-2	Mitigation	• Potential for severe adverse weather?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	
EX-3	Conveyance Improvements	• Potential for severe adverse weather?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	
EX-4	Rebuild Existing Levees	• Potential for severe adverse weather?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	
EX-5	Construct New Levees	• Potential for severe adverse weather?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	
EX-6	Non-Structural	• Potential for market volatility impacting competition, pricing?	<ul style="list-style-type: none"> • Political influences, lack of support, obstacles? • Local influences? • Potential for market volatility impacting competition, pricing? 	Current political climate is very supportive of the project, but support is subject to change along with the national emphasis on limiting spending. Local sponsor (Navajo County) is actively engaged and very supportive of the project but significant funding commitments could present issues. While historically steady state, significant regional economic growth could be forthcoming in the next 10-15 years, potentially increasing local labor costs.	Likely	Significant	3	

Little Colorado at Winslow
 Feasibility (Alternatives)
 Abbreviated Risk Analysis

		<u>Potential Risk Areas</u>								
		Remove Saltcedar	Mitigation	Conveyance Improvements	Rebuild Existing Levees	Construct New Levees	Non-Structural	Remaining Construction Items	Planning, Engineering, & Design	Construction Management
Project Scope Growth	-	3	2	1	2	2	-	-	-	
Acquisition Strategy	1	1	1	1	1	1	-	-	-	
Construction Elements	1	1	2	3	1	2	-	-	-	
Quantities for Current Scope	2	3	1	2	2	1	-	-	-	
Specialty Fabrication or Equipment	-	-	-	-	1	1	-	-	-	
Cost Estimate Assumptions	1	2	1	3	3	3	-	-	-	
External Project Risks	3	3	3	3	3	3	-	-	-	

Typical Risk Elements

Attachment 8

**Optimization Work for Economics Section – Figures and TPCs for
Alternatives 10.1, 10.2, 10.3, & 10.4**

ALTERNATIVE SUMMARY SHEET
LITTLE COLORADO RIVER-CITY OF WINSLOW, ARIZONA
PRELIMINARY FEASIBILITY COST ESTIMATE - DRAFT

DATE PREPARED: 12/11/2015
 PRICE LEVEL: August 2014

CODE OF ACCTS	DESCRIPTION	COST	CONTINGENCY % ¹	CONTINGENCY	TOTAL COST	NOTES
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ALTERNATIVE 10.1 - LEVEE INCREMENTS 1 & 2 (1% ACE1 +3')						
01	Lands and Damages ²	\$121,338	40.86%	\$49,579	\$170,917	
02	Relocations - Utilities ³	\$608,625	40.86%	\$248,684	\$857,309	
06	Fish and Wildlife Facilities ⁵	\$483,439	36.61%	\$176,987	\$660,426	
09	Channels and Canals	\$11,412,767	36.61%	\$4,178,214	\$15,590,981	
11	Levees & Floodwalls	\$23,158,667	36.61%	\$8,478,388	\$31,637,055	
22	Cultural Resources ⁶	\$350,549	40.63%	\$142,428	\$492,977	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$5,310,813	36.61%	\$1,944,289	\$7,255,102	
31	Construction Management (S&A) - 6.7% ⁸	\$2,372,163	36.61%	\$868,449	\$3,240,612	
	TOTAL PROJECT COST	\$43,818,361		\$16,087,017	\$59,905,378	

ALTERNATIVE 10.2 - LEVEE INCREMENTS 1 & 2 (4% ACE +3')						
01	Lands and Damages ²	\$121,338	40.86%	\$49,579	\$170,917	
02	Relocations - Utilities ³	\$608,625	40.86%	\$248,684	\$857,309	
06	Fish and Wildlife Facilities ⁵	\$483,559	36.61%	\$177,031	\$660,590	
09	Channels and Canals	\$0	36.61%	\$0	\$0	
11	Levees & Floodwalls	\$22,279,000	36.61%	\$8,156,342	\$30,435,342	
22	Cultural Resources ⁶	\$227,626	40.63%	\$92,484	\$320,110	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$3,448,528	36.61%	\$1,262,506	\$4,711,034	
31	Construction Management (S&A) - 6.7% ⁸	\$1,540,342	36.61%	\$563,919	\$2,104,262	
	TOTAL PROJECT COST	\$28,709,018		\$10,550,545	\$39,259,563	

ALTERNATIVE 10.3 - LEVEE INCREMENTS 1 & 2 (2% ACE +3')						
01	Lands and Damages ²	\$121,338	40.86%	\$49,579	\$170,917	
02	Relocations - Utilities ³	\$608,625	40.86%	\$248,684	\$857,309	
06	Fish and Wildlife Facilities ⁵	\$483,441	36.61%	\$176,988	\$660,429	
09	Channels and Canals	\$11,986,237	36.61%	\$4,388,161	\$16,374,399	
11	Levees & Floodwalls	\$22,258,212	36.61%	\$8,148,732	\$30,406,944	
22	Cultural Resources ⁶	\$347,279	40.63%	\$141,099	\$488,378	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$5,261,275	36.61%	\$1,926,153	\$7,187,428	
31	Construction Management (S&A) - 6.7% ⁸	\$2,350,036	36.61%	\$860,348	\$3,210,385	
	TOTAL PROJECT COST	\$43,416,444		\$15,939,744	\$59,356,189	

ALTERNATIVE 10.4 - LEVEE INCREMENTS 1 & 2 (0.5% ACE +3')						
01	Lands and Damages ²	\$121,338	40.86%	\$49,579	\$170,917	
02	Relocations - Utilities ³	\$608,625	40.86%	\$248,684	\$857,309	
06	Fish and Wildlife Facilities ⁵	\$483,407	36.61%	\$176,975	\$660,383	
09	Channels and Canals	\$16,593,406	36.61%	\$6,074,846	\$22,668,252	
11	Levees & Floodwalls	\$23,140,394	36.61%	\$8,471,698	\$31,612,093	
22	Cultural Resources ⁶	\$402,172	40.63%	\$163,403	\$565,575	
30	Preconstruction Engineering and Design (PED) - 15% ⁷	\$6,092,907	36.61%	\$2,230,613	\$8,323,520	
31	Construction Management (S&A) - 6.7% ⁸	\$2,721,498	36.61%	\$996,341	\$3,717,839	
	TOTAL PROJECT COST	\$50,163,748		\$18,412,139	\$68,575,887	

Notes						
1	Abbreviated CSRA's developed by Walla Walla District. Net meeting occurred with PDT on February 6, 2014. Risk Register revised on December 9, 2015					
2	Lands and Damages provided by Real Estate and Study Management on December 8, 2015					
3	Utility Costs developed by Real Estate Appendix G Real Estate Plan sent out on December 8, 2015 only for the following utilities as part of the overall cost : Inverted Siphons; City of Winslow 6" potable Homolovi water line; 4.5" High Pressure Gas Line; line on wooden utility poles, and protect in place Century Link F.O. Line.					
4	Fish and Wildlife Facilities - Mitigation costs due to impacts to Salt Cedar (Tamarack) coordinated this through PD Environmental Resources. See ERB's calcs dated February 3, 2014					
5	Instructed by PM, Study Management, and Cultural Resources POC to assume 1% of total construction costs to account for impacts of construction to cultural resources.					
6	PED developed from judgement and experience.					
7	S&A developed from judgement and experience.					



Legend

- Rebuild Winslow Levee
- Remove Winslow Levee
- New Levees
- Winslow Levee-No Improvements
- Rebuild RWDL
- RWDL-No Improvements
- Channelization
- Remove Saltcedar
- 1% ACE Floodplain
- Little Colorado River
- Roads
- BNSF Railroad

Sources:

Imagery Background:
 Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Reference Map Background:
 USGS The National Map: National Boundaries Dataset, 3D Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line

Coordinate System:
 State Plane Arizona East (FIPS 201, Feet)
 Datum: NAD 1983



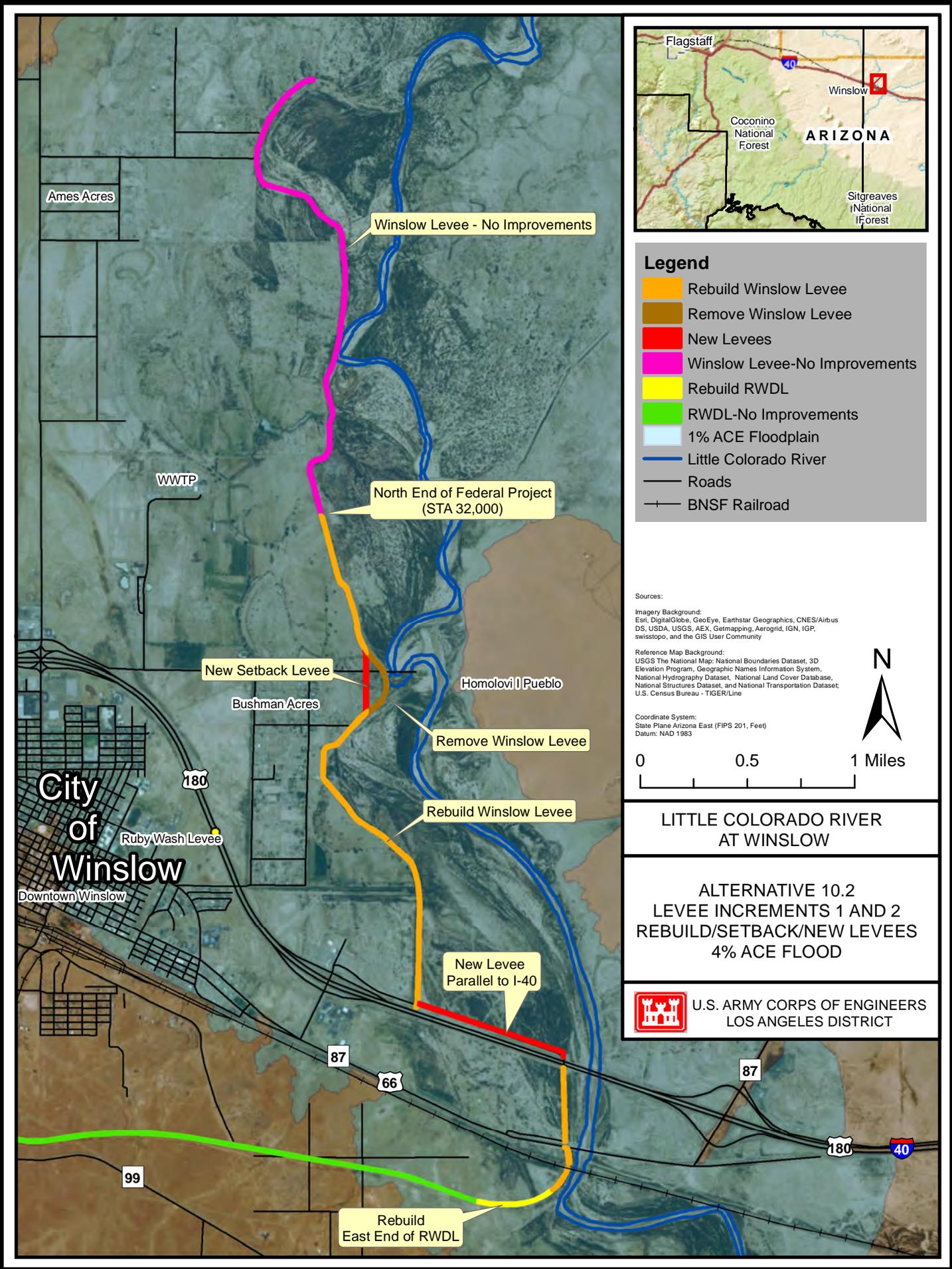
LITTLE COLORADO RIVER AT WINSLOW

**ALTERNATIVE 10.1
 LEVEE INCREMENTS 1 AND 2
 REBUILD/SETBACK/NEW LEVEES
 CONVEYANCE IMPROVEMENTS
 1% ACE FLOOD**



**U.S. ARMY CORPS OF ENGINEERS
 LOS ANGELES DISTRICT**





Legend

- Rebuild Winslow Levee
- Remove Winslow Levee
- New Levees
- Winslow Levee-No Improvements
- Rebuild RWDL
- RWDL-No Improvements
- 1% ACE Floodplain
- Little Colorado River
- Roads
- BNSF Railroad

Sources:

Imagery Background:
 Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swissopo, and the GIS User Community

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Coordinate System:
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 Datum: NAD 1983





**LITTLE COLORADO RIVER
AT WINSLOW**

**ALTERNATIVE 10.2
LEVEE INCREMENTS 1 AND 2
REBUILD/SETBACK/NEW LEVEES
4% ACE FLOOD**



**U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT**



Legend

- Rebuild Winslow Levee
- Remove Winslow Levee
- New Levees
- Winslow Levee-No Improvements
- Rebuild RWDL
- RWDL-No Improvements
- Channelization
- Remove Saltcedar
- 1% ACE Floodplain
- Little Colorado River
- Roads
- + BNSF Railroad

Sources:

Imagery Background:
 Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Coordinate System:
 State Plane Arizona East (FIPS 201, Feet)
 Datum: NAD 1983





**LITTLE COLORADO RIVER
AT WINSLOW**

**ALTERNATIVE 10.3
LEVEE INCREMENTS 1 AND 2
REBUILD/SETBACK/NEW LEVEES
CONVEYANCE IMPROVEMENTS
2% ACE FLOOD**





Legend

- Rebuild Winslow Levee
- Remove Winslow Levee
- New Levees
- Winslow Levee-No Improvements
- Rebuild RWDL
- RWDL-No Improvements
- Channelization
- Remove Saltcedar
- 1% ACE Floodplain
- Little Colorado River
- Roads
- BNSF Railroad

Sources:

Imagery Background:
 Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Coordinate System:
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 Datum: NAD 1983

**LITTLE COLORADO RIVER
AT WINSLOW**

**ALTERNATIVE 10.4
LEVEE INCREMENTS 1 AND 2
REBUILD/SETBACK/NEW LEVEES
CONVEYANCE IMPROVEMENTS
0.5% ACE FLOOD**

