

# PALO PARADO I-19 TO PENDLETON DRIVE DESIGN CONCEPT REPORT

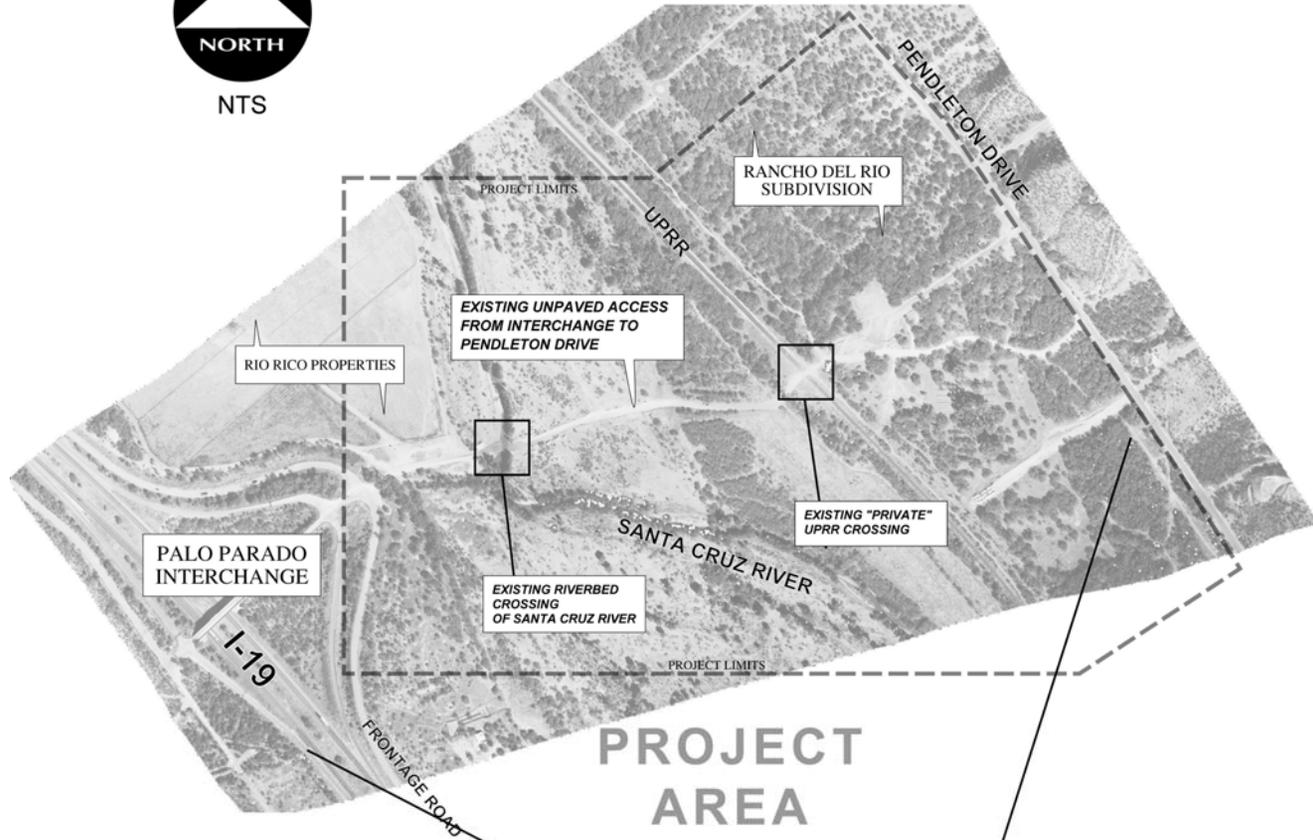


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CPE Consultants, LLC

May 29, 2008

- Purpose: Evaluate alternative roadway alignments across the Santa Cruz River from the Palo Parado Interchange (Exit 25km), across the Union Pacific Railroad (UPRR), to Pendleton Drive.
- A report prepared by Tetra Tech, Inc. in 2002 for Santa Cruz County, “**Rio Rico Corridor Study**” (RRCS), analyzed a larger area, approximately 16.5 square miles, which included three alternatives.
- The Palo Parado Crossing Alternative was the selected solution and thus became the study area for this current DCR.
- This DCR analyzes three alternatives of the Palo Parado Crossing.
- Four main design components of each alternative are:
  1. An intersection at the Palo Parado Interchange
  2. A new bridge crossing of the Santa Cruz River
  3. A new crossing of the Union Pacific Railroad
  4. A new intersection at Pendleton Drive



# PROJECT AREA

## SCOPE OF WORK

- New road construction
- New river crossing, construction of a 40' wide bridge with 2 – 14' travel lanes
- Palo Parado Interchange to Pendleton Drive, 3260 LF to 4025 LF depending on alternative selected
- Design speed 55 mph, posted speed 35 to 45 mph
- Nominal right-of-way width of 120 feet to 60 feet
- Road section details
- Drainage improvements – Santa Cruz River channelization, CMP drainage crossings, Cut Ditches and Culverts along roadway section
- New graded railroad crossing requiring coordination with UPRR
- New signage and pavement markings
- Non-signalized intersection at Pendleton Drive
- Non-signalized intersection at Palo Parado Interchange
- Environmental screening

## EXISTING ROADWAYS/ACCESS

- **Interstate 19** and appurtenant Frontage Roads all lie within ADOT rights-of-way, are paved and in satisfactory to good condition.
- The **Palo Parado Interchange** (Exit 25km) provides direct access to a two-way, two-lane frontage road located east of the highway.
- **Pendleton Drive** is a north-south collector road located east of both the Santa Cruz River and the UPRR tracks. Pendleton Drive is a paved, rural, two-lane road that extends through the limits of this study area. It is within Santa Cruz County right-of-way and is in satisfactory condition. Pendleton Drive crosses numerous washes in paved, at-grade ford sections.



## SANTA CRUZ RIVER CROSSING

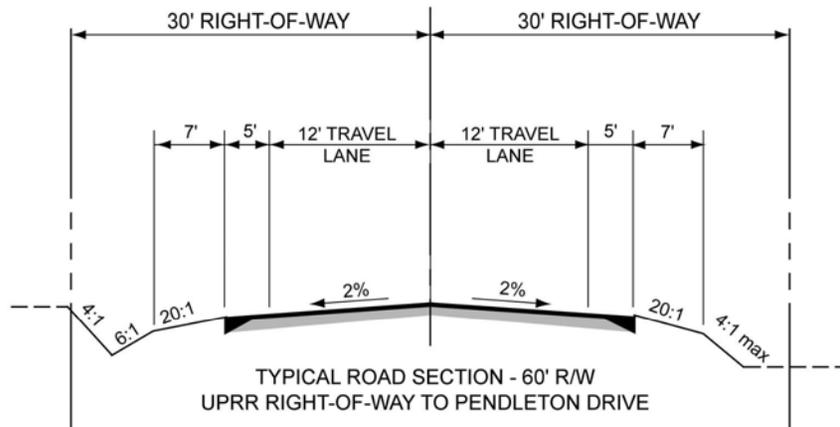
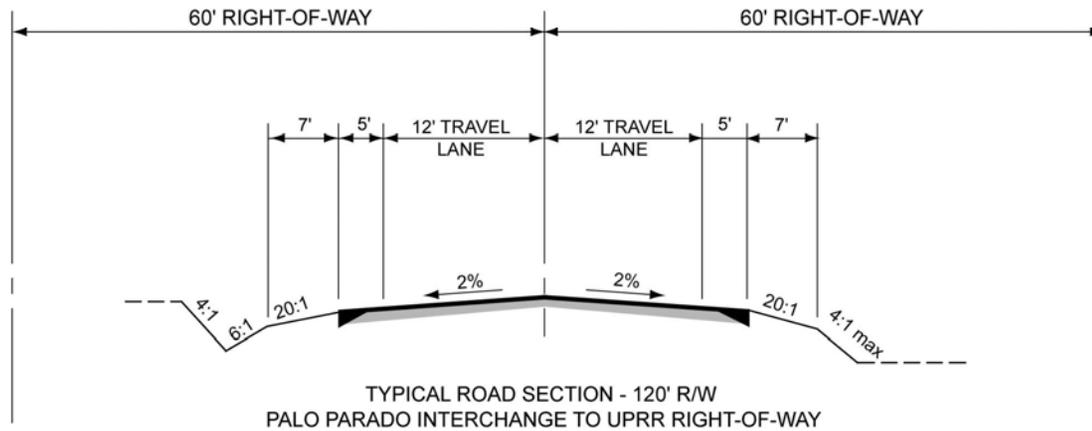
Any one of the three alternatives will have to cross the Santa Cruz River. The existing reach of the Santa Cruz at any of the three proposed crossings is unimproved without bank protection on either side.



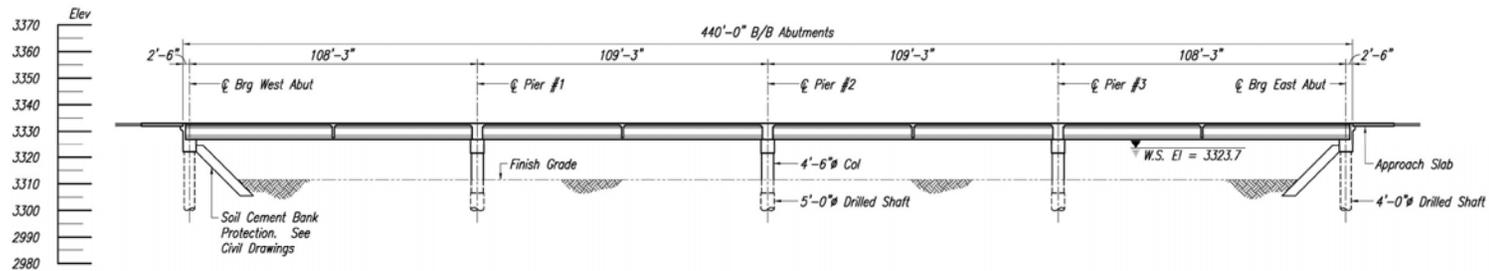
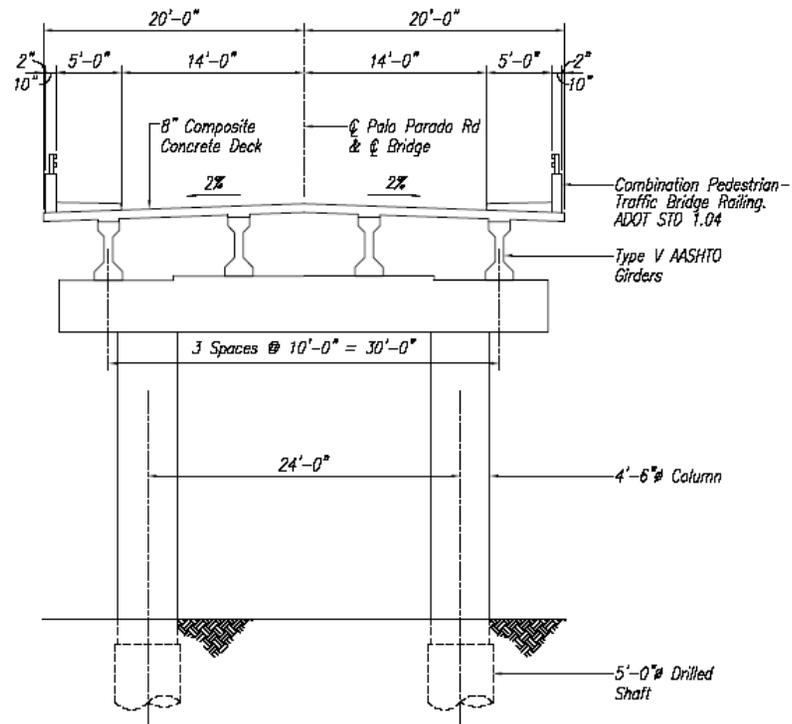
## UPRR CROSSING

- The Union Pacific Railroad maintains tracks within the study area.
- The tracks traverse this area in a north/south direction lying east of the Santa Cruz River and west of Pendleton Drive.
- The tracks lie within UPRR right-of-way which maintains a fairly consistent 200-foot width through the study area.
- The tracks are elevated above the floodplain in which they lie.
- Maximum sight visibility at the crossing is an important criterion.





Maricopa County DOT Standard for  
Rural Minor Collector Road



LONGITUDINAL SECTION ALONG CONSTRUCTION CENTERLINE

# MAJOR DESIGN FEATURES

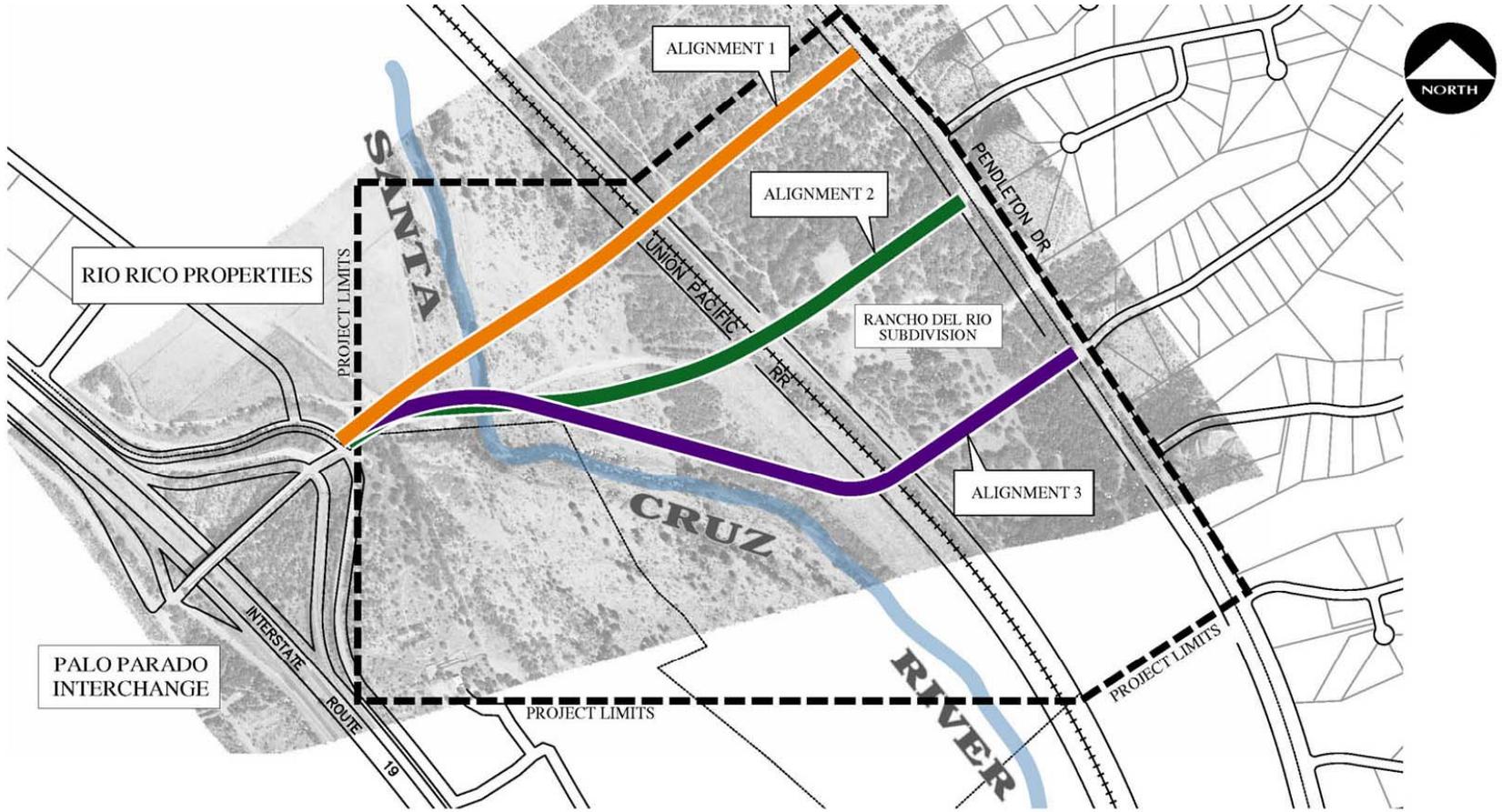
## ALIGNMENT AND GRADE CRITERIA

- Obtain the greatest sight distance at the UPRR crossing for safety
- Minimize the limits of construction
- Minimize overall environmental impact on the Santa Cruz River and surrounding area, mitigate where necessary
- Maximize the hydraulic capacity of the bridge opening
- Minimize right-of-way acquisition
- Minimize earthwork/excavation as much as is practical
- Roadway Safety, need for guardrails, fences, etc.
- Railroad crossing: gated, signalized, visibility north and south

## RIGHT-OF-WAY

- From the Palo Parado Interchange across the Santa Cruz River to the UPRR right-of-way, the land is owned by Rio Rico Properties (RRP).
- A permanent right-of-way of 120 feet, 60 feet either side of the alignment centerline, will be granted by RRP from the Palo Parado Interchange to the UPRR right-of-way.
- Rio Rico Properties expressed a preference for Alternative #3 because 120' of right-of-way already has been dedicated and platted roughly along this alignment after the Rio Rico Corridor Study results of several years ago.
- Alternative #2 contains Caballero Corte though it is only 60'. Any additional right-of-way would seriously damage the adjacent lots fronting Caballero Corte.
- Rio Rico Properties also has expressed concerns with Alternative #1 since this alignment has a negative impact on the adjacent lots. Although there is a 60' equestrian easement, we recommend shifting road alignment south to only impact the rear portion of the adjacent lots to the south and still maintain the minimum lot size requirements.
- A minimum of 60-foot easement across the UPRR property will have to be negotiated and coordinated with UPRR.
- No additional ADOT right-of-way will be required at the interchange connection.

## THREE ALTERNATIVE ALIGNMENTS



# MAJOR DESIGN FEATURES

## QUALITATIVE ALTERNATIVE ALIGNMENT SELECTION CRITERIA

The identification of alternatives for a new all-weather crossing within the study area of the Palo Parado Interchange were selected and evaluated on the criteria of:

1. Safety crossing at the railroad
2. Impacts on the UPRR
3. Existing drainage patterns
4. Environmental concerns and requirements
5. Santa Cruz River crossing / Bridge location
6. Traffic concerns and requirements
7. Route length
8. Design and posted speed limits
9. The best comfort for the driver
10. Construction cost
11. Construction duration

## ALTERNATIVE #1

- This alignment is the most northerly, and most direct of the three alternatives.
- This alternative provides the best site visibility for the UPRR crossing.
- Allows increase traffic safety and reduces potential delay at the crossing.
- Requires the shortest and most economical Santa Cruz River channelization.
- Provides a straight roadway with very minimal and gentle horizontal and vertical curvature, which increases driver's comfort significantly.
- The bridge alignment at this location is on a straight alignment.
- Full route length from existing pavement at Palo Parado Interchange to existing pavement at Pendleton Drive is approximately 3,260 feet.
- Right-of-way acquisition required for this alternative.
- The design speed of this alternative is 55 mph, with a recommended posted speed of 45 mph. No private driveways from adjacent properties will connect to the new roadway.
- This is the least expensive of the alternatives.

## ALTERNATIVE #2

- Good site visibility for the UPRR crossing, however newly-constructed homes along Caballero Corte may reduce site visibility in future.
- A gated railroad crossing is essential.
- This alternative requires the second shortest and economical Santa Cruz River channelization.
- The alignment features gentle horizontal and vertical curvature, which promotes driver comfort. The alignment requires horizontal curvature at the bridge.
- The full route length is 3,509 feet.
- Right-of-way acquisition required for this alternative.
- The design speed is 55 mph, posted speed of 45 mph from the Palo Parado Interchange to the UPRR crossing.
- A posted speed of 25 mph from the UPRR crossing to Pendleton drive.
- This alternative is the second least expensive of all.

## ALTERNATIVE #3

- Acceptable site visibility for the UPRR crossing.
- A gated railroad crossing is essential.
- Requires the longest and most expensive Santa Cruz River channelization.
- Features vertical curvature, which promotes driver comfort. The alignment requires horizontal curvature at the bridge. A horizontal curve located close to railroad crossing is sharp and requires speed reduction.
- The route length is 4,025 feet.
- No right-of-way acquisition is necessary.
- The design speed is 55 mph and 35 mph. Posted speed of 30 to 45 mph.
- Ties the new road to the existing intersection Pendleton Drive and Avenida Ostion.
- This alternative is the most expensive of all.

## QUALITATIVE ALTERNATIVES COMPARISON MATRIX

COMPARISON CATEGORIES	Ait 1	Ait 2	Ait 3	COMMENTS
Design and construction cost	3	2	1	
ROW availability / cost	2	1	3	
Safety	3	2	1	(i) Sight Visibility (ii) Animal Access
Railroad crossing improvements	3	2	1	(i) Sight Visibility (ii) Vegetation Density
Bridge Design	3	2	2	Straight Reach of River upstream and downstream
Trip length	3	2	1	Alternative 1 is shortest
Acceptability by Development	2	1	3	Need for Limited Access from Development
Acceptability by ADOT	2	1	1	(i) Bridge Curvature (ii) Intersection Improvement
ADJACENT Access	2	3	3	
Environmental	3	2	1	Destruction of Riparian Habitat
<b>TOTAL</b>	<b>26</b>	<b>18</b>	<b>17</b>	<b>SELECT ALTERNATE 1.</b>

**NOTE: WEIGHT; 3 HIGHEST, 1 LOWEST**

Note: Alignment 1 has the best appeal and therefore this is the selected alignment for future roadway design and construction.

COST ESTIMATE SUMMARY	
Alternative #1	\$ 6,372,085
Alternative #2	\$ 6,432,220
Alternative #3	\$ 7,976,370

## WHERE DO WE GO FROM HERE?

- State/Federal approvals needed to construct bridge over Santa Cruz River.
- Investigate and address potential impacts to species of special interest, endangered species and important riparian areas.
- Field inventory affected area for regulated native plants. Mitigation plan, if necessary, for vegetation.
- Cultural or archeological impacts, 404 permits, air quality, or noise issues.
- Coordinate with the Corps of Engineers to initiate the 404 permit process.
- Coordinate with ADOT for I-19 connection; Encroachment permit
- Possibility of receiving Federal Section 130 monies for construction of UPRR crossing.
- On-site meeting with all parties involved: Issues such as exact location of crossing, financing of project, discussion of grade separation, and ACC staff recommendations will be discussed.
- Submit application to ACC including reasons for crossing, funding, signed agreement with UPRR, conceptual drawing of crossing.
- ACC Rail Safety Staff may request: average daily traffic counts, train movement information, traffic studies and concept reports.

## **PROJECT SCHEDULING**

- Allow approximately 1½ to 2 years to complete the designs.
- Allow minimum of 1 year for environmental studies, permits, etc.
- Allow between 270 and 365 calendar days for construction.

## **FUNDING ALTERNATIVES**

- At present, no funding alternatives have been identified or appropriated.
- Potential funding sources:
  1. County funds
  2. Flood Control District funds for the bridge portion
  3. Developer contributions
  4. 130 Monies for UPRR crossing
  5. Federal and State funding
  6. School District participation
  7. Formation of an Improvement District.

## SUMMARY

- For 13,000 residents and school children east of Pendleton Drive, the need for a safe connection to I-19 is obvious, and essential. This design concept report completes a second major step by the Board of Supervisors to provide that connection. Already 1,400 vehicles per day travel this difficult roadway.
- CPEC has analyzed 3 alternative alignments, all of which provide a bridge over the Santa Cruz River and a gated crossing of the railroad.
- The recommended alignment (#1) is the north alignment providing for a 3,260 foot “straight shot” costing \$6,372,000 that ranks the most safe with the least amount of disturbance to riparian habitat.
- We await the direction of the Board of Supervisors to continue the design, and support your Staff’s efforts to secure the necessary State and Federal permits while working with the Union Pacific Railroad.