Council Agenda Report

From: John Falkenstien, City Engineer

Subject: General Plan Circulation Element Update Process – Huer Huero Creek Crossing Alternatives, Costs and Financing Options

Date: May 2, 2017

Facts

1. At its meeting of April 5, 2011, the City Council updated the Circulation Element of the General Plan by adoption of Resolution 11-032.

2. At its meeting of April 1, 2014, the City Council adopted Resolution 14-035 accepting the Development Impact Fee Justification Study and setting the current array of Development Impact Fees.

3. The Circulation Element of the General Plan is the policy basis of the Transportation section of the Needs List within the Justification Study of the development impact fee program. The cost estimates of the projects on the List form the fundamental financial goal of the impact fee program.

4. The Housing Constraints and Opportunities Committee (HCOC) formed by the City Council in early 2016, has requested that staff prioritize the Needs List and re-evaluate its cost estimates.

5. At its meeting of August 2, 2016, the City Council adopted Resolution 16-103 amending the General Plan to change land uses of the Erskine property located at the eastern end of Wisteria Lane from Agriculture to Manufacturing. Public facilities gained from this key amendment include right-of-way dedication of a connecting arterial road from Wisteria Lane over the Huer Huero Creek to Airport Road and construction of a portion of the road. The connecting road will provide part of the Circulation Element's 46E Parallel Route and eventually eliminate reliance on the intersection of Airport Road – Highway 46E and the use of the Highway for access to the Airport.

6. At a special meeting of the City Council on September 15, 2016, a presentation was made outlining the background of the formation of the 2011 Circulation Element, the progress made towards its stated goals, and the potential of eliminating expensive segments currently on the Needs List.

7. At their meeting of September 15, 2016, the City Council requested staff to evaluate the feasibility of an at grade "Arizona" type crossing of the Huer Huero Creek for the extension of Erskine's connection road to Airport Road.

8. At its meeting of December 20, 2016, the City Council authorized the City Manager to retain the Wallace Group to provide more thorough planning and definition of the items on the AB 1600 Needs List and prepare more precise cost estimates. Additionally, The Wallace Group was asked to evaluate the feasibility of permitting and constructing an at grade ("Arizona") crossing of Huer Huero Creek.

9. At is meeting of December 20, 2016, the City Council authorized the City Manager to retain Central Coast Transportation Consultants (Joe Fernandez) to update the City's Travel Demand Model and to analyze the need of certain segments of 2011 Circulation Element and ascertain the potential impact of their removal.

10. On April 20, 2017, Jorge Aguilar of the Wallace Group, submitted a memo outlining the feasibility and potential cost of three design alternative crossings of the Huer Huero Creek including an at grade "Arizona" option and a conventional bridge. The analyses include cost estimates.

Options

1. Take no action.

2. Receive and file report.

3. Provide direction to staff on a preferred crossing alternative to incorporate into the Circulation Element Needs List update.

4. Refer back to staff for additional analysis.

Analysis and Conclusion

Background.

At its meeting of August 2, 2016, the City Council approved the General Plan Amendment for the Erskine property north of the intersection of Union Road and Highway 46E. This amendment provides for the change in land use of the Erskine property from Agriculture to Manufacturing. Key features of this amendment include the dedication of a connecting road from Wisteria Lane north, eventually crossing the Huer Huero Creek and connecting to Airport Road, creating a key segment of the Circulation Element's Parallel Route.

When developed, this connecting road will eventually eliminate the City's reliance on the intersection of Airport Road and Highway 46E. Furthermore, this connection will allow City residents a number of optional routes to the Airport without use of Highway 46E. These are primary goals first outlined in the City's Parallel Routes Study, published in 2007, reiterated in the Caltrans Corridor Study published in 2009, and reflected again in the City's updated Circulation Element, adopted by the City Council on April, 5, 2011.

Urgency to push the connecting road from concept to reality became the topic of discussion among Council members in the 2017 consideration of the Destino Resort project on Airport Road. Conditions of approval of the resort essentially limit its development to its first phase until the connecting road is completed between Airport Road and Wisteria Lane. That connection will require some form of crossing over the Huer Huero Creek.

Erskine Industrial Tract 3069 Update.

Erskine has his team of engineers working on his portion of subdivision improvements. Staff expects to see plans for the connecting road from Wisteria Lane to the end of the peninsula by the end of April 2017.

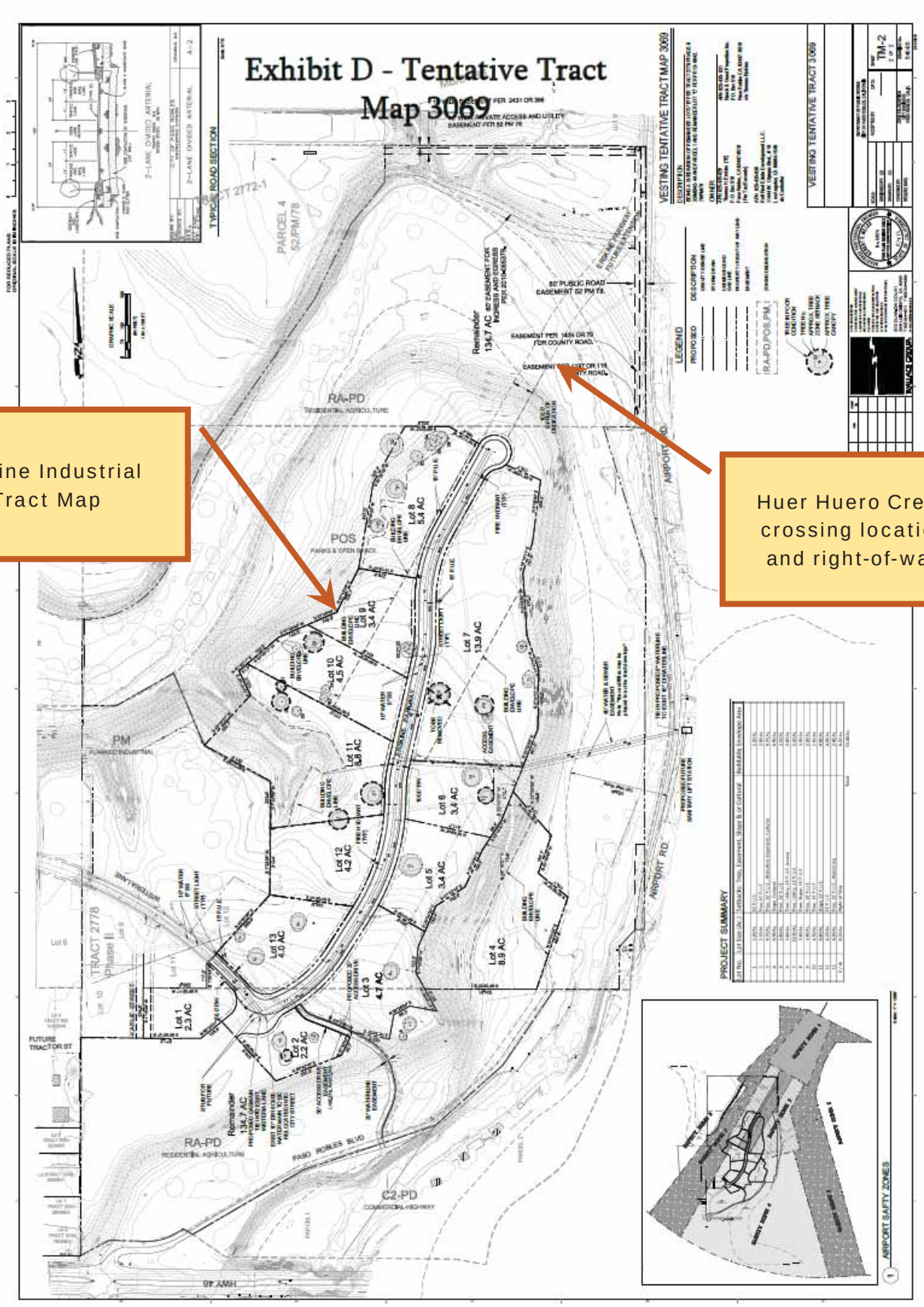
Exhibit D - Tentative Tract Map 3069
Erskine Industrial Tract Map
Huer Huero Creek crossing location and right-of-way
VESTING TENTATIVE TRACT MAP 3069
LEGEND
PROJECT SUMMARY
AIRPORT SAFETY ZONES
PASO ROBLES BLVD
AIRPORT RD
RA-PD
POS
PM
C2-PD

Wallace Group Update.
In accordance with their contract with the City, Jorge Aguilar of the Wallace Group has prepared a memo and exhibits (see Attachment 1) for three alternative "bridge" crossings of the Huer Huero Creek for the northerly road connection to Airport Road.

Huer Huero Creek Crossing Options

1. At grade "Arizona" crossing
2. Low-water culvert crossing
3. Conventional bridge.

Mr. Aguilar has further scrutinized the bridge alternative into three height options resulting in three levels of grading and site disturbance. Cost estimates and a color coded feasibility matrix are provided for all alternatives, comparing costs, reliability, environmental impacts, permitting and utility accommodations. With all findings evaluated, the conventional bridge alternative appears to be the most appropriate option to pursue.

	Crossing Type		
Criteria	At Grade	Low Water	Bridge
Construction & Support Cost Range*	$6.4 - $7.8M	$9.0 - $11.0M	$7.1 - $12.9M
Creek Footprint	19,000 sq. ft.	36,000 sq. ft.	200 sq. ft.
Risk of Failure	Medium	Highest	Lowest
Access During Creek Flow	Likely closed	Medium	Open
Impact on Erskine Parkway/TTM 3069	More	Highest	Least
Permitting	Not likely	Low	High
Environmental/Wildlife Impacts	High	Moderate	Low
Utilities Accommodation	Low	bad	good

*Note: Permitting/mitigation costs not included.

Color Key:	
	Significantly Impact/Undesirable
	Caution/Risk
	Better Outcome/Desirable

CCTC Update.
Central Coast Transportation Consulting (CCTC), Joe Fernandez, has completed his Travel Demand Model (TDM) update and is beginning the analysis portion of his work. This will include analyzing the elimination of the Golden Hill Road – Dry Creek Road connection. Additionally, Mr. Fernandez will use the model to evaluate road segments in the Circulation Element including the Wisteria Lane connection through the Cuesta College property, the easterly extension of Tractor Way into the Erskine property, Airport Road and Sherwood Road through Chandler Ranch and Airport Road though the Beechwood Plan.

Fiscal Impact
The conventional bridge alternative is estimated to cost $10 million to $12 million.

Recommendation
Direct staff to incorporate the conventional bridge option into the Circulation Element Needs List update.

Attachments
1. Memorandum From the Wallace Group dated April 20, 2017
2. Drawings and Cost Estimates

MEMORANDUM

City of Paso Robles
Huer Huero Creek Crossing Alternatives – Feasibility Study

Date: April 24, 2017

To: John Falkenstien, P.E. City Engineer

From: Jorge Aguilar, P.E. C48,704

Subject: Huer Huero Creek Crossing Alternatives - Preliminary Findings

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CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES

1.0 Introduction/Purpose

The purpose of this memorandum is to summarize our preliminary findings associated with the various alternatives under consideration by the City of Paso Robles (the City) for crossing Huer Huero Creek and connecting future Erskine Parkway to Airport Road. The general alignment for this future crossing is shown on the City's Circulation Element as well as in the approved Vesting Tentative Tract Map 3069 as an offer of dedication that is 100 feet wide.

Wallace Group was retained by the City to review three (3) alternatives for the Huer Huero Creek Crossing as follows:

- At-Grade Crossing ("Arizona" Crossing)
- Low Water Crossing (Culverts Crossing)
- Bridge Crossing

The scope of work for this effort is as summarized below:

- Create a conceptual layout and profile for each alternative (see Attachment 1 "Conceptual Plan & Profile Exhibits")
- Perform a preliminary hydraulics analysis based on previous studies and available data to estimate flood elevations in the Creek (see Attachment 2 Preliminary Hydraulic Summary)
- Estimate the construction cost of each option (see Attachment 3 Preliminary Construction Cost Estimates)
- Compare the feasibility of permitting approval for each alternative including the physical impacts and environmental constraints (see Attachment 4 memo from Althouse and Meade, Inc.)

This effort included a site visit with City and Wallace Group staff, environmental specialists as well as a representative of the Regional Water Quality Control Board (RWQCB) that would have regulatory permitting jurisdiction on the proposed crossing. Based on the hydraulic data, preliminary layouts and conceptual review by the

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environmental/regulatory review specialists our engineers were to make a recommendation to the City on the direction for further planning and design.

2.0 Existing Conditions

The existing site and proposed location for the crossing is currently undeveloped. From the south the approach to the crossing consists of relatively flat pastures perched on a local bluff that quickly slopes down to the Huer Huero Creek bed at an approximate slope of 25% then gradually rising to the existing location of Airport Road further to the North. The southerly bluff of the proposed crossing has a 50-ft drop form the top of the bluff to the Huer Huero Creek stream bed. The southerly bluff and portions of the banks of the creek are dotted with oak trees and covered in native grasses, particularly on the bank where the crossing would connect to future Erskine Parkway and Vesting Tentative Tract 3069. Huer Huero Creek is an ephemeral underground stream with approximately 100,000 acres of watershed area. Peak flows in the Creek are estimated at 13,000 cfs for the 100-year storm event (see Attachment 2 Preliminary Hydraulic Summary Memorandum prepared by Wallace Group).

3.0 Proposed Crossing

The proposed crossing is consistent with the City's circulation element and is to meet or exceed the following design criteria requirements as specified by the City:

- Road Classification - Principal Arterial
- Design Speed - 35 mph
- Maximum Road Grade - 10%
- Able to carry utilities - potentially water, sewer, recycled water

The crossing would connect to the future Erskine Parkway Road Improvements south of Huer Huero Creek as currently being designed by the developer of Vesting Tentative Tract Map 3069. The crossing would attempt to conform to or minimize the reconstruction of Erskine Parkway and coordination with the development has been taken into consideration as part of this study. The 100-foot wide Right of Way dedication made by Vesting Tentative Tract Map 3069 is adequate based on the City determined road/bridge widths; therefore, no additional Right of Way would be necessary for the proposed crossing. This study assumes that the ROW for the proposed improvements (including any temporary construction easements) are to be provided as part of development considerations and no further considerations have been made by this study.

3.1 Crossing Alternatives

3.1 Alternative 1: At-Grade Crossing

An at-grade crossing is conceptualized to consist of cast-in-place or precast concrete panels or other hardened surfaces placed along the existing channel bottom. This

crossing provides an “armored” driving surface across the creek bed, without major alterations to the creek profile or cross sectional geometry. While these crossings are lower in initial construction cost, they are typically used in lower-speed, low-volume rural roads where frequent closures due to flooding are acceptable. During even smaller flow events the roadway could require closure and subsurface flows may be disrupted as a consequence of scour protection features required for higher flow events. At-grade crossings tend to minimize initial impacts to channel flow hydraulics but they are susceptible to silt deposition or localized scour and are therefore prone to higher maintenance and lifecycle costs. The crossing would include rock slope protection and a concrete cut-off wall at both the upstream and downstream sides along the entire crossing to protect against scour.

Utilities along an at-grade crossing corridor would have to be installed deeper and potentially separately than the crossing roadbed to protect them from potential scour. Utility crossings are also subject to environmental permitting review and approval. Based on the initial comments from RWQCB staff and correspondence from that agency (see Attachment 4) it is unlikely that the at-grade water crossing would be a feasible alternative. Concerns expressed from the permitting perspective include potential for direct impacts to Waters of the State, potential for localized scour/sedimentation and redirection of underground flows and water tables. Mitigation requirements and costs, while not accounted for in the preliminary construction costs, are significantly higher for this type of a crossing than for spanning (bridge) crossings.

3.2 Alternative 2: Low Water Crossing

A low water crossing would potentially consist of a raised roadway prism over the creek bed with a series of large arch-culverts under the road to accommodate “low” flows. “Low” flows can range between a 2-year design storm to as much as a 50-year design storm depending on the critical nature of the facility. During “low” flows, water passes through the culverts with mitigated restriction. During higher flows, water would be more restricted and could potentially overtop the roadway, closing it to traffic. Because of the restrictive nature of low water crossings, they are more susceptible to scour, silt deposition, and backwater impacts to upstream channel conditions. Because of the broad and winding nature of the creek through the project site, a low water crossing would be difficult to implement while maintaining the overall flow characteristics of the creek. In order to mimic creek flows and convey a minimum 25-year storm event we anticipate needing 20-30 culverts ranging in size from 12’x5’ arches possibly up to 20’x6’ low profile arches founded on longitudinal strip footings. The banks of the crossing would be protected by rock slope protection on either side. For scour protection, concrete cut-off walls are envisioned along the perimeter of the upstream and downstream approaches.

As in the case of the low water crossing, utilities along the crossing corridor would have to be installed below the roadway prism and potentially separately than the crossing roadbed to protect them from potential scour. Utility crossings are also subject to environmental permitting review and approval. Based on the initial comments from RWQCB staff and correspondence from that agency (see Attachment 4) it is unlikely that the low water crossing would be a feasible alternative. Concerns

expressed from the permitting perspective include potential for direct impacts to Waters of the State, potential for localized scour/sedimentation and redirection of underground flows and water tables. Mitigation requirements and costs, while not accounted for in the preliminary construction costs, are significantly higher for this type of a crossing than for spanning (bridge) crossings.

3.3 Alternative 3: Standard Bridge Crossing

A bridge crossing would consist of a traditional concrete superstructure on multiple concrete pier supports spanning the creek and conveying creek flows in the relatively unchanged channel corridor. The road approach and abutment locations were assumed to be outside of the 100-year flow footprint to reduce impacts on flows and to improve potential for regulatory approval. Based on a preliminary road alignment and profile, we estimate the bridge to be between 450 feet to 500 feet in length. Our initial assessment is that the bridge could be a 4-span bridge (3 bents or piers in the creek bed) with reinforced concrete abutments and wingwalls. Various bridge types are feasible and could include a pre-cast concrete girder or cast-in-pace box girder structure. For the purposes of this preliminary assessment we have assumed the bridge constraint based on a cast-in-place box girder with an approximate 5.5 ft. superstructure depth based on the assumed geometry and span ratio.

As part of the bridge crossing analysis we looked at three (3) alternative profiles for the crossing. The three (3) alternatives were classified as “low,” “medium,” and “high.” The “low” bridge alternative minimized the height of the bridge at the creek 100-year Water Surface Elevation (WSE), where the bridge surface was up to 15’ higher than the creekbed, but also increased the amount of grading on the south bank and impacts at the connection to the future Erskine Parkway. The “high” bridge alternative minimized the grading impact to the south bank area but resulted in a higher bridge profile over the creek varying with up to 30’ higher profile. The “medium” height bridge alternative was intended to balance the profile and the grading to the south bank. This “medium” bridge alternative assumes a bridge profile that varies at the creek crossing with up to a 20’ height over the creek bed at its tallest point.

Utilities could be attached to the bridge deck or installed within the deck structure as typically accomplished across bridges. Localized scour at the piers is expected but would be mitigated with foundation depth design. Access over a bridge crossing is reliable and not subject to risk of closure or failure for higher flow events. Based on the initial comments from RWQCB staff and correspondence from that agency (see Attachment 4) it is likely that a bridge crossing would be a feasible alternative. Concerns expressed from the permitting perspective are much less for a bridge alternative than that for the other crossing alternatives. Mitigation requirements and costs, while not accounted for in the preliminary construction costs, are also much less.

Attachment 1

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4.0 Comparison of Alternatives

Based on our preliminary assessment and findings we have prepared the following table that summarizes the evaluation criteria for the three (3) crossing alternatives. The costs have been estimated based on our preliminary concepts, using public bid data unit pricing and other publicly available data as specified in our Scope of Services. The qualitative assessments have been made based on our engineering judgement and experience and reflect a relative risk or concern associated with that particular criteria.

	Crossing Type		
Criteria	**At Grade**	**Low Water**	**Bridge**
Construction & Support Cost Range*	$6.4 - $7.8M	$9.0 - $11.0M	$7.1 - $12.9M
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Color Key:	
	Significantly Impact/Undesirable
	Caution/Risk
	Better Outcome/Desirable

3.5 Recommendation

Based on the preliminary analysis including City's criteria input and that of environmental and regulatory specialists, Wallace Group recommends further exploring the bridge alternative as the most viable crossing option to cross the Huer Hero Creek.

Initial higher construction cost for a bridge alternative may be mitigated by lower environmental mitigation and life cycle costs. The reliability of a bridge over an at-grade or low water crossing for an arterial road is also a benefit consideration of the bridge option for the City of Paso Robles.

Attachments:

1. Conceptual Plan & Profile Exhibits
2. Preliminary Hydraulic Summary
3. Preliminary Construction Cost Estimates
4. Memo- *Permit Constraints Huer Huero Creek Crossing-City of Paso Robles* (Althouse and Meade, Inc.)

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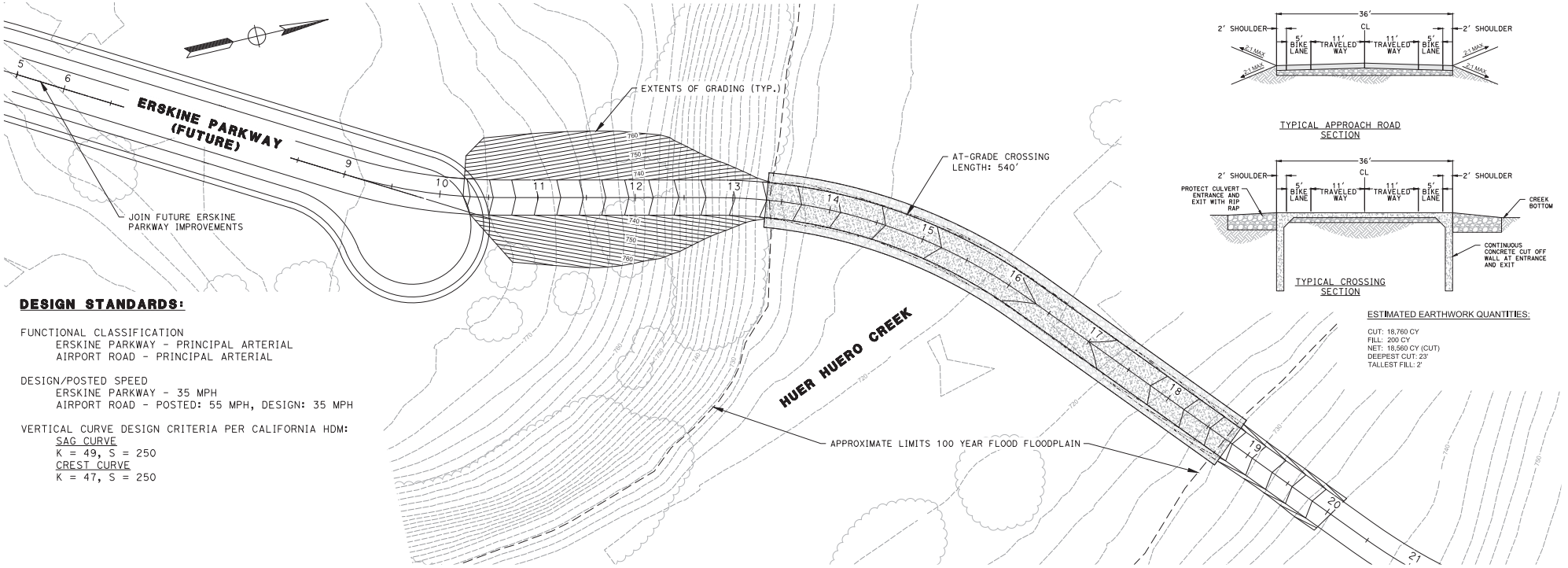
Attachment for Huer Huero Creek Crossing

1. Conceptual Plan & Profile Exhibits (5pp)



TYPICAL APPROACH ROAD SECTION

TYPICAL CROSSING SECTION

DESIGN STANDARDS:

FUNCTIONAL CLASSIFICATION
ERSKINE PARKWAY - PRINCIPAL ARTERIAL
AIRPORT ROAD - PRINCIPAL ARTERIAL

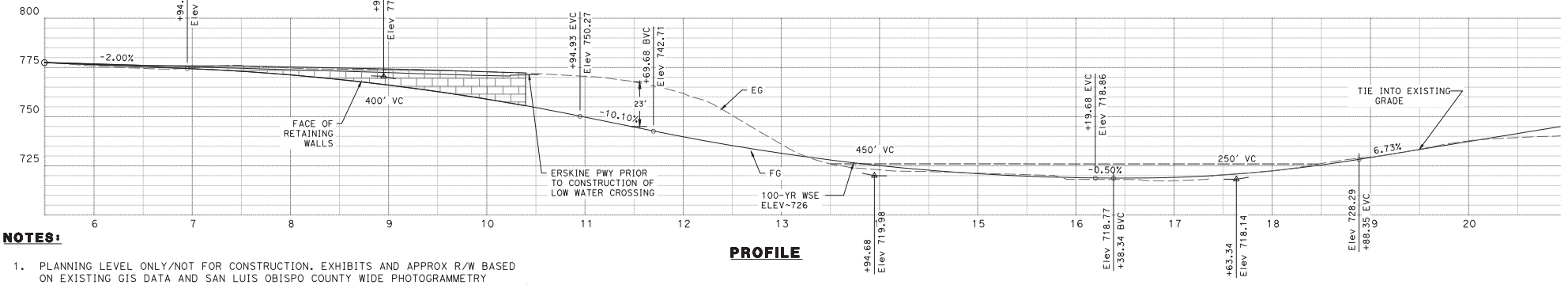
DESIGN/POSTED SPEED
ERSKINE PARKWAY - 35 MPH
AIRPORT ROAD - POSTED: 55 MPH, DESIGN: 35 MPH

VERTICAL CURVE DESIGN CRITERIA PER CALIFORNIA HDM:
SAG CURVE
K = 49, S = 250
CREST CURVE
K = 47, S = 250

ESTIMATED EARTHWORK QUANTITIES:

CUT: 18,760 CY
FILL: 200 CY
NET: 18,560 CY (CUT)
DEEPEST CUT: 23'
TALLEST FILL: 2'

PLAN



PROFILE

NOTES:

1. PLANNING LEVEL ONLY/NOT FOR CONSTRUCTION. EXHIBITS AND APPROX R/W BASED ON EXISTING GIS DATA AND SAN LUIS OBISPO COUNTY WIDE PHOTOGRAMMETRY DATED 2014.
2. FLOOD PLAIN LIMITS APPROXIMATED FROM FEMA INFORMATION.

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Paso Robles, CA 93446

SCALE: HORIZ 1" = 50'
VERT 1" = 25'
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2

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PROJECT ENGINEER
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER JORGE A. AGUILAR No. 48704 FOR PLAN REVIEW ONLY NOT FOR CONSTRUCTION CIVIL STATE OF CALIFORNIA

REVISIONS					
NO.	BY	DATE	DESCRIPTION	APPROVED BY	DATE
1					
2					
3					
4					

ACCEPTED BY THE CITY CAPITAL PROJECTS ENGINEER
DATE
JOHN FALKENSTIEN RCE: C33760

HUER HUERO CREEK CROSSING

CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1 - AT-GRADE CROSSING

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SHEET	OF
WBH	WBH/JC	EB	0067-0031	1	5

DISREGARD PRINTS BEARING EARLIER REVISION DATE
REVISION DATES (PRELIMINARY STAGE ONLY)

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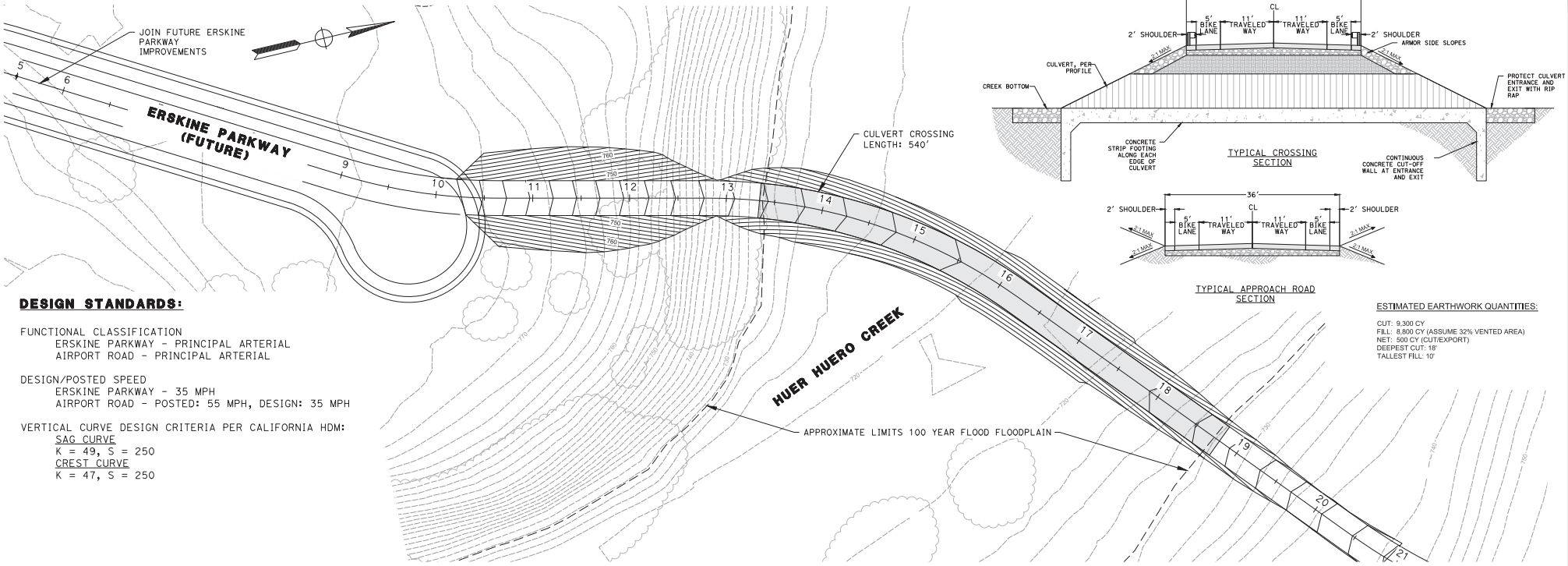
PLOT DATE: 4/23/2017 BY: ESAUB



TYPICAL CROSSING SECTION

TYPICAL APPROACH ROAD SECTION

DESIGN STANDARDS:

FUNCTIONAL CLASSIFICATION
ERSKINE PARKWAY - PRINCIPAL ARTERIAL
AIRPORT ROAD - PRINCIPAL ARTERIAL

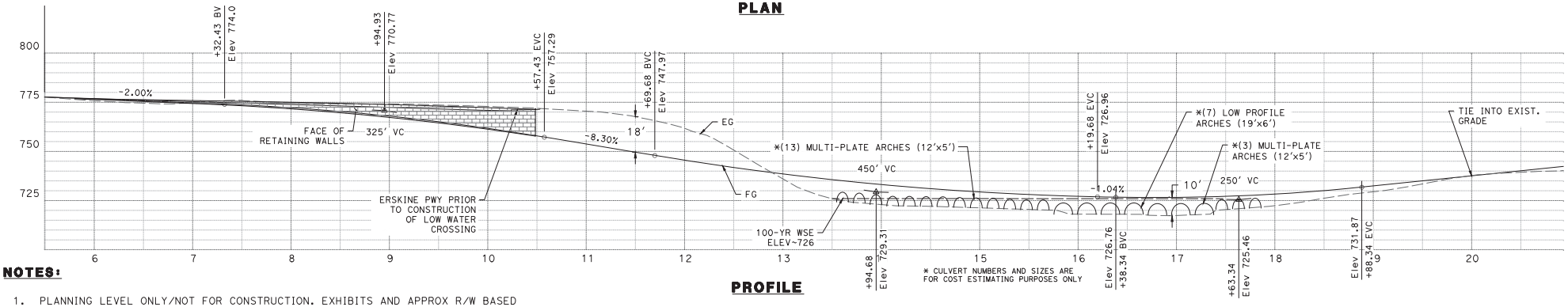
DESIGN/POSTED SPEED
ERSKINE PARKWAY - 35 MPH
AIRPORT ROAD - POSTED: 55 MPH, DESIGN: 35 MPH

VERTICAL CURVE DESIGN CRITERIA PER CALIFORNIA HDM:
SAG CURVE
K = 49, S = 250
CREST CURVE
K = 47, S = 250

ESTIMATED EARTHWORK QUANTITIES:

CUT: 9,300 CY
FILL: 8,800 CY (ASSUME 32% VENTED AREA)
NET: 500 CY (CUT/EXPORT)
DEEPEST CUT: 18'
TALLEST FILL: 10'

PLAN



* CULVERT NUMBERS AND SIZES ARE FOR COST ESTIMATING PURPOSES ONLY

PROFILE

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2. FLOOD PLAIN LIMITS APPROXIMATED FROM FEMA INFORMATION.

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PROJECT ENGINEER
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REGISTERED PROFESSIONAL ENGINEER
JORGE A. AGUILAR
No. 48704
FOR PLAN REVIEW ONLY NOT FOR CONSTRUCTION
CIVIL
STATE OF CALIFORNIA

REVISIONS					
NO.	BY	DATE	DESCRIPTION	APPROVED BY	DATE

ACCEPTED BY THE CITY CAPITAL PROJECTS ENGINEER

JOHN FALKENSTIEN RCE: C33760 DATE

HUER HUERO CREEK CROSSING

CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 2 - LOW WATER CROSSING

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SHEET	OF
WBH	WBH/JC	EB	0067-0031	2	5

DISREGARD PRINTS BEARING EARLIER REVISION DATE
REVISION DATES (PRELIMINARY STAGE ONLY)

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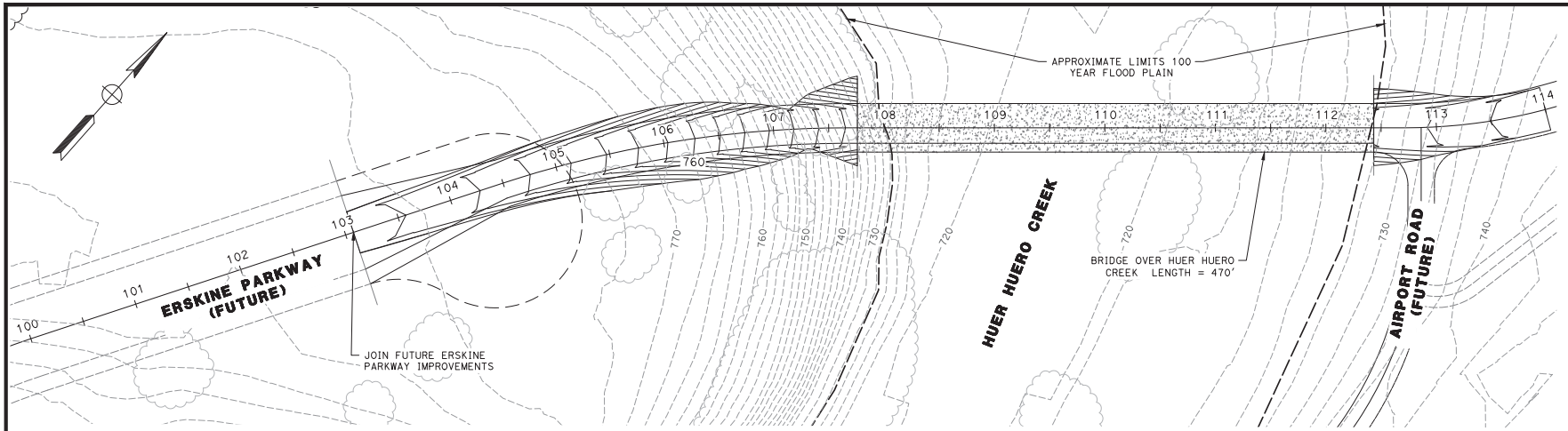
PLOT DATE: 4/24/2017
BY: ESAUB



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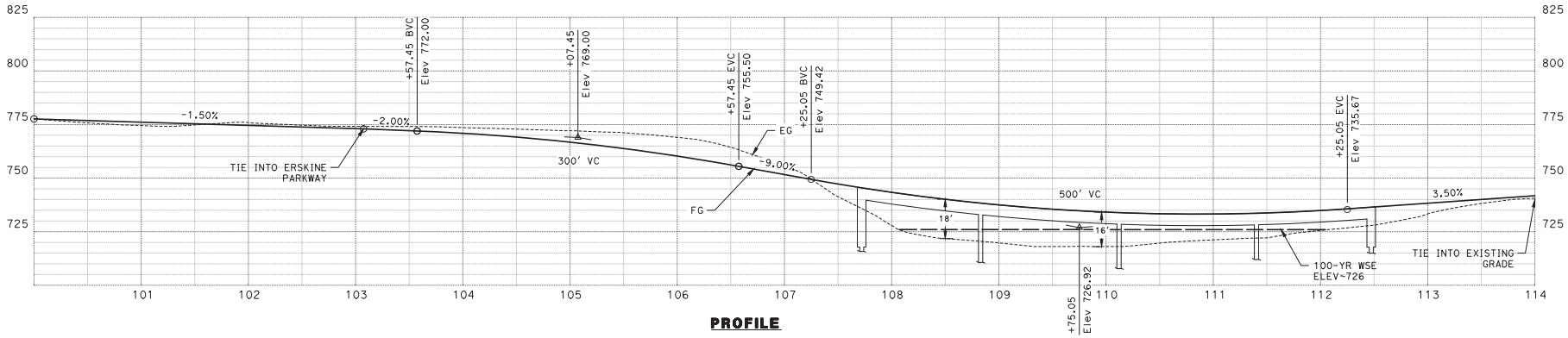
2. FLOOD PLAIN LIMITS APPROXIMATED FROM FEMA INFORMATION.

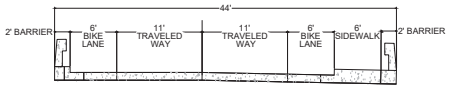
ESTIMATED EARTHWORK QUANTITIES:

CUT: 4,500 CY
FILL: 1,300 CY
NET: 3,200 CY (CUT)
DEEPEST CUT: 21'
TALLEST FILL: 6'

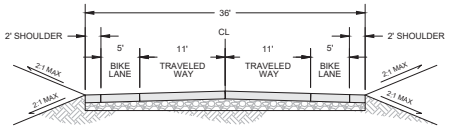
PLAN



PROFILE



TYPICAL BRIDGE SECTION
NTS



TYPICAL APPROACH ROAD SECTION
NTS

DESIGN STANDARDS:

FUNCTIONAL CLASSIFICATION
ERSKINE PARKWAY - PRINCIPAL ARTERIAL
AIRPORT ROAD - PRINCIPAL ARTERIAL

DESIGN/POSTED SPEED
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K = 49, S = 250
CREST CURVE
K = 47, S = 250

BRIDGE DESIGN CRITERIA PER CALIFORNIA BRIDGE MANUAL AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS:
CAST IN PLACE BOX GIRDER BRIDGE, LENGTH = 470'
4 SPANS
SPAN LENGTH = 135' (3/4S = 100')
DEPTH (INCLUDING DECK) = 0.04 x S = 5.4'

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PLOT DATE: 4/24/2017
BY: ESAUB

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PROJECT ENGINEER
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER JORGE A. AGUILAR No. 48704 FOR PLAN REVIEW ONLY NOT FOR CONSTRUCTION CIVIL STATE OF CALIFORNIA

REVISIONS					
NO.	BY	DATE	DESCRIPTION	APPROVED BY	DATE
1					
2					
3					
4					

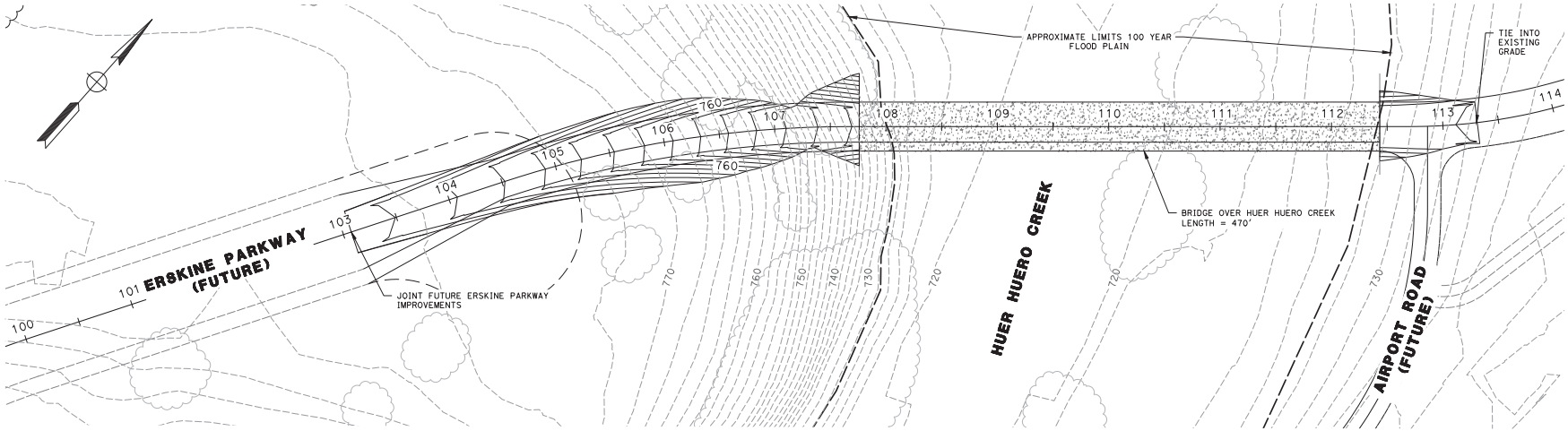
ACCEPTED BY THE CITY CAPITAL PROJECTS ENGINEER
DATE
JOHN FALKENSTIEN RCE: C33760

HUER HUERO CREEK CROSSING

CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 3 - STANDARD BRIDGE CROSSING (LOW)

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SHEET	OF
EB/JC	JC	EB	0067-0031	3	5

DISREGARD PRINTS BEARING EARLIER REVISION DATE
REVISION DATES (PRELIMINARY STAGE ONLY)



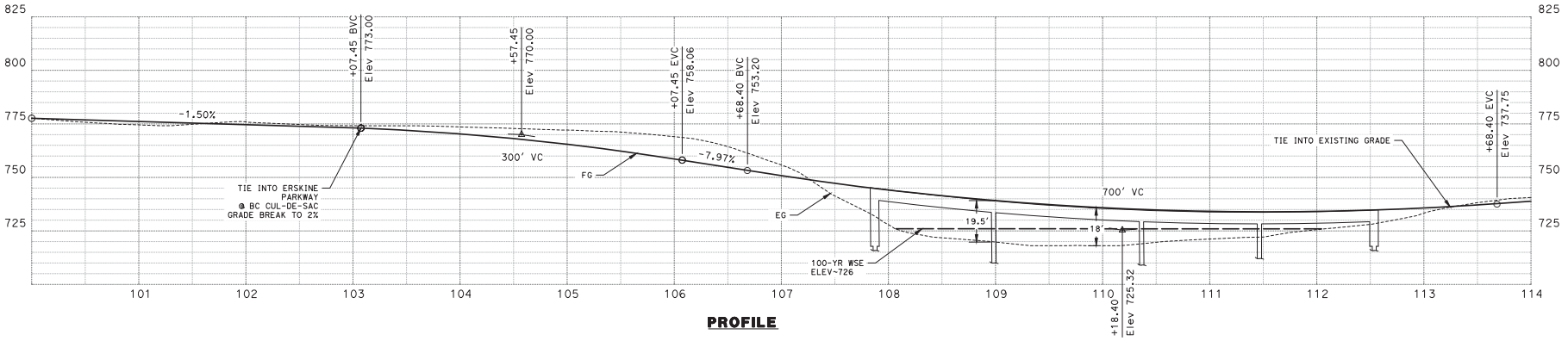
NOTES:

1. PLANNING LEVEL ONLY/NOT FOR CONSTRUCTION. EXHIBITS AND APPROX R/W BASED ON EXISTING GIS DATA AND SAN LUIS OBISPO COUNTY WIDE PHOTOGRAMMETRY DATED 2014.
2. FLOOD PLAIN LIMITS APPROXIMATED FROM FEMA INFORMATION.

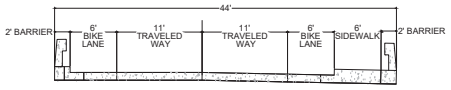
ESTIMATED EARTHWORK QUANTITIES:

CUT: 5,530 CY
FILL: 890 CY
NET: 4,640 CY (CUT)
DEEPEST CUT: 12'
TALLEST FILL: 6'

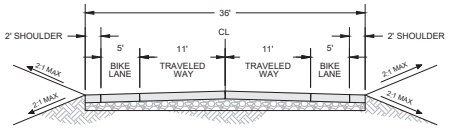
PLAN



PROFILE



TYPICAL BRIDGE SECTION
NTS



TYPICAL APPROACH ROAD SECTION
NTS

DESIGN STANDARDS:

FUNCTIONAL CLASSIFICATION
ERSKINE PARKWAY - PRINCIPAL ARTERIAL
AIRPORT ROAD - PRINCIPAL ARTERIAL

DESIGN/POSTED SPEED
ERSKINE PARKWAY - 35 MPH
AIRPORT ROAD - POSTED: 55 MPH, DESIGN: 35 MPH

VERTICAL CURVE DESIGN CRITERIA PER CALIFORNIA HDM:
SAG CURVE
K = 49, S = 250
CREST CURVE
K = 47, S = 250

BRIDGE DESIGN CRITERIA PER CALIFORNIA BRIDGE MANUAL AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS:
CAST IN PLACE BOX GIRDER BRIDGE, LENGTH = 470'
4 SPANS
SPAN LENGTH = 135' (3/4S = 100')
DEPTH (INCLUDING DECK) = 0.04 x S = 5.4'

FILE NAME: 0067-0031-DSGN-BRDG-MED.dwg
PLOT DATE: 4/24/2017
BY: ESAUB

City of Paso Robles
Public Works Department
1000 Spring Street
Paso Robles, CA 93446

SCALE: HORIZ 1" = 50'
VERT 1"=25'
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2

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PROJECT ENGINEER

PLANS APPROVAL DATE

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NO.	BY	DATE	DESCRIPTION	APPROVED BY	DATE
1					
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ACCEPTED BY THE CITY CAPITAL PROJECTS ENGINEER

DATE

JOHN FALKENSTIEN RCE: C33760

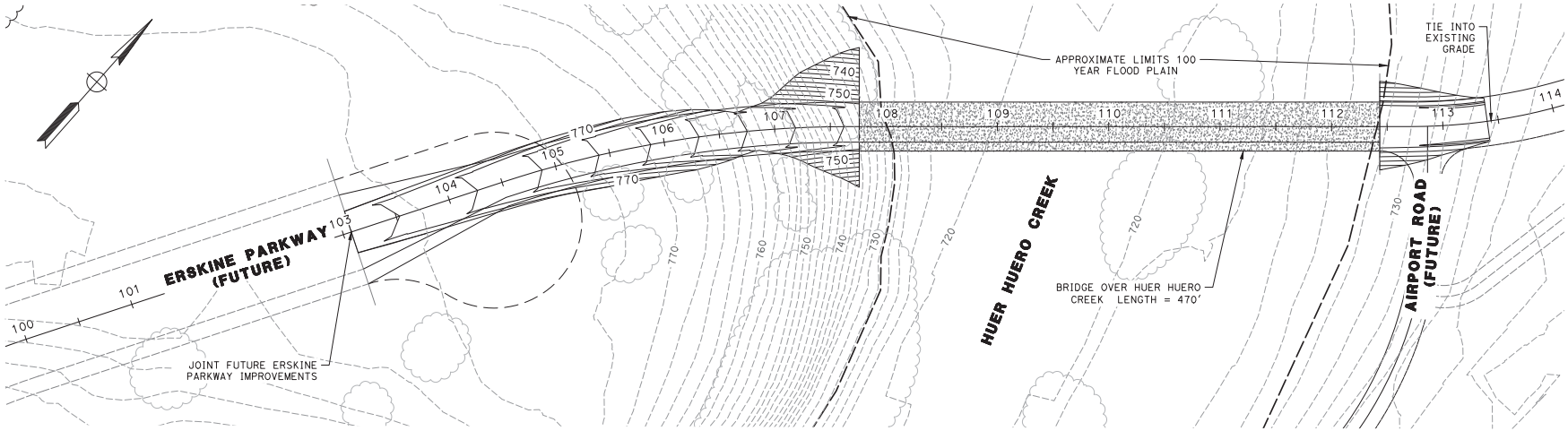
HUER HUERO CREEK CROSSING

CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 4 - STANDARD BRIDGE CROSSING (MEDIUM)

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SHEET	OF
WBH/JC	WBH/JC	EB	0067-0031	4	5

DISREGARD PRINTS BEARING EARLIER REVISION DATE

REVISION DATES (PRELIMINARY STAGE ONLY)



NOTES:

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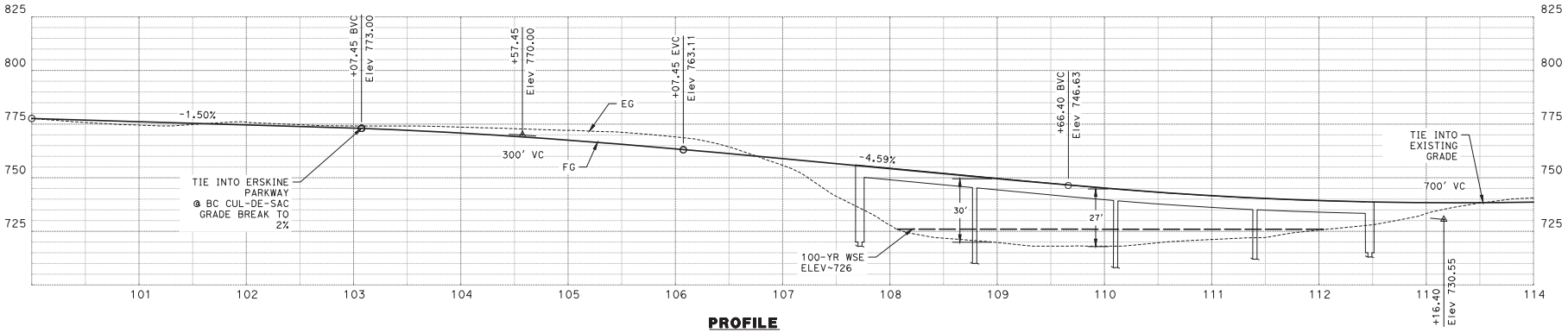
2. FLOOD PLAIN LIMITS APPROXIMATED FROM FEMA INFORMATION.

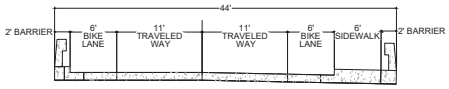
ESTIMATED EARTHWORK QUANTITIES:

CUT: 2950 CY
FILL: 3150 CY
NET: 200 CY (FILL)
DEEPEST CUT: 6'
TALLEST FILL: 9'

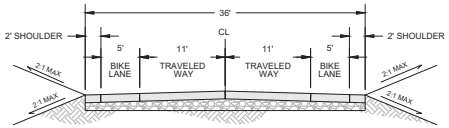
PLAN



PROFILE



TYPICAL BRIDGE SECTION
NTS



TYPICAL APPROACH ROAD SECTION
NTS

DESIGN STANDARDS:

FUNCTIONAL CLASSIFICATION
ERSKINE PARKWAY - PRINCIPAL ARTERIAL
AIRPORT ROAD - PRINCIPAL ARTERIAL

DESIGN/POSTED SPEED
ERSKINE PARKWAY - 35 MPH
AIRPORT ROAD - POSTED: 55 MPH, DESIGN: 35 MPH

VERTICAL CURVE DESIGN CRITERIA PER CALIFORNIA HDM:
SAG CURVE
K = 49, S = 250
CREST CURVE
K = 47, S = 250

BRIDGE DESIGN CRITERIA PER CALIFORNIA BRIDGE MANUAL AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS:
CAST IN PLACE BOX GIRDER BRIDGE, LENGTH = 470'
4 SPANS
SPAN LENGTH = 135' (3/4S = 100')
DEPTH (INCLUDING DECK) = 0.04 x S = 5.4'

FILE NAME: 0067-0031-DSGN-BRDG-HIGH.dwg
PLOT DATE: 4/24/2017
BY: ESAUB

City of Paso Robles
Public Works Department
1000 Spring Street
Paso Robles, CA 93446

SCALE: HORIZ 1" = 50'
VERT 1" = 25'
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2

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4					

ACCEPTED BY THE CITY CAPITAL PROJECTS ENGINEER
DATE
JOHN FALKENSTIEN RCE: C33760

HUER HUERO CREEK CROSSING

CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 5 - STANDARD BRIDGE CROSSING (HIGH)

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SHEET	OF
EB/JC	JC	EB	0067-0031	5	5

DISREGARD PRINTS BEARING EARLIER REVISION DATE
REVISION DATES (PRELIMINARY STAGE ONLY)

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Attachment for Huer Huero Creek Crossing

2. Preliminary Hydraulic Summary (3pp)

MEMORANDUM

Huer Huero Creek Preliminary Hydraulic Summary – Paso Robles

WG Job # 0067-0031

Date: April 24, 2017

Subject: Preliminary Hydraulic Summary

PURPOSE

This memo provides a preliminary hydraulic review of Huer Huero Creek in support of the conceptual roadway crossings at the Erskine Parkway extension in Paso Robles. A preliminary HEC-RAS model has been created for Huer Huero Creek and the existing hydraulic parameters and preliminary results are presented.

PRELIMINARY HYDRAULIC DATA

Existing Flow Data

Existing peak flows within Huer Huero Creek were estimated from the following existing studies: Caltrans Report for Hwy 42 Bridge – 1989, USGS Regression Equations 1977 and 2006, North Coast Engineering Report for the Paso Robles Motorcoach Resort – 2008, and the County of San Luis Obispo Geneseo Road Project- 2008. FEMA has not published a study for Huer Huero Creek and flow data is not available in the County Flood Impact Studies. The following table identifies the flow rates incorporated into the hydraulic model.

Table 1 – Huer Huero Creek Discharge

Flood Interval	Peak Flow (cfs)
10 Year	3,700
50 Year	10,500
100 Year	13,000

Topography

Topographic data for the hydraulic model is based on an existing aerial topographic survey performed in 2006 by DKS Surveys. Cross sections within the creek were created perpendicular to flow and strategically placed to capture the characteristic of the creek. Existing topographic information was sampled at each creek cross section and entered into the hydraulic model. The bridge alignment and elevation profile used in the model is based on conceptual layouts created by Wallace Group for the roadway crossing at the Erskine Parkway extension.

Flow Parameters

The proposed HEC-RAS model is a steady state model (no flow variation with time) and the subcritical flow regime was implemented. The existing channel between the banks was modeled with a Manning's coefficient of 0.035 (natural stream – clean, straight with stones and weeds). The overbanks roughness was set at 0.45 which represents a natural stream –

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Attachment 2

clean, winding, some pools and shoals, some weeds and stones. The bridge piers were modeled as dual 4 ft diameter circular piers (C_d=1.2) without a diaphragm (K=1.05).

PRELIMINARY RESULTS

The preliminary HEC-RAS model shows the low chord of the low bridge alternative to be over 2.5 feet above the 100 year water surface elevation (WSE). The abutments and bridge deck section are above the 100 year flood path. The low bridge alternative is supported by three sets of piers that extend down to the creek bed. The influence of these three piers on the 100 year flow is relatively minor, only increasing water surface elevations on the upstream side by about 1 inch. Water surface elevations return to existing just downstream of the bridge and approximately 1,000 feet upstream. The following tables summarize the modeling results for the bridge.

Table 2 – HEC-RAS Results (XS 3143 – 30' Upstream of Bridge)

Model	Low Chord	50 YR WSE	100 YR WSE
Existing Model	N/A	725.30	725.96
Low Bridge Alt	728.70	725.39	726.05

Table 3 – HEC-RAS Results (XS 3030 – 30' Downstream of Bridge)

Model	Low Chord	50 YR WSE	100 YR WSE
Existing Model	N/A	724.39	724.88
Low Bridge Alt	728.70	724.39	724.88

Preliminary scour estimates are outside this scope of work and were not evaluated in the hydraulic model however existing studies for Huer Huero Creek can provide general scour information. The 1989 preliminary Caltrans report for Huer Huero Creek Bridges on Route 46 describes both local scour and long term channel degradation. The following statements are taken from the Caltrans report.

"Under present conditions, it is anticipated that 4 to 5 feet of initial and temporary channel degradation could occur at this site during a major discharge event. This initial degradation then should reverse but a long term channel lowering of 1 to 2 feet from existing conditions could result"

"Based on a wall type pier about 4 feet wide, the estimated potential scour depth is about 8 to 10 feet. An increase in pier width will increase this potential depth; streamlining of the pier nose will reduce this depth."

Since the proposed low bridge alternative and the bridge crossing at Route 46 are in close proximity and have similar features, it is estimated that the local pier scour would also be similar (8 to 10 feet).

For conceptual layout and planning level review, scour at 8 to 10 feet may be used for the at-grade crossing, the low water (culvert) crossing, and the low bridge crossing until a more detailed study is performed. A detailed scour analysis will be required once the project moves beyond the conceptual planning phase.

Attachment for Huer Huero Creek Crossing

3. Preliminary Construction Cost Estimates (6pp)

City of Paso Robles UERO CREEK CROSSING - PRELIMINARY CONSTRUCTION COST EST

SUMMARY OF COSTS

Alt	Location	**Total	Lower Range	Upper Range
1	At-Grade Crossing	**$ 7,100,000**	$ 6,390,000	$ 7,810,000
2	Low Water Crossing	**$ 10,000,000**	$ 9,000,000	$ 11,000,000
3	"Low" Bridge Crossing	**$ 7,900,000**	$ 7,110,000	$ 8,690,000
4	"Medium" Bridge Crossing	**$ 9,600,000**	$ 8,640,000	$ 10,560,000
5	"Tall" Bridge Crossing	**$ 11,700,000**	$ 10,530,000	$ 12,870,000

* It is assumed that all right of way wil be dedicated to the City at no cost
** Total Costs rounded up to nearest $100k

Attachment 2

City of Paso Robles- Huer Huero Creek Crossing **PRELIMINARY CONSTRUCTION COST ESTIMATE**

Alternative 1 At-Grade Crossing

Description: At Grade "Arizona" Style crossing

Total Project Cost (2017 Dollars)	$ 7,100,000

Total Construction Costs:	$	6,150,000
Total Right of Way Costs:	$	-
Total Capital Support Costs:	$	930,000

Construction Costs

Roadway Items

Section	Description	Quantity	Unit	Unit Price	Cost
1	Roadway Excavation	18760	CY	$ 50.00	$ 938,000
2	Hot Mix Asphalt	1240	TON	$ 150.00	$ 186,000
2	Class 2 Aggregate Base	1987	CY	$ 85.00	$ 168,900
2	Reinforced Concrete Pavement	360	CY	$ 1,000.00	$ 360,000
3	Rock Slope Protection	1200	CY	$ 200.00	$ 240,000
4	Modify Erskine Parkway	1	LS	$ 200,000	$ 200,000
				Subtotal Section 1-4:	$ 2,092,900
5	Storm Water Collection and Treament	10%	of Sections 1-4		$ 210,000
6	Water Pollution Control	10%	of Sections 1-4		$ 210,000
7	Erosion Control	5%	of Sections 1-4		$ 105,000
8	Traffic Items	5%	of Sections 1-4		$ 105,000
				Subtotal Section 5-8:	$ 630,000
9	Minor Items	5%	Sect 1-8	$ 2,722,900	$ 137,000
10	Roadway Mobilization	10%	Sect 1-9	$ 2,859,900	$ 286,000
11	Supplemental Work	2%	Sect 1-9	$ 2,859,900	$ 58,000
12	Contingencies	35%	Sect 1-9	$ 2,859,900	$ 1,001,000
				Subtotal Sections 9-12:	$ 1,482,000
				Total Roadway Item Cost:	**$ 4,210,000**

Structure Items

Structure	Description	Quantity	Unit	Unit Price	Cost
1	Retaining Walls	10670	SQFT	$ 50.00	$ 533,500
2	Structural Concrete (cut-off walls)	900	CY	$ 1,000.00	$ 900,000
				Subtotal Structure Items:	$ 1,433,500
	Contingency for Structure Items:	35%		Contingency Cost	$ 501,725
				Total Structure Item Cost:	**$ 1,935,225**

Construction Cost Summary

Roadway Items	$	4,210,000
Structure Items	$	1,935,225
Total Construction Costs:	**$**	**6,150,000**

Capital Support Costs

Description	%	Cost
Engineering/Permitting/Approvals	10%	$ 615,000
Construction Administration/ Management/Inspection	5%	$ 307,500
Right of Way Support	N/A	$ -
	Total Professional Services Cost:	**$ 930,000**

Right of Way (See assumption 6)

Parcel Type	Quantity	Unit	Unit Price	Cost
Residential	0.00	AC	$ -	$ -
Undeveloped	0.00	AC	$ -	$ -
			Subtotal Right of Way Items:	$ -
Contingency for Right of Way Items:	25%		Contingency Cost	$ -
			Total Right of Way Cost:	**$ -**

Assumptions

1) 35% contigency assumed. Overall cost rounded to the nearest $100k.
2) Asphalt thickness is assumed to be 6" with a unit weight of 145 pcf.
3) Class 2 aggregate base thickness assumed to be 12" under pavement.
4) Minor items includes those that have not been specifically itemized but will still present cost not covered by contigencies such as pavement sawcut, grind, and overlay to conform, etc.
5) Supplemental work includes payment adjustments for price index fluctuations, soft spot repair, etc.
6) It is assumed that all right of way wil be dedicated to the City at no cost

City of Paso Robles- Huer Huero Creek Crossing **PRELIMINARY CONSTRUCTION COST ESTIMATE**

Alternative 2 **Low Water Crossing**

Description: Vented Ford crossing with CMP Culverts

Total Project Cost (2017 Dollars)	$ 10,000,000

Total Construction Costs:	$	8,620,000
Total Right of Way Costs:	$	-
Total Capital Support Costs:	$	1,300,000

Construction Costs

Roadway Items

Section	Description	Quantity	Unit	Unit Price	Cost
1	Roadway Excavation	9260	CY	$ 50.00	$ 463,000
2	Hot Mix Asphalt	1944	TON	$ 150.00	$ 291,700
2	Class 2 Aggregate Base	1987	CY	$ 85.00	$ 168,900
2	Midwest Guardail System	1080	LF	$ 50.00	$ 54,000
3	Low Profile Arch (18'x6')	7	EA	$ 45,000.00	$ 315,000
3	Mult-Plate Arch (12'x5')	16	EA	$ 30,000.00	$ 480,000
3	Rock Slope Protection	3216	CY	$ 200.00	$ 643,200
4	Modify Erskine Parkway	1	LS	$ 200,000	$ 200,000
				Subtotal Section 1-4:	$ 2,615,800
5	Storm Water Collection and Treament	10%	of Sections 1-4		$ 262,000
6	Water Pollution Control	10%	of Sections 1-4		$ 262,000
7	Erosion Control	5%	of Sections 1-4		$ 131,000
8	Traffic Items	5%	of Sections 1-4		$ 131,000
				Subtotal Section 5-8:	$ 786,000
9	Minor Items	5%	Sect 1-8	$ 3,401,800	$ 171,000
10	Roadway Mobilization	10%	Sect 1-9	$ 3,572,800	$ 358,000
11	Supplemental Work	2%	Sect 1-9	$ 3,572,800	$ 72,000
12	Contingencies	35%	Sect 1-9	$ 3,572,800	$ 1,251,000
				Subtotal Sections 9-12:	$ 1,852,000
				Total Roadway Item Cost:	**$ 5,260,000**

Structure Items

Structure	Description	Quantity	Unit	Unit Price	Cost
1	Retaining Walls	5504	SQFT	$ 50.00	$ 275,200
2	Structural Concrete (cut-off walls, cluvert footings)	2212	CY	$ 1,000.00	$ 2,211,900
				Subtotal Structure Items:	$ 2,487,100
	Contingency for Structure Items:	35%		Contingency Cost	$ 870,485
				Total Structure Item Cost:	**$ 3,357,585**

Construction Cost Summary

Roadway Items	$	5,260,000
Structure Items	$	3,357,585
Total Construction Costs:	**$**	**8,620,000**

Capital Support Costs

Description	%	Cost
Engineering/Permitting/Approvals	10%	$ 862,000
Construction Administration/ Management/Inspection	5%	$ 431,000
Right of Way Support	N/A	$ -
	Total Professional Services Cost:	**$ 1,300,000**

Right of Way (See assumption 6)

Parcel Type	Quantity	Unit	Unit Price	Cost
Residential	0.00	AC	$ -	$ -
Undeveloped	0.00	AC	$ -	$ -
			Subtotal Right of Way Items:	$ -
Contingency for Right of Way Items:	25%		Contingency Cost	$ -
			Total Right of Way Cost:	**$ -**

Assumptions

1) 35% contigency assumed. Overall cost rounded to the nearest $100k.
2) Asphalt thickness is assumed to be 6" with a unit weight of 145 pcf.
3) Class 2 aggregate base thickness assumed to be 12" under pavement.
4) Minor items includes those that have not been specifically itemized but will still present cost not covered by contigencies such as sidewalk underdrains, pavement sawcut, grind, and overlay to conform, etc.
5) Supplemental work includes payment adjustments for price index fluctuations, soft spot repair, etc.
6) It is assumed that all right of way wil be dedicated to the City at no cost

City of Paso Robles- Huer Huero Creek Crossing **PRELIMINARY CONSTRUCTION COST ESTIMATE**

Alternative 3 — Low Height Bridge Crossing

Description: Lowest bridge to still maintain 100 year flood plain clearance

Total Project Cost (2017 Dollars)	$ 7,900,000

Total Construction Costs:	$	6,840,000
Total Right of Way Costs:	$	-
Total Capital Support Costs:	$	1,030,000

Construction Costs

Roadway Items

Section	Description	Quantity	Unit	Unit Price	Cost
1	Roadway Excavation	4259	CY	$ 50.00	$ 213,000
2	Hot Mix Asphalt	859	TON	$ 150.00	$ 128,900
2	Class 2 Aggregate Base	878	CY	$ 85.00	$ 74,700
3	Modify Erskine Parkway	1	LS	$ 200,000.00	$ 200,000
				Subtotal Section 1-3:	$ 616,600
4	Storm Water Collection and Treament	10%	of Sections 1-3		$ 62,000
5	Water Pollution Control	10%	of Sections 1-3		$ 62,000
6	Erosion Control	5%	of Sections 1-3		$ 31,000
7	Traffic Items	5%	of Sections 1-3		$ 31,000
				Subtotal Section 4-7:	$ 186,000
8	Minor Items	5%	Sect 1-7	$ 802,600	$ 41,000
9	Roadway Mobilization	10%	Sect 1-8	$ 843,600	$ 85,000
10	Supplemental Work	2%	Sect 1-8	$ 843,600	$ 17,000
11	Contingencies	35%	Sect 1-8	$ 843,600	$ 296,000
				Subtotal Sections 8-11:	$ 439,000
				Total Roadway Item Cost:	**$ 1,250,000**

Structure Items

Structure	Description	Quantity	Unit	Unit Price	Cost
1	Cast-in-Place Box Girder Bridge	20680	SQFT	$ 200.00	$ 4,136,000
				Subtotal Structure Items:	$ 4,136,000
		Contingency for Structure Items:	35%	Contingency Cost	$ 1,447,600
				Total Structure Item Cost:	**$ 5,583,600**

Construction Cost Summary

Roadway Items	$	1,250,000
Structure Items	$	5,583,600
Total Construction Costs:	**$**	**6,840,000**

Capital Support Costs

Description	%	Cost
Engineering/Permitting/Approvals	10%	$ 684,000
Construction Administration/ Management/Inspection	5%	$ 342,000
Right of Way Support	N/A	$ -
	Total Professional Services Cost:	**$ 1,030,000**

Right of Way (See assumption 6)

Parcel Type	Quantity	Unit	Unit Price	Cost
Residential	0.00	AC	$ -	$ -
Undeveloped	0.00	AC	$ -	$ -
			Subtotal Right of Way Items:	$ -
	Contingency for Right of Way Items:	25%	Contingency Cost	$ -
			Total Right of Way Cost:	**$ -**

Assumptions

1) 35% contigency assumed. Overall cost rounded to the nearest $100k.
2) Asphalt thickness is assumed to be 6" with a unit weight of 145 pcf.
3) Class 2 aggregate base thickness assumed to be 12" under pavement.
4) Minor items includes those that have not been specifically itemized but will still present cost not covered by contigencies such as sidewalk underdrains, pavement sawcut, grind, and overlay to conform, etc.
5) Supplemental work includes payment adjustments for price index fluctuations, soft spot repair, etc.
6) It is assumed that all right of way wil be dedicated to the City at no cost

City of Paso Robles- Huer Huero Creek Crossing **PRELIMINARY CONSTRUCTION COST ESTIMATE**

Alternative 4 — Medium Height Bridge Crossing

Description: Medium height bridge, balancing bridge costs with grading and modifications to Erskine Parkway

Total Project Cost (2017 Dollars)	$ 9,600,000

Total Construction Costs:	$	8,310,000
Total Right of Way Costs:	$	-
Total Capital Support Costs:	$	1,250,000

Construction Costs

Roadway Items

Section	Description	Quantity	Unit	Unit Price	Cost
1	Roadway Excavation	5527	CY	$ 50.00	$ 276,400
2	Hot Mix Asphalt	759	TON	$ 150.00	$ 113,900
2	Class 2 Aggregate Base	776	CY	$ 85.00	$ 66,000
3	Modify Erskine Parkway	1	LS	$ 200,000.00	$ 200,000
				Subtotal Section 1-3:	$ 656,300
4	Storm Water Collection and Treament	10%	of Sections 1-3		$ 66,000
5	Water Pollution Control	10%	of Sections 1-3		$ 66,000
6	Erosion Control	5%	of Sections 1-3		$ 33,000
7	Traffic Items	5%	of Sections 1-3		$ 33,000
				Subtotal Section 4-7:	$ 198,000
8	Minor Items	5%	Sect 1-7	$ 854,300	$ 43,000
9	Roadway Mobilization	10%	Sect 1-8	$ 897,300	$ 90,000
10	Supplemental Work	2%	Sect 1-8	$ 897,300	$ 18,000
11	Contingencies	35%	Sect 1-8	$ 897,300	$ 315,000
				Subtotal Sections 8-11:	$ 466,000
				Total Roadway Item Cost:	**$ 1,330,000**

Structure Items

Structure	Description	Quantity	Unit	Unit Price	Cost
1	Cast-in-Place Box Girder Bridge	20680	SQFT	$ 250.00	$ 5,170,000
				Subtotal Structure Items:	$ 5,170,000
	Contingency for Structure Items:	35%		Contingency Cost	$ 1,809,500
				Total Structure Item Cost:	**$ 6,979,500**

Construction Cost Summary

Roadway Items	$	1,330,000
Structure Items	$	6,979,500
Total Construction Costs:	**$**	**8,310,000**

Capital Support Costs

Description	%	Cost
Engineering/Permitting/Approvals	10%	$ 831,000
Construction Administration/ Management/Inspection	5%	$ 415,500
Right of Way Support	N/A	$ -
Total Professional Services Cost:		**$ 1,250,000**

Right of Way (See assumption 6)

Parcel Type	Quantity	Unit	Unit Price	Cost
Residential	0.00	AC	$ -	$ -
Undeveloped	0.00	AC	$ -	$ -
			Subtotal Right of Way Items:	$ -
Contingency for Right of Way Items:	25%		Contingency Cost	$ -
			Total Right of Way Cost:	**$ -**

Assumptions

1) 35% contigency assumed. Overall cost rounded to the nearest $100k.
2) Asphalt thickness is assumed to be 6" with a unit weight of 145 pcf.
3) Class 2 aggregate base thickness assumed to be 12" under pavement.
4) Minor items includes those that have not been specifically itemized but will still present cost not covered by contigencies such as sidewalk underdrains, pavement sawcut, grind, and overlay to conform, etc.
5) Supplemental work includes payment adjustments for price index fluctuations, soft spot repair, etc.
6) It is assumed that all right of way wil be dedicated to the City at no cost

City of Paso Robles- Huer Huero Creek Crossing **PRELIMINARY CONSTRUCTION COST ESTIMATE**

Alternative 5 Tall Bridge Crossing

Description: Tall bridge with less grading and minimum impacts to Erskine Parkway

Total Project Cost (2017 Dollars)	$ 11,700,000

Total Construction Costs:	$	10,170,000
Total Right of Way Costs:	$	-
Total Capital Support Costs:	$	1,530,000

Construction Costs

Roadway Items

Section	Description	Quantity	Unit	Unit Price	Cost
1	Roadway Excavation	3152	CY	$ 50.00	$ 157,600
2	Hot Mix Asphalt	759	TON	$ 150.00	$ 113,900
2	Class 2 Aggregate Base	776	CY	$ 85.00	$ 66,000
3	Modify Erskine Parkway	1	LS	$ 200,000.00	$ 200,000
				Subtotal Section 1-3:	$ 537,500
4	Storm Water Collection and Treament	10%	of Sections 1-3		$ 54,000
5	Water Pollution Control	10%	of Sections 1-3		$ 54,000
6	Erosion Control	5%	of Sections 1-3		$ 27,000
7	Traffic Items	5%	of Sections 1-3		$ 27,000
				Subtotal Section 4-7:	$ 162,000
8	Minor Items	5%	Sect 1-7	$ 699,500	$ 35,000
9	Roadway Mobilization	10%	Sect 1-8	$ 734,500	$ 74,000
10	Supplemental Work	2%	Sect 1-8	$ 734,500	$ 15,000
11	Contingencies	35%	Sect 1-8	$ 734,500	$ 258,000
				Subtotal Sections 8-11:	$ 382,000
				Total Roadway Item Cost:	**$ 1,090,000**

Structure Items

Structure	Description	Quantity	Unit	Unit Price	Cost
1	Cast-in-Place Box Girder Bridge	20680	SQFT	$ 325.00	$ 6,721,000
				Subtotal Structure Items:	$ 6,721,000
		Contingency for Structure Items:	35%	Contingency Cost	$ 2,352,350
				Total Structure Item Cost:	**$ 9,073,350**

Construction Cost Summary

Roadway Items	$	1,090,000
Structure Items	$	9,073,350
Total Construction Costs:	**$**	**10,170,000**

Capital Support Costs

Description	%	Cost
Engineering/Permitting/Approvals	10%	$ 1,017,000
Construction Administration/ Management/Inspection	5%	$ 508,500
Right of Way Support	N/A	$ -
Total Professional Services Cost:		**$ 1,530,000**

Right of Way (See assumption 6)

Parcel Type	Quantity	Unit	Unit Price	Cost
Residential	0.00	AC	$ -	$ -
Undeveloped	0.00	AC	$ -	$ -
			Subtotal Right of Way Items:	$ -
	Contingency for Right of Way Items:	25%	Contingency Cost	$ -
			Total Right of Way Cost:	**$ -**

Assumptions

1) 35% contigency assumed. Overall cost rounded to the nearest $100k.
2) Asphalt thickness is assumed to be 6" with a unit weight of 145 pcf.
3) Class 2 aggregate base thickness assumed to be 12" under pavement.
4) Minor items includes those that have not been specifically itemized but will still present cost not covered by contigencies such as sidewalk underdrains, pavement sawcut, grind, and overlay to conform, etc.
5) Supplemental work includes payment adjustments for price index fluctuations, soft spot repair, etc.
6) It is assumed that all right of way wil be dedicated to the City at no cost

Attachment for Huer Huero Creek Crossing

4. Memo- *Permit Constraints Huer Huero Creek Crossing-City of Paso Robles* (Althouse and Meade, Inc.), 4pp.

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

1602 Spring Street, Paso Robles, CA 93446
(805) 237-9626 • Fax (805) 237-9181 • www.althouseandmeade.com

Memo

To: Jorge Aguilar
From: LynneDee Althouse and Mike Hill
Date: April 10, 2017
Re: Permit Constraints Huer Huero Creek Crossing – City of Paso Robles

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The table below summarizes agency fees and priorities for alternatives considered by the City.

Agency	Authorization/ Permit	At-grade Crossing	Bridge	Arch Culverts
CDFW	LSAA (Fish and Game Code 1602)	Least preferable alternative At-grade crossings prone to aggradation/degradation, can wash out during high flows, and covers maximum aquatic area. Fee:$4,200 to $5,000	Most preferable alternative because it does not disrupt flow, animal movement, does not create a grade control structure. No aggradation/degradation. Minimum number of piles would be recommended. Fee: $5,000	Viable option to maintain large areas of natural streambed that allows for natural fluctuation of bed height. Does not create grade control effect. Maximize arch width, as feasible. Minimize pier dimensions. Fee: $5,000
USACE	Nationwide Permit (NWP) 14 linear transportation (No fees for federal authorization)	Requires pre-construction notification and consultation with federal Endangered Species Act agencies (NMFS and USFWS)	Place abutments above the ordinary high water mark. [Piles with minimal footprint are not regulated under the Clean Water Act.]	Piers will require authorization under the Clean Water Act, but small footprint may not require notification.
RWQCB	Water Quality Certification (Clean Water Act Section 401) and Porter Cologne Act (Waste Discharge Requirement; WDR).	RWQCB does not authorize at-grade structures for arterial roads.	If abutments are above the Ordinary High Water Mark, and bridge is on pile, a 401 permit would not be required. May require mitigation for impacts to the riparian zone under the Porter Cologne Act (WDR)	401 Water Quality Certification required to authorize non-reporting NWP 14.

Information needed by agencies includes:

1. Evaluation of least damaging project alternative – The smallest footprint in the Water of the U.S. and State (to an elevation of approximately 3 feet above the bed for WOUS and the active flood terrace for Waters of the State).
2. Delineation of Waters of the U.S. and State
3. Wildlife assessment
4. Hydrologic analysis
    a. hydrology study
    b. scour analysis (for structures w/in Waters of the U.S.)
    c. shear velocities (for structures in the flood plain)
    d. describe fluvial geomorphology of the affected reach
5. Geotechnical report
6. Soils Report
7. Engineered plans with cross-sections of facilities, Q10 and Q100 shown
8. Erosion control/spill response plan
9. If directional bore is planned for utilities, a frac-out plan will be required.
10. Mitigation plan
    a. Restore riparian vegetation in a reach of creek approximately 3:1 ratio of area affected by the structure
    b. Plant trees and shrubs to compensate for impacts to riparian zone.

Email from Regional Water Quality Control Board, Clean Water Act Section 401, Water Quality Certification Project Manager, Paula Richter, regarding subject at-grade crossing on the HuerHuero:

From: Richter, Paula C.@Waterboards [mailto:Paula.Richter@Waterboards.ca.gov]
Sent: Wednesday, March 29, 2017 3:20 PM
To: LynneDee Althouse
Cc: Hammer, Phillip@Waterboards
Subject: City of Paso Robles Erskine Parkway Crossing - Pre-application Site Visit

Hi LynneDee,

Please allow this e-mail to confirm our discussions during a pre-application site visit held on January 19, 2017 related to the above-referenced project. The City of Paso Robles proposed to install a low water crossing in Huer Huero Creek at Erskine Parkway. The City advised that the crossing would allow for the installation of a new access road to ameliorate heavy and sometimes potentially dangerous traffic conditions at the Highway 41 [sic; Hwy 46] intersection. The City explained that the low water crossing would be used on a frequent basis, primarily by local drivers. We explained that it has been Central Coast Water Board staff's standard practice, for some time now, not to approve the installation of low water crossings on water bodies with characteristics similar to Huer Huero Creek. This is because low water crossings have negative impacts on water quality and beneficial uses.

- They essentially function as dams. They obstruct, redirect, or otherwise restrict flow, resulting in an increase in velocity across the hardened crossing, and alterations to the stream morphology.
- Installations on ephemeral streams often result in scour, and spatial patterns of fragmentation, analogous to those processes associated with larger dams.
- They may alter subsurface flows by blocking groundwater and effectively raising the upstream water table, which can then impact vegetation on both sides of the crossing.
- During high flows, a low water crossing can cause sediment deposition and often bank erosion.
- Increased runoff due to the impervious surface of the road can lead to increased erosion, increased sediment loads, and reduced percolation and groundwater recharge.
- They reduce the amount and variability of stream migration across the floodplain, leading to changes in downstream flow, riffle-pool sequences, scour, and downstream habitat-forming debris (by trapping it against the crossing).
- They have been associated with the alteration of pH, additional nutrient inputs, and chemical runoff from the road surface.
- They can pose a barrier to the movement of aquatic species and significantly modify the creek's flow regime.

In addition, a low water crossing does not avoid or minimize direct impacts to waters. Optimizing avoidance and minimization of direct impacts is also a standard practice of Central Coast Water Board staff. Continued pursuit of a low water crossing would necessitate that the City demonstrate their project design avoids impacts to waters of the state wherever feasible, and minimizes impacts where avoidance is infeasible. We would need a detailed fluvial geomorphological analysis that examines the potential direct and indirect impacts of a low water crossing to the stream channel. This analysis would need to demonstrate that building the crossing will not impact beneficial uses of Huer Huero Creek, result in hydrologic or geomorphic modification of the creek and/or its banks, or degrade water quality.

Finally, we discussed practicable alternatives to a low water crossing at Erskine Parkway, such as a bridge. Bridges can maintain the original stream channel with minimal or no alteration or disturbance. Clear-span bridges do not require infilling or restricting the area of water flow. Bridges provide better capacity to accommodate high flows while creating better inlet and outlet conditions that allow debris to pass through without blockage.

Please do not hesitate to contact me with any further questions. We look forward to working with the City on this project. We appreciate that they came to us early in the design process seeking our input and advice.

Regards,

~Paula

Paula Richter
Environmental Scientist
Central Coast Regional Water Quality Control Board
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