



## **APPENDIX 2 WILDLIFE CROSSINGS MEETING MINUTES**

**Town of Marana  
Tangerine Road Wildlife Linkages  
Technical Team Meeting Minutes  
August 10, 2011**

**Purpose:**

Gather engineers, biologists, hydrologists, planners, etc. to finalize recommendations on the wildlife crossings for Tangerine Road.

**Attendees:**

Person	Organization
Keith Brann	Town of Marana Engineering
Scott Leska	Town of Marana Capital Improvement
Jennifer Christelman	Town of Marana Engineering
Lisa Shafer	Town of Marana Planning
Mike Ingraldi	Arizona Game and Fish Department
Jose Rodriguez	Oro Valley Engineering
Rick Ellis	Pima County Department of Transportation
Bill Zimmerman	Pima County Regional Flood Control District
Kim Otero	Westland Resources
Jim DeGrood	Pima Association of Governments
Alejandro Angel	PSOMAS
Brent Bartz	PSOMAS
Jerry Curless	CMG Drainage

**Background:**

The AGFD completed a wildlife mortality and hotspot evaluation for the Tangerine Road Corridor. This study included recommendations for locations and sizes of wildlife crossings along the corridor. This study was strictly based on wildlife needs and did not evaluate the future development, drainage, transportation needs etc.

**Goal of Meeting:**

- create recommendations that will supplement the recommendations from the AGFD report on the sizing of culverts for wildlife use
- make the best recommendations for locations, sizing, and treatment of wildlife crossing structures
- come up with recommendations that can be used to assist in the design of the road as well as the support the request for funding to the RTA Wildlife Linkages Subcommittee

**Initial Evaluation:**

This evaluation used recommendations from the report and applied to the design to determine size and location of wildlife crossings. The recommendations were as follows:

Structure #	Approximate Station #	Size for Hydro	Proposed Drop	Classification (Large or Medium Animals)	Wildlife Recommendation
1	528	3-10'x4'	Y	Med	add 2' and remove drop
2	574	3-10'x4'	Y	Large	add 5' and remove drop
3	610	1-10'x4'	Y	Med	add 2' and remove drop
4	627	2-48"	N	Med	add 2' and change to box
5	653	6-10'x7'	Y	Large	add 2' and remove drop
6	671	6-10'x4'	Y	Large	add 5' and remove drop

7	735	5-10'x4'	Y	Med	add 2' and remove drop
8	758	2-10'x5'	Y	Med	add 1' and remove drop
9	771	6-10'x6'	Y	Large	add 3' and remove drop
10	827	4-10'x5'	Y	Med	add 1' and remove drop
11	853	6-10'x5'	Y	Med	add 1' and remove drop
12	882	7-10'x6'	N	Med	drainage already accommodates
13	928	2-8'x4'	N	Large	add 5'
14	944	2-10'x5'	N	Med	Add 1'

**Technical Advisory Committee Evaluation:**

The technical advisory committee evaluated the crossings based on the following questions:

- Is there a wildlife crossing need?
- Is it in the habitat conservation plan?
- What are the adjacent land uses (current and proposed in general plan)?
- Is there good vegetation?
- Is there good connectivity?
- Are there traffic signals or future signals that will add light to the crossing?
- Is additional fill required?
- Is the drainage design compatible with the wildlife needs?
- Is the crossing in an area for set aside under the Conservation Land System?

Many of these items were consistent across all of the locations so they dropped out. The crossings were differentiated by the following:

Structure #	Approximate Station #	In HCP	Compatible Adjacent Land Use	Absence of Future Traffic Signal	Suitable Vegetation	Totals
1	528	0	0	0	0	0
2	574	1	1	1	1	4
3	610	0	1	1	1	3
4	627					
5	653	1	1	1	1	4
6	671	1	1	1	1	4
7	735	0	1	1	1	3
8	758	0	0	0	1	1
9	771	0	1	0	1	2
10	827	0	1	1	1	3
11	853	0	1	1	1	3
12	882	0	1	1	1	3
13	928	0	0	1	1	2
14	944	0	0	1	1	2

If the total score was 0-2 then the crossing was given a low priority. If the score was a 3 or 4, then the crossing was given a high priority. There is one that was classified as a moderate rating and that is explained below.

The table below shows the committee's priority rating and the recommendations for each crossing:

Structure #	Approximate Station #	Priority	Notes and Recommendations
1	528	low	There is no vegetative connectivity on the south side and there will be future development. There will also likely be a future traffic signal with lighting at Breakers Rd
2	574	high	This is in the HCP corridor. Looking at a bridge (~70 ft) in this location rather than boxes.
3	610	high	Do a crossing at either one. The culvert treatment will need to be determined for the selected location.
4	627		
5	653	high	This is in the HCP corridor. Looking at a bridge (~70 ft) in this location rather than boxes.
6	671	high	This is in the HCP corridor. Looking at a bridge (~70 ft) in this location rather than boxes.
7	735	high	Have existing connectivity and open space through existing development. Need to design wildlife treatment on crossing.
8	758	low	Future development will restrict wildlife mobility, near a future signal at Camino de Oeste. Design for hydro only.
9	771	moderate	Evaluate to change from a large crossing to a medium crossing due to it's proximity to Camino De Manana and the associated constrains on road profile and sight visibility. Need to design wildlife treatment on crossing.
10	827	high	Have connectivity through existing development. Need to evaluate for a span rather than a box
11	853	high	Need to evaluate for a span rather than a box
12	882	high	This crossing already meets wildlife needs, but evaluate for a span rather than a box
13	928	low	Existing development and an existing box downstream restrict wildlife mobility. Design for hydro only.
14	944	low	Existing development. Design for hydro only

#### Other items discussed

- A brief discussion took place regarding Openness Index (OI). For large mammals, such as mule deer, the required OI should be accomplished as a single opening; otherwise, the animals will not use the crossings. The OI of crossings for medium mammals such as Coyotes and Javelina can add the area of several openings. For example, a 3 cell RCBC, 12'x6'x130' (1.83mx3.66mx40m) would have an OI of 0.50.



08/10/2011

# Tangerine - wildlife

<u>Name</u>	<u>Company</u>	<u>Phone</u>	<u>e-mail</u>
Alejandro Angel	Psomas	292-2300	aangel@psomas.com
Isa Shaffer	TOM	382-2649	ishaffer@maranacom
Keith Brann	Tom	382-2629	kbrann@marana.com
KHANG NGUYEN	KAI	382-4708	knguyen@kittelson.com
Rick Ellis	PODOT	740-6385	RICK.ELLIS@DOT.PIMA.GOV
Bill Zimmerman	RFCO	248-1831	bill.zimmerman@rfcd.pima.gov
Jennifer Christelman	TOM	382-2665	jchristelman@marana.com
Jose Rodriguez	T.O.V.	229-1872	JRODRIGUEZ@CROWLLEYAZ.GOV
Scott Leska	TOM	382-2675	sleska@marana.com
Kimberly Otero	Westland Resource.	206-9585	krotero@westlandresources.com
Michael Ingraldi	AZ G+FD	928-532-5625	mingraldi@frontiernet.net
Jim DeGroot	PAG/RTA	792-1093	jdegroot@pagnobare.com
Jerry Curless	CMG Drainage	882-4244	jcurless@cmgdrainage.
Brent Bartz	Psomas	292-2300	bbartz@psomas.com

# MINUTES

## ***Tangerine Road: I-10 to La Cañada Dr***

### ***Design Team Meeting***

**Wednesday December 14, 2011**

**Town of Marana Conference Center**

**1:30-3:00 PM**

#### **1. Introductions - See attached sign-in sheet**

#### **2. Previous Action Items**

<b>Action Item</b>	<b>Responsible</b>	<b>Resolution</b>
Research ROW situation at Thornydale	Pima County (Ellis)	Resolved. Will need to acquire the ROW for this project.
Finalize traffic report	Psomas	Final traffic report has been uploaded to the project extranet
Refine culvert dimensions	CMG	Almost completed, finalizing bridge locations/dimensions
Get approval of JD	US COE	The JD has been approved. Psomas to provide CAD file of the delineation to Kittelson
Evaluate the need for a sewer corridor	Marana	A 30 ft wet utility corridor for water and sewer will be shown on the typical sections
Follow up with RTA on west end drainage study	Marana (Leska)	Done, see notes below for further discussion
Provide plan and profile exhibit with wildlife crossings labeled.	Psomas/ Kittelson	Done, uploaded to projectweb
Invite AZ Game and Fish to next meeting to discuss 10:1 drop inlets for medium size crossings	Marana (J. Christelman)	Done, AZG&F was in attendance at the meeting
Meet with TEP to discuss OHE impact and potential relocation cost	Psomas	Met with Debbie Sykes and Warrant McElya. Have not been able to meet with the TEP Transmission group

#### **3. Design Progress Update**

- Traffic
  - The revised traffic report has been uploaded to project web. Marana, Oro Valley and Pima County to verify that all comments have been addressed.
  - Kittelson has completed the access management and land use reports. The reports will be uploaded to projectweb.
- Roadway Design

- Psomas is realigning the roadway from the I-10 curve to the Thornydale substation (~Sta 570+00). The road centerline will be 25 ft south of the section line to avoid TRICO relocation (which has prior rights), and to maximize the area available for drainage conveyance in the west end of the project.
- Electric Utilities
  - The Town and Psomas met with TRICO representatives on December 8 to discuss an agreement to relocate their power line from the Thornydale substation to approximately 900 ft west of Dove Mountain Boulevard (~2.5 Mi). An agreement was reached. The main elements of the agreement are attached, and will be formalized in a memorandum of understanding
  - Psomas and Kittelson met with Debra Sykes and Warren McElyea to discuss potential impacts to TEP's facilities. The team wanted to find out the relocation cost for the lines, how much embankment would be allowed against existing poles, and any access requirements for maintenance. TEP requested an additional meeting with their Transmission department, but the team has been unable to schedule a meeting.
- Environmental Update
  - The project's JD has been approved
- Drainage
  - The team discussed the scope of the west end drainage study proposal.
  - If the study is not conducted and no suitable solution is identified, the western 1.5 miles of the roadway will still be subject to flooding.
  - The following scope changes were recommended to the west end drainage study:
    1. Instead of performing detailed analysis of the three alternatives, limit the analysis to a concept-level study. Then, advance the preferred alternative for more detailed analysis.
    2. Organize the scope to make the study a phased project. In other words, if a given constraint makes one or more alternatives non-viable, any further evaluation/consideration of that alternative is eliminated.
  - Jerry Curless will revise the scope and fee and resubmit the proposal for the west end drainage study to Marana and the RTA.

#### **4. Pavement Section**

- Psomas provided a table with pavement alternatives and costs per square foot of road surface (next page).
- Segments 1 and 4 have areas with deficient subgrade. As shown in the table, Cement-treated subgrade (CTS) is a less costly alternative than using a thicker pavement section. Therefore, the team agreed to use CTS in areas with deficient soil properties.
- Although a ton of rubberized asphalt (ARAC) is more expensive than a ton of Asphaltic Concrete (AC), it also provides more pavement structural support. Therefore, using ARAC for the surface course does not increase pavement costs.
- Oro Valley decided to use 2" of ARAC for the surface course in their jurisdiction. Marana has yet to decide whether they would prefer 1.5" or 2" of ARAC as the surface course.

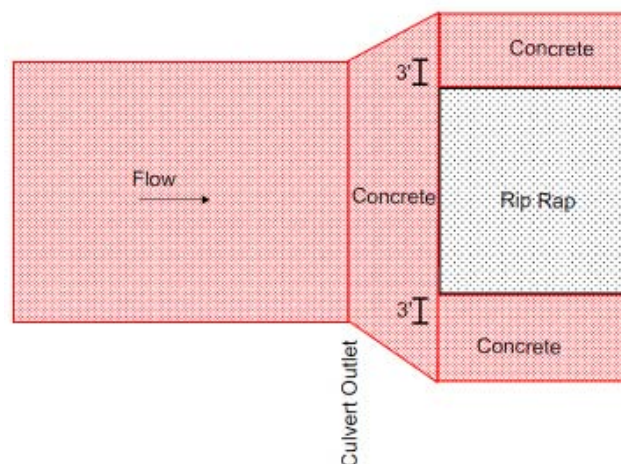
Tangerine Road Pavement Cost Comparison												
			ton	ton	cy	sy						
			Cost	\$ 75.00	\$ 65.00	\$ 25.00	\$ 4.70					
			Layer Thickness (in)				Layer cost for 1 SF surface area					
Segment #	Limits	Alternative	ARAC	AC	AB	CTS	ARAC	AC	AB	CTS	Total (\$/SF Pavement)	
1	I-10 to TRICO	C	2	5.5	8	0	0.86	2.04	0.62	-	\$ 3.51	
1	I-10 to TRICO	D	1.5	6	8	0	0.64	2.23	0.62	-	\$ 3.49	
1	I-10 to TRICO	G	2	3	5	6	0.86	1.11	0.39	0.52	\$ 2.88	
1	I-10 to TRICO	H	1.5	3.5	5	6	0.64	1.30	0.39	0.52	\$ 2.85	
2	TRICO to Dove Mtn	C	2	3	8	0	0.86	1.11	0.62	-	\$ 2.59	
2	TRICO to Dove Mtn	D	1.5	4	8	0	0.64	1.48	0.62	-	\$ 2.74	
3	Dove Mtn to La Cholla	C	2	3	8	0	0.86	1.11	0.62	-	\$ 2.59	
3	Dove Mtn to La Cholla	D	1.5	3.5	8	0	0.64	1.30	0.62	-	\$ 2.56	
4	La Cholla to La Canada	C	2	4.5	10	0	0.86	1.67	0.77	-	\$ 3.30	
4	La Cholla to La Canada	D	1.5	5	10	0	0.64	1.86	0.77	-	\$ 3.27	
4	La Cholla to La Canada	G	2	3	5	6	0.86	1.11	0.39	0.52	\$ 2.88	
4	La Cholla to La Canada	H	1.5	3.5	5	6	0.64	1.30	0.39	0.52	\$ 2.85	
5	La Cholla	A	0	5	7	0	-	1.86	0.54	-	\$ 2.40	
5	La Cholla	B	0	5.5	6	0	-	2.04	0.46	-	\$ 2.50	
5	La Cholla	C	2	3	5	0	0.86	1.11	0.39	-	\$ 2.36	
5	La Cholla	D	1.5	3.5	6	0	0.64	1.30	0.46	-	\$ 2.40	
6	Thornsdale	A	0	5	5	0	-	1.86	0.39	-	\$ 2.24	
6	Thornsdale	B	2	2.5	5	0	0.86	0.93	0.39	-	\$ 2.17	
6	Thornsdale	C	1.5	3	5	0	0.64	1.11	0.39	-	\$ 2.14	

## 5. Wildlife Crossings (Medium Size)

- The discussion below applies only to medium crossings (6' of vertical clearance). Crossings for large animals are being designed with bridges.
- Inlet treatments: Psomas provided a concept (attached) for wildlife-friendly drop inlets. The concept can be used for drops of 3-4 ft and uses a 10:1 drop to ensure line of sight for the wildlife across the culvert. The drop is treated with shotcrete to avoid scour and to provide traction to wildlife.
- Outlet treatments: AZG&F mentioned that riprap is a difficult substrate for animals to negotiate, and reiterated that line of sight is important. From a hydraulic perspective, riprap or other means of energy dissipation are critical. After some discussion, the group agreed to the treatment shown below to serve both functions.

Wildlife Crossing Outlet Treatment

Plan View



- Psomas mentioned that in a previous meeting with AZG&F the TAC agreed to combine the area of several culvert cells to calculate the openness index (OI) of medium size crossings. Without combining the area of several cells, the width of each cell would need to be greater than 30 feet. Some TAC members expressed concern over combining the area of multiple cells. Psomas will research the notes from previous meetings regarding this discussion. Marana, Oro Valley and Pima County will provide direction on how to proceed. Given that the medium culverts have already been sized with the aforementioned assumption, changing their design to provide a single opening will require significant additional drainage analysis and reassessing the roadway profile.
- The team discussed the use of wildlife-only crossings with separate drainage crossings, but the economic cost made it unfeasible for the project.

## 6. Open Discussion

- The value analysis for the project will be scheduled for late march.
- The next team meeting will focus on finalizing the project phasing and on planning the next round of public meetings.

## 7. New Action Items

Action Item	Responsible	Resolution
Provide a copy of the CAD file for the jurisdictional delineation to Kittelson	Psomas	
Upload the access management and land use reports to projectweb	Kittelson	
Revise the scope and fee for the west end drainage study	CMG	
Decide on thickness of ARAC to be used for surface course (1.5 v 2")	Marana	
Research notes from previous TAC meetings dealing with wildlife Openness Index (OI)	Psomas	
Provide direction on the design of medium wildlife crossings (single cell v. multi-cell)	Marana/OV/P CDOT	

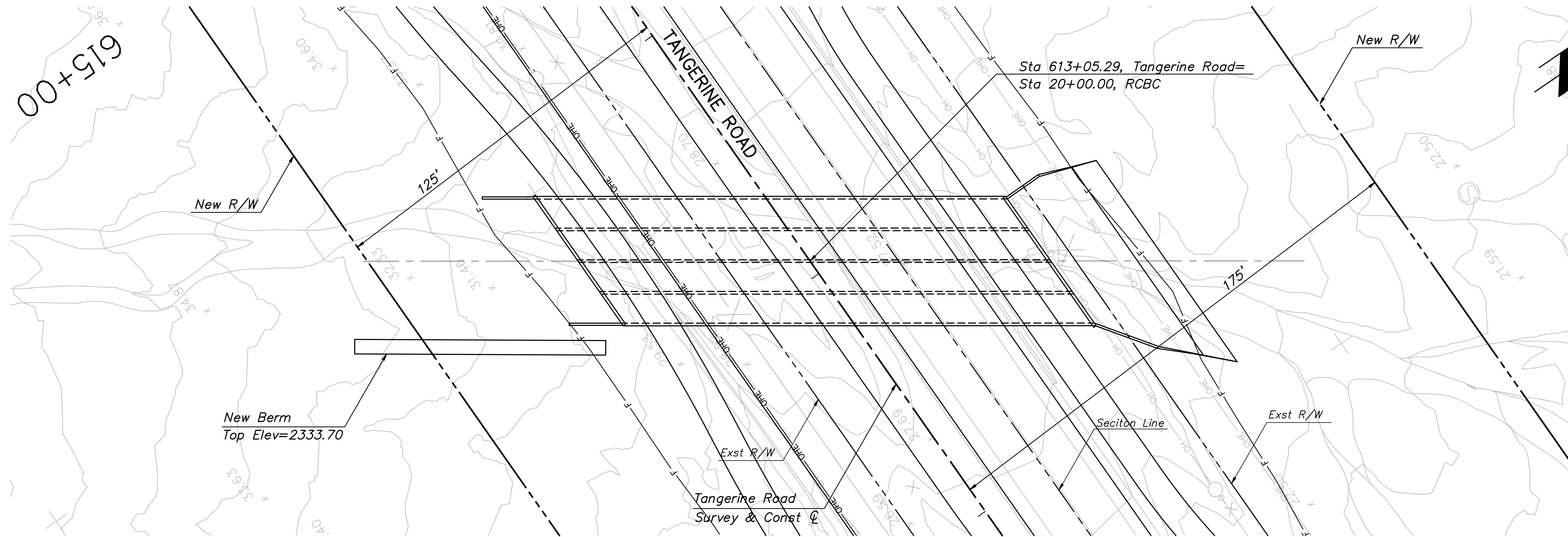
TANGERINE ROAD CORRIDOR

DATE: 12/14/11

#	Name	Company/Agency	Phone	E-mail
1	Alfredo Angel	Psomas	292-2300	aangel@psomas.com
2	Clint Glass	CMG Drainage	882-4244	clint@cmgdrainage.com
3	Michael Ingraldi	AZ Game + Fish	928-532-5625	mingraldi@frontiernet.net
4	R Schweinburg	AZ GFD	602-663-3233	rschweinburg@azgfd.gov
5	Bill Zimmerman	PC RFD	243-1831	bill.zimmerman@rfd.pima.gov
6	Jiankang Wang	CMG Drainage	882-4244	jwang@cmgdrainage.com
7	JERRY CURLESS	" "	" "	jcurless@cmgdrainage.com
8	Paul Baughman	Marana	382-1990	pbaughman@marana.com
9	Scott Leska	"	382-2675	sleska@ " "
10	Keith Braun	"	382-2629	kbraun@marana.com
11	RICK ELLIS	PCDOT	740-6385	Rick.ellis@dot.pima.gov
12	Scott BLACKMAN	AZGFD	520 609 2163	Sblackman@azgfd.gov
13	Matt Ashby	KAI	382-4709	mashby@Kittelson.com
14	Fernando Leal	TOM	382-2676	fproba@marana.com
15	STEVE CHESLAK	TOM	382-2650	SCHESLAK@MARANA.COM
16	Jennifer Christelman	"	382-2665	jchristelman@marana.com
17	Jim DeGroot	PAE/RTA	792-1093	jdegroot@paenet.org
18	Colby Hensel	RECON	325-9977	CHENS@RECONENVIRONMENTAL.COM
19	Janine Spencer	Marana	382-2658	jspencer@marana.com
20	SUREN NARADIZIAN	P.C. RWRD	740-6322	suren.naradizian@pima.gov

CRAIG CIVILIER TOV 229-4874 CCIVILIER@OROVALLEYAZ.COM  
 Chenggang Zhang Psomas 2922300 Chenggang.zhang@psomas.com

615+00



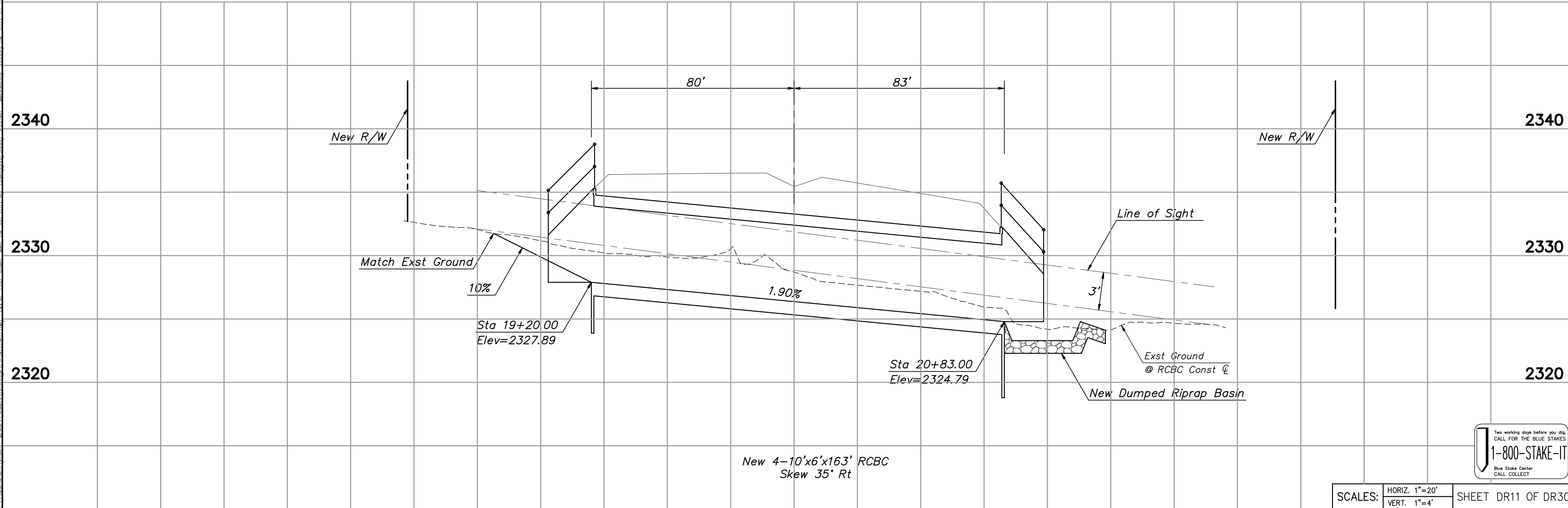
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PROJ. ENG.:	AA	DATE	12/11

NO.	REVISION DESCRIPTION	DIV. ENGINEER	DATE

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TOWN OF MARANA - PROJECT NO. 2005-061  
DRAINAGE PLAN AND PROFILE  
FOR  
TANGERINE ROAD  
TANGERINE ROAD

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**Tangerine Road Wildlife Crossings Meeting**  
**Town of Marana, April 23, 2012**

**Attendees:**

Janine Spencer – Town of Marana  
Scott Leska – Town of Marana  
Alejandro Angel – Psomas  
Chenggang Zhang – Psomas  
Shawn Lowery – AZG&F Department

**Discussion Items:**

1. Shawn mentioned that there is very literature on O.I. needs for anything smaller than a mule deer (the current target for the project is 0.4). However, the arches on Twin Peaks Road have been very effective in funneling medium wildlife including coyotes, javalinas, bobcats, etc (Shawn will provide photos/info to Marana and Psomas). He suggested finding out what the O.I.s are on Twin Peaks Road and try to provide something comparable for Tangerine.

NOTE – Psomas evaluated the arches for Twin Peaks Road after the meeting. There are 8 arches for medium wildlife; the minimum OI is 0.12, the maximum is 0.23, and the average is 0.19. All the medium wildlife crossings on Tangerine have OIs of at least 0.12.

2. The desire to replace some of the medium wildlife crossings with arches instead of box culverts was discussed. The intent would be to increase the O.I. of key crossings (using the O.I. of each individual cell, not the sum). The crossings at Shannon Rd (Sta 885+15, 7-12x8) and at Camino de Manana (Sta 772+32, 6-10x6) are of primary interest because they provide even spacing (about 2 miles) between major crossings and because they require significant width for drainage anyway.

NOTE – Psomas ran a preliminary evaluation of arch sizes to maintain the total flow area of the current RCBCs and avoid raising the roadway. The results are as follows:

- At Sta 885+15, use 1-9x36 arch in the center with 2-8x32 arches (one on each side).  
Approximately 1 foot of the arch would be buried (this was the case on Twin Peaks Rd),  
resulting in a clearance of 8 ft, and an OI of 0.53 for the center arch (the OI on the large Twin



Peaks crossing is 0.29). About 3 feet are needed from the top of the arch to the roadway surface. This structure would likely need a concrete bottom for scour control.

- At Sta 772+32, use 1-7x24 arch in the center with 2-6x20 arches (one on each side). Approximately 1 foot of the arch would be buried (this was the case on Twin Peaks Rd), resulting in a clearance of 6 ft, and an OI of 0.32 for the center arch. About 3 feet are needed from the top of the arch to the roadway surface. This structure would likely need a concrete bottom for scour control.
3. The Town and AZG&F recommended adding medium fence for the area between Sta 627+84 and Sta 644+51 to close a gap in the proposed fence.
  4. Psomas will prepare an exhibit showing the limits of the current fence and also send the fence information in a shapefile format to Shawn for evaluation of potential adjustment in fencing limits (reductions or additions).
  5. Janine and Shawn mentioned that the easternmost bridge at Prospect wash could be converted back to a box culvert due to its proximity to the western bridge (1,000 ft) as long as fencing is provided (the DCR shows large animal fence in this area). Eliminating this bridge will help reduce borrow and overall costs, and may be able to offset the additional costs of upsizing the crossings at Camino de Manana and Shannon Road (see item #2).

Action Items are underlined

**Tangerine Road Wildlife Crossings Meeting**  
**Town of Marana, January 30, 2013**

**Attendees:**

Jennifer Christelman

Janine Spencer – Town of Marana

Alejandro Angel – Psomas

Shawn Lowery – AZG&F Department

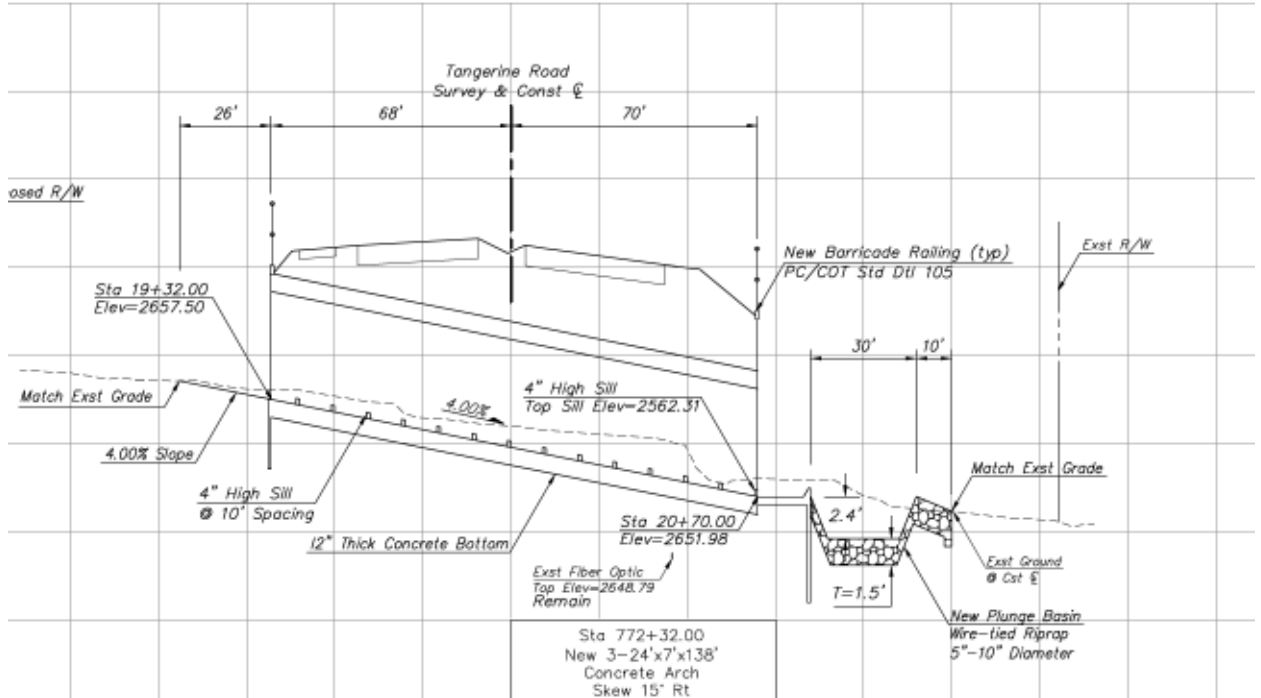
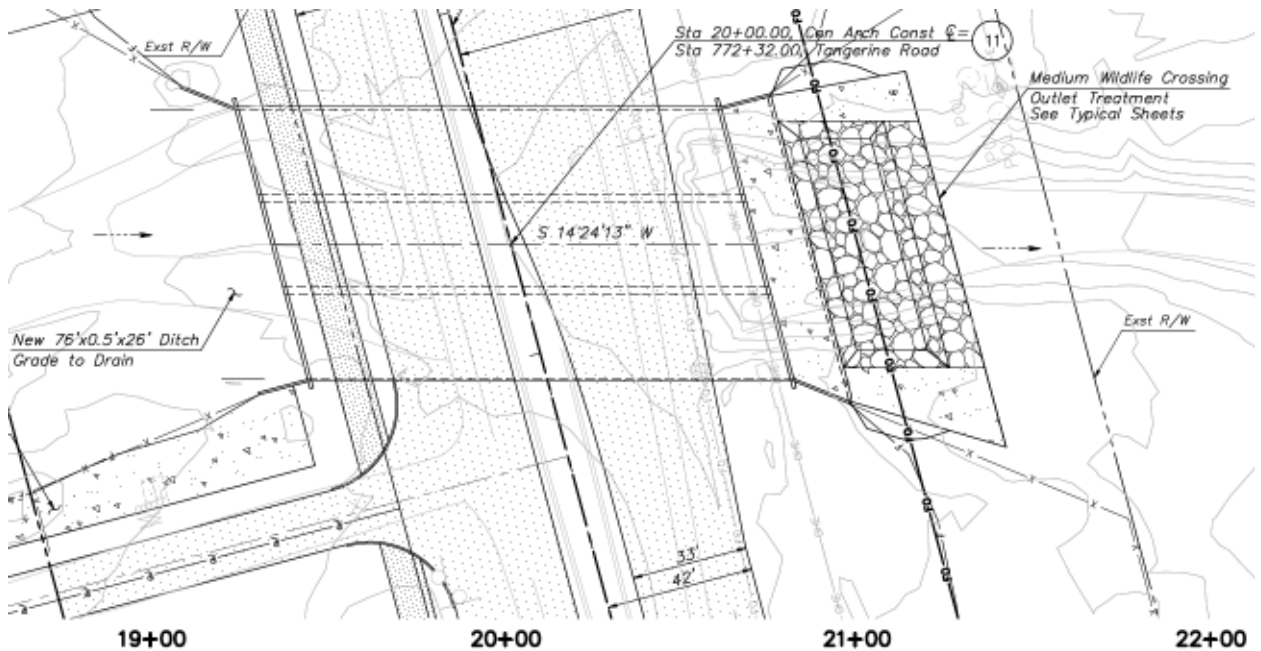
Ray Schweinsburg – AZG&F Department

Scott Blackman - AZG&F Department

**Discussion Items:**

**1. Medium Mammal Crossings**

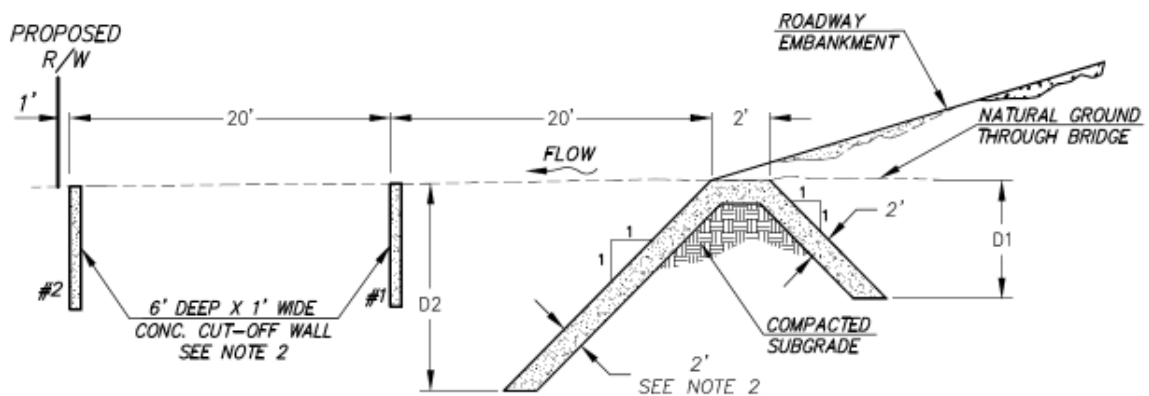
- The discussion focused on the crossing near Camino de Mañana (Sta 772+00) and an alternative being considered to reduce the culvert outlet velocity. The alternative used a shotcrete drop inlet (10:1 gradual slope) and provided better hydraulic characteristics (lower outlet velocities) than the original design. Although the team agreed that the shotcrete inlet is an acceptable alternative (and will be used at other crossings), it is preferable to have natural ground on the inlet where possible. The conclusion was to retain the original design (no drop inlet), but to increase the thickness of the riprap in the middle of the wildlife-friendly outlet treatment from 1 to 1.5 feet to mitigate flow velocities. The outlet treatment would continue to provide an outlet concrete platform and flat concrete sidewalks on the side to allow wildlife to exit. Conversations with Paul Baughman following the meeting confirmed that the proposed solution (depicted in the next page) was acceptable for drainage purposes.
  
- Concrete bottoms are needed in the culverts to avoid degradation that could compromise the structures. However, in order to try to make the substrate more natural, the design will incorporate “baffles” or 4” lips approximately every 10 feet along the bottom of the culverts. This should provide some sediment deposition in the culverts. There were some concerns that adding the lips would reduce hydraulic capacity, which would impact water surface elevation and potentially increase the size of the culverts. However, verification with CMG following the meeting indicated that no changes in culvert size will be needed, and that the impact to the water surface elevation is minimal.



## 2. Large Mammal Crossings (Bridges)

- The design team recommended grade control structures at the outlet of the two proposed bridges/large wildlife crossings to avoid scour that could affect the integrity of the structures. The current design calls for large wildlife “platforms” similar to those used in the medium crossings (riprap in the middle with concrete sidewalks on the sides).

- Two alternative outlet treatments were discussed: one consisted of a large shotcrete plunge basin that would be covered with sediment to provide a natural substrate. However, during large storm events, the sediment would be washed away and the shotcrete exposed. Marana would then have to either add material to the outlet again, or wait for small storms to deposit sediment again over the shotcrete. The other alternative was a “stepped” grade control structure (see detail below) where a series of underground structures and cutoff walls would be spaced about 20 ft to minimize the size of the scour hole and provide as much natural surface as possible.



- After discussing the various alternatives the team agreed that the “stepped” grade control structure concept was preferred because it maximized the natural substrate and minimized maintenance. Although small scour holes are expected to develop between each of the successive structures (approx. 3’ each), the holes will be uneven across the width of the crossing, which means that several areas will have minimal or no degradation, therefore facilitating wildlife passage.
- There was also some concern that berms funneling water to the bridges would create a “canyon effect” and affect the use of the crossings by mule deer. The berms are a few hundred feet long and start from a height of up to 8 ft at the bridge to match ground level at the upstream end. The slopes of the berms are gradual at 3:1 and made of shotcrete. After discussion, the team agreed that the “canyon effect” would be mitigated by two factors: the gradual slopes of the berms, which create a more open feel, and the **generous width of the crossings**, which allows the deer to maintain separation from the berm. Therefore, the current berm design will remain.

### 3. Fencing

- The Tangerine project includes more than 3 miles of large fencing (8 ft tall) and 7 miles of medium fencing. There was discussion on the cost of the large fence, as some of the initial ADOT wildlife fence projects had cost of \$50/LF. AZG&F mentioned that they high cost was a result of that particular contract and that more recently the large fence is costing \$7-9/LF. On Camino de Mañana (Twin Peaks Rd) the large fence cost approximately \$10-11/LF. As a result, the team will continue to use the current estimate of \$12/LF for the large fence.
- Marana residents have expressed concerns with the visual appearance of the large fence used on Camino de Mañana. This could also be a problem on Tangerine Road given the amount of fencing and because in order to avoid blocking storm flows coming from the Tortolita Mountains, the fence may have to be located at the top of the embankment immediately adjacent to (or very close to) the pedestrian path.
- After discussion, the team agreed to pursue the following strategy for fencing:
  - South side of Tangerine: Because the drainage flows are conveyed across the road by culverts, all fencing can be placed along the ROW line as long as the fence is connected to all the culvert wingwalls/outlets in order to avoid blocking flows. This is consistent with the current design.
  - North side of Tangerine: In areas where little to no flow enters the ROW (such as ridges), both the medium and large wildlife fence will be located along the edge of the ROW. In areas where drainage flows enter the ROW and run parallel to the road to a culvert (which is the typical condition), the medium and large fence will be placed on the embankment slope, above the water surface elevation (and slope protection such as riprap or shotcrete). This location is typically approximately 18" below the top of the embankment and 10 ft away from the pedestrian path. It was discussed that on riprap-treated embankment slopes the height of the fence may be reduced from 8' to 6' because deer would have difficulty finding a good footing to jump on a riprap slope. In addition, the fence would move from the described location with a minimum height of 6 feet to the ROW area where riprap protection was not needed. At these locations the fence would increase back to 8'. The

transition from 6' to 8' fence at the ROW should start when the riprap is  $\geq 6'$  wide on a 3:1 slope. It should be noted that if shotcrete is used for the slopes, the height of the fence would have to remain at 8 ft because animals would be more likely to be able to jump from that surface than from riprap

- AZG&F suggested that woven wire be considered for fencing instead of chain-link because it is less visible for road users. Marana will evaluate the cost implications of this change.

#### **4. Miscellaneous**

- The primary reason natural substrate is required for deer crossings is that the animals hear the echo of their hoofs inside the structures and get frightened.
- If a hard surface is required for a crossings inlet or outlet, shotcrete is better than smooth concrete because its rough finish allows wildlife to have a firmer footing. AZG&F is testing the use of shotcrete at a couple of locations in northern Arizona.



## **APPENDIX 3 COST ESTIMATE**

**TANGERINE ROAD CORRIDOR DCR  
I-10 TO LA CAÑADA DRIVE**

**COST SUMMARY**

	<b>Segment 2 (I-10 to Dove Mtn Blvd), 5 Mi</b>	<b>Segment 1B (Dove Mtn Blvd to Thornydale Rd), 2 Mi</b>	<b>Segment 1A (Thornydale Rd to La Cañada Dr), 3 Mi</b>	<b>Total (I-10 to La Cañada Dr)</b>
<b>Removals</b>	\$311,006	\$162,138	\$240,198	<b>\$713,342</b>
<b>Grading/Paving/Roadway Construction</b>	\$9,640,473	\$4,088,884	\$8,780,822	<b>\$22,510,179</b>
<b>Bridges/Underpasses</b>	\$3,609,500	\$0	\$0	<b>\$3,609,500</b>
<b>Drainage</b>	\$5,781,225	\$2,855,440	\$5,785,535	<b>\$14,422,200</b>
<b>Traffic (Signing, Striping, Signals, F.O., Traffic Control)</b>	\$2,181,180	\$1,314,655	\$1,660,000	<b>\$5,155,835</b>
<b>Landscape and Irrigation</b>	\$1,100,000	\$460,000	\$850,000	<b>\$2,410,000</b>
<b>Lump sums (Mobilization, PDES, Field Office, Survey)</b>	\$1,930,000	\$870,000	\$1,500,000	<b>\$4,300,000</b>
<b>Construction Subtotal</b>	<b>\$24,553,384</b>	<b>\$9,751,117</b>	<b>\$18,816,555</b>	<b>\$53,121,056</b>
<b>Contingency (20%)</b>	\$4,910,677	\$1,950,223	\$3,763,311	<b>\$10,624,211</b>
<b>Construction Total</b>	<b>\$29,464,061</b>	<b>\$11,701,340</b>	<b>\$22,579,866</b>	<b>\$63,745,267</b>
<b>Final Design (10%)</b>	\$2,946,406	\$1,170,134	\$2,257,987	<b>\$6,374,527</b>
<b>Construction Management (10%)</b>	\$2,946,406	\$1,170,134	\$2,257,987	<b>\$6,374,527</b>
<b>Environmental Mitigation (404 In Lieu, Archeology)</b>	\$213,700	\$31,850	\$181,850	<b>\$427,400</b>
<b>Utility Relocations (TEP, TRICO)</b>	\$460,000	\$550,000	\$330,000	<b>\$1,340,000</b>
<b>UPRR Improvements</b>	\$250,000	\$0	\$0	<b>\$250,000</b>
<b>Right-of-Way</b>	\$3,351,007	\$615,531	\$2,237,466	<b>\$6,204,003</b>
<b>Project Total</b>	<b>\$39,631,579</b>	<b>\$15,238,989</b>	<b>\$29,845,155</b>	<b>\$84,715,723</b>



**TANGERINE ROAD: SEGMENT 2 - INTERSTATE 10 TO DOVE MOUNTAIN BLVD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 2 QUANTITY	UNIT PRICE	AMOUNT
2010001	CLEARING AND GRUBBING	L. SUM	1	\$90,000.00	\$90,000.00
2020001	REMOVAL OF STRUCTURES & OBSTRUCTIONS	L. SUM	1	\$20,000.00	\$20,000.00
2020007	REMOVAL OF MISCELLANEOUS CONCRETE	L. SUM	1	\$10,000.00	\$10,000.00
2020020	REMOVAL OF CURB	L.F.	4,134	\$3.00	\$12,402.00
2020029	REMOVAL OF BITUMINOUS PAVEMENT	S.Y.	109,315	\$1.00	\$109,315.00
2020034	REMOVAL OF SIGNS AND DELINEATORS	L. SUM	1	\$3,000.00	\$3,000.00
2020040	REMOVAL OF PIPE	L.F.	298	\$20.00	\$5,960.00
2020071	REMOVAL OF GUARD RAIL	L.F.	595	\$4.00	\$2,380.00
2020101	REMOVAL OF FENCE	L.F.	44,576	\$1.30	\$57,948.80
2030300	ROADWAY EXCAVATION	C.Y.	60,354	\$8.00	\$482,832.00
2030401	DRAINAGE EXCAVATION	C.Y.	11,029	\$8.00	\$88,232.00
2030500	STRUCTURAL EXCAVATION	C.Y.	4,451	\$10.00	\$44,510.00
2030506	STRUCTURE BACKFILL	C.Y.	2,354	\$25.00	\$58,850.00
2030901	BORROW	C.Y.	322,100	\$8.00	\$2,576,800.00
3020001	CEMENT TREATED SUBGRADE	S.Y.	40,350	\$4.70	\$189,645.00
3030003	AGGREGATE BASE	C.Y.	43,714	\$28.00	\$1,223,992.00
3030004	AGGREGATE BASE (PAVED PATH)	C.Y.	2,654	\$28.00	\$74,312.00
4040111	TACK COAT	TON	6	\$1,500.00	\$9,000.00
4060001	ASPHALTIC CONCRETE (NO. 1)	TON	32,675	\$70.00	\$2,287,250.00
4060002	ASPHALTIC CONCRETE (NO. 2)	TON	3,399	\$70.00	\$237,930.00
4060009	ASPHALTIC CONCRETE (PAVED PATH)	TON	2,597	\$70.00	\$181,790.00
4130040	ASPHALTIC CONCRETE (ASPHALT-RUBBER)	TON	20,165	\$80.00	\$1,613,200.00
5011010	PIPE, REINFORCED CONCRETE, CLASS II, 18"	L.F.	1,409	\$65.00	\$91,585.00
5011024	PIPE, REINFORCED CONCRETE, CLASS IV, 24"	L.F.	1,165	\$70.00	\$81,550.00
5011034	PIPE, REINFORCED CONCRETE, CLASS IV, 30"	L.F.	208	\$90.00	\$18,720.00
5011044	PIPE, REINFORCED CONCRETE, CLASS IV, 36"	L.F.	1,930	\$100.00	\$193,000.00
5011049	PIPE, REINFORCED CONCRETE, CLASS IV, 42"	L.F.	1,126	\$160.00	\$180,160.00
5011054	PIPE, REINFORCED CONCRETE, CLASS IV, 48"	L.F.	930	\$170.00	\$158,100.00
5011282	PIPE, REINFORCED CONCRETE, CLASS HE II, 34" X 53"	L.F.	0	\$200.00	\$0.00
5014024	FLARED END SECTION, 24" (ADOT C-13.25)	EACH	5	\$1,500.00	\$7,500.00
5021208	CONCRETE ARCH, 3-24'X7'	L.F.	0	\$4,800.00	\$0.00
5030033	CATCH BASIN, PC/COT STD. DTL. 309 (TYPE 4, OFF ROAD)	EACH	19	\$4,600.00	\$87,400.00
5030182	DROP INLET	EACH	8	\$10,000.00	\$80,000.00
5030550	CONCRETE PIPE COLLAR	EACH	0	\$1,000.00	\$0.00
5150001	MISCELLANEOUS UTILITY RELOCATION	F.A.	50,000	\$1.00	\$50,000.00
6010101	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 8'X4'	L.F.	151	\$700.00	\$105,700.00
6010102	REINFORCED CONCRETE BOX CULVERT, TRIPLE BARREL, 8'X4'	L.F.	200	\$950.00	\$190,000.00
6010103	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 10'X4'	L.F.	0	\$850.00	\$0.00
6010104	REINFORCED CONCRETE BOX CULVERT, TRIPLE BARREL, 10'X4'	L.F.	0	\$1,200.00	\$0.00
6010105	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X4'	L.F.	178	\$1,500.00	\$267,000.00
6010106	REINFORCED CONCRETE BOX CULVERT, FIVE BARREL, 10'X4'	L.F.	229	\$1,750.00	\$400,750.00
6010107	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 10'X5'	L.F.	0	\$900.00	\$0.00
6010108	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X5'	L.F.	0	\$1,300.00	\$0.00
6010109	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X6'	L.F.	156	\$1,700.00	\$265,200.00

**TANGERINE ROAD: SEGMENT 2 - INTERSTATE 10 TO DOVE MOUNTAIN BLVD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 2 QUANTITY	UNIT PRICE	AMOUNT
6010110	REINFORCED CONCRETE BOX CULVERT, ONE BARREL, 12'X10'	LF	125	\$1,000.00	\$125,000.00
6010111	REINFORCED CONCRETE BOX CULVERT, ONE BARREL, 12'X12'	LF	117	\$1,100.00	\$128,700.00
6010200	CONCRETE RETAINING WALL	S.F.	525	\$45.00	\$23,625.00
6016090	CONCRETE HEADWALL (D<=42")	EACH	27	\$3,000.00	\$81,000.00
6016092	CONCRETE HEADWALL (D>=48")	EACH	6	\$4,000.00	\$24,000.00
6080000	SIGNING	L.SUM	1	\$130,000.00	\$130,000.00
7010001	MAINTENANCE AND PROTECTION OF TRAFFIC	L. SUM	1	\$300,000.00	\$300,000.00
7010006	CONSTRUCTION AREA ELEMENTS (PREDETERMINED REIMBURSEMENT RATES)	F.A.	800,000	\$1.00	\$800,000.00
7040000	STRIPING	L.SUM	1	\$140,000.00	\$140,000.00
7310052	TRAFFIC SIGNALS (PER INTERSECTION)	EACH	2	\$200,000.00	\$400,000.00
7310053	TRAFFIC SIGNAL MODIFICATIONS (I-10 WB RAMP)	EACH	1	\$30,000.00	\$30,000.00
7310054	TRAFFIC SIGNAL MODIFICATIONS (DOVE MOUNTAIN BLVD)	EACH	0	\$75,000.00	\$0.00
7320042	ELECTRICAL CONDUIT (PVC) (4") (FIBER OPTIC W/3-1.5" INNERDUCTS)	L.F.	25,412	\$15.00	\$381,180.00
8010000	LANDSCAPING	L.SUM	1	\$1,100,000.00	\$1,100,000.00
8100001	AZPDES/NPDES (ORIGINAL)	L. SUM	1	\$100,000.00	\$100,000.00
8100011	AZPDES/NPDES (MODIFIED)	F.A.	70,000	\$1.00	\$70,000.00
9010001	MOBILIZATION	L. SUM	1	\$1,400,000.00	\$1,400,000.00
9030010	BARBED WIRE FENCE, TYPE 1	L.F.	13,012	\$2.50	\$32,530.00
9030020	WILDLIFE FENCE, SMALL	L.F.	0	\$4.00	\$0.00
9030030	WILDLIFE FENCE, MEDIUM	L.F.	10,400	\$5.50	\$57,200.00
9030040	WILDLIFE FENCE, LARGE	L.F.	15,800	\$12.00	\$189,600.00
9050001	GUARD RAIL, W-BEAM, SINGLE FACE	L.F.	4,200	\$10.00	\$42,000.00
9050020	GUARD RAIL TERMINAL (SKT 350)	EACH	9	\$2,500.00	\$22,500.00
9050036	GUARD RAIL, ANCHOR ASSEMBLY	EACH	9	\$650.00	\$5,850.00
9050400	GUARD RAIL TRANSITION, W-BEAM TO CONCRETE BARRIER	EACH	16	\$700.00	\$11,200.00
9080005	CONCRETE CURB, (PC/COT STD. DTL. 209) (TYPE 2)	L.F.	319	\$12.00	\$3,828.00
9080010	CONCRETE CURB (TYPE G) (4" REVEAL)	L.F.	1,940	\$12.00	\$23,280.00
9080051	CONCRETE CURB AND GUTTER (PC/COT STD. DTL. 209) (TYPE 1G)	L.F.	141	\$25.00	\$3,525.00
9080288	CURB ACCESS RAMP	EACH	20	\$1,500.00	\$30,000.00
9080402	CONCRETE HEADER	L.F.	2,236	\$12.00	\$26,832.00
9080503	CONCRETE FORD WALL (1' X 3')	L.F.	158	\$35.00	\$5,530.00
9090002	SURVEY MONUMENT	EACH	24	\$150.00	\$3,600.00
9120002	SHOTCRETE (6")	S.Y.	54,195	\$60.00	\$3,251,700.00
9130001	RIPRAP (DUMPED)	C.Y.	3,138	\$65.00	\$203,970.00
9130002	RIPRAP (WIRE-TIED)	C.Y.	653	\$120.00	\$78,360.00
9170020	WILDLIFE OUTLET TREATMENT	EACH	1	\$10,000.00	\$10,000.00
9170030	BRIDGE GRADE CONTROL	EACH	2	\$210,000.00	\$420,000.00
9250101	CONSTRUCTION SURVEYING AND LAYOUT	L. SUM	1	\$320,000.00	\$320,000.00
9260001	ENGINEER'S FIELD OFFICE	L. SUM	1	\$40,000.00	\$40,000.00
9330001	BARRICADE RAILING (PC/COT STD. DTL. 105)	L.F.	2,328	\$20.00	\$46,560.00
	BRIDGE - THORNYDALE SUBSTATION	SF	5,370	\$200.00	\$1,074,000.00
	BRIDGE - PROSPECT WEST	SF	9,309	\$200.00	\$1,861,800.00
	<b>CONSTRUCTION SUBTOTAL</b>				<b>\$24,553,383.80</b>
	CONTINGENCIES (20%)		20.0%		\$4,910,676.76

**TANGERINE ROAD: SEGMENT 2 - INTERSTATE 10 TO DOVE MOUNTAIN BLVD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 2 QUANTITY	UNIT PRICE	AMOUNT
	<b>CONSTRUCTION TOTAL</b>				<b>\$29,464,060.56</b>
	FINAL DESIGN		10.0%		\$2,946,406.06
	CONSTRUCTION MANAGEMENT		10.0%		\$2,946,406.06
	ARCHAEOLOGICAL CLEARANCE		\$150,000		\$150,000.00
	404 PERMIT IN-LIEU FEES (\$20,000 / Ac)		\$63,700		\$63,700.00
	TRICO RELOCATIONS (2.3 MI @ \$200,000 / MILE)		\$460,000		\$460,000.00
	TEP RELOCATIONS (\$55,000/POLE)	POLE	0	\$55,000.00	\$0.00
	UPRR CROSSING IMPROVEMENTS		\$250,000		\$250,000.00
	RIGHT-OF-WAY	SQFT	3,142,667	\$1.00	\$3,142,667.00
	DRAINAGE EASEMENTS	SQFT	416,679	\$0.50	\$208,339.50
	SLOPE EASEMENTS	SQFT	84,530	\$0.50	\$42,265.00
	TCE	SQFT	87,275	\$0.25	\$21,818.75
	<b>PROJECT TOTAL</b>				<b>\$39,631,579.17</b>

**TANGERINE ROAD: SEGMENT 1B - DOVE MOUNTAIN BLVD TO THORNYDALE RD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 1B QUANTITY	UNIT PRICE	AMOUNT
2010001	CLEARING AND GRUBBING	L. SUM	1	\$50,000.00	\$50,000.00
2020001	REMOVAL OF STRUCTURES & OBSTRUCTIONS	L. SUM	1	\$15,000.00	\$15,000.00
2020007	REMOVAL OF MISCELLANEOUS CONCRETE	L. SUM	1	\$10,000.00	\$10,000.00
2020020	REMOVAL OF CURB	L.F.	2,702	\$3.00	\$8,106.00
2020029	REMOVAL OF BITUMINOUS PAVEMENT	S.Y.	54,068	\$1.00	\$54,068.00
2020034	REMOVAL OF SIGNS AND DELINEATORS	L. SUM	1	\$2,000.00	\$2,000.00
2020040	REMOVAL OF PIPE	L.F.	450	\$20.00	\$9,000.00
2020071	REMOVAL OF GUARD RAIL	L.F.	1,674	\$4.00	\$6,696.00
2020101	REMOVAL OF FENCE	L.F.	5,591	\$1.30	\$7,268.30
2030300	ROADWAY EXCAVATION	C.Y.	12,466	\$8.00	\$99,728.00
2030401	DRAINAGE EXCAVATION	C.Y.	5,948	\$8.00	\$47,584.00
2030500	STRUCTURAL EXCAVATION	C.Y.	5,217	\$10.00	\$52,170.00
2030506	STRUCTURE BACKFILL	C.Y.	1,430	\$25.00	\$35,750.00
2030901	BORROW	C.Y.	153,401	\$8.00	\$1,227,208.00
3020001	CEMENT TREATED SUBGRADE	S.Y.	0	\$4.70	\$0.00
3030003	AGGREGATE BASE	C.Y.	18,868	\$28.00	\$528,304.00
3030004	AGGREGATE BASE (PAVED PATH)	C.Y.	1,052	\$28.00	\$29,456.00
4040111	TACK COAT	TON	7	\$1,500.00	\$10,500.00
4060001	ASPHALTIC CONCRETE (NO. 1)	TON	14,055	\$70.00	\$983,850.00
4060002	ASPHALTIC CONCRETE (NO. 2)	TON	3,155	\$70.00	\$220,850.00
4060009	ASPHALTIC CONCRETE (PAVED PATH)	TON	1,029	\$70.00	\$72,030.00
4130040	ASPHALTIC CONCRETE (ASPHALT-RUBBER)	TON	6,324	\$80.00	\$505,920.00
5011010	PIPE, REINFORCED CONCRETE, CLASS II, 18"	L.F.	595	\$65.00	\$38,675.00
5011024	PIPE, REINFORCED CONCRETE, CLASS IV, 24"	L.F.	0	\$70.00	\$0.00
5011034	PIPE, REINFORCED CONCRETE, CLASS IV, 30"	L.F.	0	\$90.00	\$0.00
5011044	PIPE, REINFORCED CONCRETE, CLASS IV, 36"	L.F.	558	\$100.00	\$55,800.00
5011049	PIPE, REINFORCED CONCRETE, CLASS IV, 42"	L.F.	994	\$160.00	\$159,040.00
5011054	PIPE, REINFORCED CONCRETE, CLASS IV, 48"	L.F.	658	\$170.00	\$111,860.00
5011282	PIPE, REINFORCED CONCRETE, CLASS HE II, 34" X 53"	L.F.	194	\$200.00	\$38,800.00
5014024	FLARED END SECTION, 24" (ADOT C-13.25)	EACH	0	\$1,500.00	\$0.00
5021208	CONCRETE ARCH, 3-24'X7'	L.F.	138	\$4,600.00	\$634,800.00
5030033	CATCH BASIN, PC/COT STD. DTL. 309 (TYPE 4, OFF ROAD)	EACH	15	\$4,600.00	\$69,000.00
5030182	DROP INLET	EACH	7	\$10,000.00	\$70,000.00
5030550	CONCRETE PIPE COLLAR	EACH	2	\$1,000.00	\$2,000.00
5150001	MISCELLANEOUS UTILITY RELOCATION	F.A.	30,000	\$1.00	\$30,000.00
6010101	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 8'X4'	L.F.	0	\$700.00	\$0.00
6010102	REINFORCED CONCRETE BOX CULVERT, TRIPLE BARREL, 8'X4'	L.F.	0	\$950.00	\$0.00
6010103	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 10'X4'	L.F.	160	\$850.00	\$136,000.00
6010104	REINFORCED CONCRETE BOX CULVERT, TRIPLE BARREL, 10'X4'	L.F.	132	\$1,200.00	\$158,400.00
6010105	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X4'	L.F.	0	\$1,500.00	\$0.00
6010106	REINFORCED CONCRETE BOX CULVERT, FIVE BARREL, 10'X4'	L.F.	0	\$1,750.00	\$0.00
6010107	REINFORCED CONCRETE BOX CULVERT, DOUBLE BARREL, 10'X5'	L.F.	205	\$900.00	\$184,500.00
6010108	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X5'	L.F.	150	\$1,300.00	\$195,000.00
6010109	REINFORCED CONCRETE BOX CULVERT, FOUR BARREL, 10'X6'	L.F.	152	\$1,700.00	\$258,400.00
6010110	REINFORCED CONCRETE BOX CULVERT, ONE BARREL, 12'X10'	LF	0	\$1,000.00	\$0.00
6010111	REINFORCED CONCRETE BOX CULVERT, ONE BARREL, 12'X12'	LF	0	\$1,100.00	\$0.00
6010200	CONCRETE RETAINING WALL	S.F.	925	\$45.00	\$41,625.00

**TANGERINE ROAD: SEGMENT 1B - DOVE MOUNTAIN BLVD TO THORNYDALE RD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 1B QUANTITY	UNIT PRICE	AMOUNT
6016090	CONCRETE HEADWALL (D<=42")	EACH	12	\$3,000.00	\$36,000.00
6016092	CONCRETE HEADWALL (D>=48")	EACH	5	\$4,000.00	\$20,000.00
6080000	SIGNING	L.SUM	1	\$60,000.00	\$60,000.00
7010001	MAINTENANCE AND PROTECTION OF TRAFFIC	L.SUM	1	\$180,000.00	\$180,000.00
7010006	CONSTRUCTION AREA ELEMENTS (PREDETERMINED REIMBURSEMENT RATES)	F.A.	400,000	\$1.00	\$400,000.00
7040000	STRIPING	L.SUM	1	\$65,000.00	\$65,000.00
7310052	TRAFFIC SIGNALS (PER INTERSECTION)	EACH	2	\$200,000.00	\$400,000.00
7310053	TRAFFIC SIGNAL MODIFICATIONS (I-10 WB RAMP)	EACH	0	\$30,000.00	\$0.00
7310054	TRAFFIC SIGNAL MODIFICATIONS (DOVE MOUNTAIN BLVD)	EACH	1	\$75,000.00	\$75,000.00
7320042	ELECTRICAL CONDUIT (PVC) (4") (FIBER OPTIC W/3-1.5" INNERDUCTS)	L.F.	8,977	\$15.00	\$134,655.00
8010000	LANDSCAPING	L.SUM	1	\$460,000.00	\$460,000.00
8100001	AZPDES/NPDES (ORIGINAL)	L.SUM	1	\$60,000.00	\$60,000.00
8100011	AZPDES/NPDES (MODIFIED)	F.A.	40,000	\$1.00	\$40,000.00
9010001	MOBILIZATION	L.SUM	1	\$600,000.00	\$600,000.00
9030010	BARBED WIRE FENCE, TYPE 1	L.F.	471	\$2.50	\$1,177.50
9030020	WILDLIFE FENCE, SMALL	L.F.	0	\$4.00	\$0.00
9030030	WILDLIFE FENCE, MEDIUM	L.F.	11,586	\$5.50	\$63,723.00
9030040	WILDLIFE FENCE, LARGE	L.F.	0	\$12.00	\$0.00
9050001	GUARD RAIL, W-BEAM, SINGLE FACE	L.F.	70	\$10.00	\$700.00
9050020	GUARD RAIL TERMINAL (SKT 350)	EACH	0	\$2,500.00	\$0.00
9050036	GUARD RAIL, ANCHOR ASSEMBLY	EACH	1	\$650.00	\$650.00
9050400	GUARD RAIL TRANSITION, W-BEAM TO CONCRETE BARRIER	EACH	0	\$700.00	\$0.00
9080005	CONCRETE CURB, (PC/COT STD. DTL. 209) (TYPE 2)	L.F.	607	\$12.00	\$7,284.00
9080010	CONCRETE CURB (TYPE G) (4" REVEAL)	L.F.	3,647	\$12.00	\$43,764.00
9080051	CONCRETE CURB AND GUTTER (PC/COT STD. DTL. 209) (TYPE 1G)	L.F.	370	\$25.00	\$9,250.00
9080288	CURB ACCESS RAMP	EACH	22	\$1,500.00	\$33,000.00
9080402	CONCRETE HEADER	L.F.	1,330	\$12.00	\$15,960.00
9080503	CONCRETE FORD WALL (1' X 3')	L.F.	84	\$35.00	\$2,940.00
9090002	SURVEY MONUMENT	EACH	8	\$150.00	\$1,200.00
9120002	SHOTCRETE (6")	S.Y.	9,510	\$60.00	\$570,600.00
9130001	RIPRAP (DUMPED)	C.Y.	185	\$65.00	\$12,025.00
9130002	RIPRAP (WIRE-TIED)	C.Y.	680	\$120.00	\$81,600.00
9170020	WILDLIFE OUTLET TREATMENT	EACH	2	\$10,000.00	\$20,000.00
9170030	BRIDGE GRADE CONTROL	EACH	0	\$210,000.00	\$0.00
9250101	CONSTRUCTION SURVEYING AND LAYOUT	L.SUM	1	\$140,000.00	\$140,000.00
9260001	ENGINEER'S FIELD OFFICE	L.SUM	1	\$30,000.00	\$30,000.00
9330001	BARRICADE RAILING (PC/COT STD. DTL. 105)	L.F.	1,360	\$20.00	\$27,200.00
	BRIDGE - THORNYDALE SUBSTATION	SF	0	\$200.00	\$0.00
	BRIDGE - PROSPECT WEST	SF	0	\$200.00	\$0.00
	<b>CONSTRUCTION SUBTOTAL</b>				<b>\$9,751,116.80</b>
	CONTINGENCIES (20%)		20.0%		\$1,950,223.36
	<b>CONSTRUCTION TOTAL</b>				<b>\$11,701,340.16</b>
	FINAL DESIGN		10.0%		\$1,170,134.02
	CONSTRUCTION MANAGEMENT		10.0%		\$1,170,134.02
	ARCHAEOLOGICAL CLEARANCE		0		\$0.00
	404 PERMIT IN-LIEU FEES (\$20,000 / Ac)		\$31,850		\$31,850.00

**TANGERINE ROAD: SEGMENT 1B - DOVE MOUNTAIN BLVD TO THORNYDALE RD**  
**30% PRELIMINARY COST ESTIMATE**

ITEM NO.	ITEM DESCRIPTION	UNIT	SEG 1B QUANTITY	UNIT PRICE	AMOUNT
	TRICO RELOCATIONS		\$0		\$0.00
	TEP RELOCATIONS (\$55,000/POLE)	POLE	10	\$55,000.00	\$550,000.00
	UPRR CROSSING IMPROVEMENTS		\$0		\$0.00
	RIGHT-OF-WAY	SQFT	571,872	\$1.00	\$571,871.67
	DRAINAGE EASEMENTS	SQFT	87,318	\$0.50	\$43,659.00
	SLOPE EASEMENTS	SQFT	2,100	\$0.50	\$1,050.00
	TCE	SQFT	95,475	\$0.25	\$23,868.75
	<b>PROJECT TOTAL</b>				<b>\$15,238,988.86</b>

**ENGINEERS OPINION OF PROBABLE COST  
30% PRELIMINARY DESIGN  
TANGERINE ROAD**

**Project Location : Tangerine Road, Thornydale Road to La Cañada Drive  
Project Description : Roadway Widening**

ITEM No.	ITEM DESCRIPTION	UNIT	TOTAL		
			QUANT.	UNIT PRICE	AMOUNT
2010001	CLEARING AND GRUBBING	L SUM	1	\$60,000.00	\$60,000
2020001	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L SUM	1	\$30,000.00	\$30,000
2020020	REMOVAL OF CONCRETE CURB	L FT	1,145	\$3.00	\$3,436
2020025	REMOVAL OF CONCRETE SIDEWALK, DRIVEWAYS AND SLABS	SQ FT	2,428	\$2.00	\$4,856
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ YD	105,686	\$1.00	\$105,686
2020041	REMOVAL OF PIPE	L. FT.	659	\$20.00	\$13,172
2020071	REMOVE GUARDRAIL	L FT	2,911	\$4.00	\$11,644
2020082	REMOVE BITUMINOUS PAVEMENT (MILLING 1.5 INCHS)	SQ YD	3,801	\$3.00	\$11,404
2030300	ROADWAY EXCAVATION	CU YD	60,846	\$8.00	\$486,768
2030401	DRAINAGE EXCAVATION	CU YD	2,166	\$8.00	\$17,328
2030456	GRADED CHANNEL	L.FT.	6,325	\$20.00	\$126,491
2030500	STRUCTURAL EXCAVATION (BOX)	CU YD	12,700	\$10.00	\$127,000
2030506	STRUCTURAL BACKFILL	CU YD	5,006	\$25.00	\$125,150
2030901	BORROW	CU YD	200,854	\$8.00	\$1,606,832
3020001	CEMENT TREATED SOIL	SQ YD	40,048	\$4.70	\$188,226
3030021	AGGREGATE BASE COURSE	CU YD	37,976	\$28.00	\$1,063,328
4040111	BITUMINOUS TACK COAT	TON	10	\$1,500.00	\$15,000
4060004	ASPHALTIC CONCRETE (MIX 1)	TON	29,496	\$70.00	\$2,064,720
4060005	ASPHALTIC CONCRETE (MIX 2)	TON	4,517	\$70.00	\$316,190
4130040	ASPHALTIC CONCRETE (ASPHALT-RUBBER)	TON	18,637	\$80.00	\$1,490,960
5010100	PIPE SLOTTED, 18" DIAMETER	L.FT.	70	\$100.00	\$7,000
5011021	PIPE, REINFORCED CONCRETE 18"	L.FT.	126	\$65.00	\$8,190
5011022	PIPE, REINFORCED CONCRETE 24"	L.FT.	1,450	\$70.00	\$101,500
5011032	PIPE, REINFORCED CONCRETE 30"	L.FT.	243	\$90.00	\$21,870
5011042	PIPE, REINFORCED CONCRETE 36"	L.FT.	1,530	\$100.00	\$153,000
5011050	PIPE, REINFORCED CONCRETE 42"	L.FT.	1,600	\$160.00	\$256,000
5011052	PIPE, REINFORCED CONCRETE 48"	L.FT.	1,950	\$170.00	\$331,500
5011262	PIPE, REINFORCED CONCRETE 29"x45"	L.FT.	600	\$140.00	\$84,000
5030183	CULVERT INLET OR OUTLET CONCRETE TREATMENTS	SQ YD	2,580	\$60.00	\$154,800
5030716	CATCH BASIN, TYPE 3, L=12' (D=<8')	EACH	1	\$5,000.00	\$5,000
5030718	CATCH BASIN, TYPE 3, L=16' (D=<8')	EACH	1	\$7,000.00	\$7,000
5030736	CATCH BASIN, TYPE 4, OFF ROAD, 2-GRATES (D=<8')	EACH	1	\$4,600.00	\$4,600
5030750	CATCH BASIN, TYPE 5, SUMP ONLY (D=<8')	EACH	2	\$4,500.00	\$9,000
5030790	CATCH BASIN SCUPPER	EACH	2	\$4,000.00	\$8,000
5050000	STORM DRAIN MANHOLE (Dtl 300)	EACH	4	\$4,200.00	\$16,800
5050090	STORM DRAIN PIPE END SECTIONS	EA	7	\$500.00	\$3,500
5090600	SEWER MISC WORK	L SUM	1	\$25,000.00	\$25,000
5110001	MISC WATER ADJUSTMENTS	L SUM	1	\$25,000.00	\$25,000
6010001	REINFORCED CONCRETE BOX CULVERT (2-6'x4')	L.FT.	128	\$520.00	\$66,560
6010002	REINFORCED CONCRETE BOX CULVERT (2-8' X 4')	L.FT.	315	\$700.00	\$220,500
6010003	REINFORCED CONCRETE BOX CULVERT (3-8' X 4')	L.FT.	137	\$950.00	\$130,150
6010004	REINFORCED CONCRETE BOX CULVERT (4-8' X5')	L.FT.	121	\$1,400.00	\$169,400
6010005	REINFORCED CONCRETE BOX CULVERT (2-10' X 4')	L.FT.	148	\$850.00	\$125,800
6010006	REINFORCED CONCRETE BOX CULVERT (3-10' X 4')	L.FT.	240	\$1,200.00	\$288,000
6010007	REINFORCED CONCRETE BOX CULVERT (2-10' X 5')	L.FT.	155	\$900.00	\$139,500
6010008	REINFORCED CONCRETE BOX CULVERT (4-10' X 6')	L.FT.	125	\$1,700.00	\$212,500
6010009	REINFORCED CONCRETE BOX CULVERT (7-10' X 6')	L.FT.	157	\$2,900.00	\$455,300
6010010	1-36'x9' and 2-32'x8' Con Arch CULVERTS	L.F.	181	\$6,500.00	\$1,176,500
6010201	RETAINING WALL (ADOT Std B-18.10)	SQ FT	2,085	\$45.00	\$93,825
6016090	PIPE HEADWALLS (D<=42")	EACH	5	\$3,000.00	\$15,000
6016091	PIPE HEADWALLS (D<=42") (MODIFIED)	EACH	16	\$5,000.00	\$80,000
6016092	PIPE HEADWALLS (D>=48")	EACH	12	\$4,000.00	\$48,000
6016093	PIPE HEADWALLS (D>=48") (MODIFIED)	EACH	21	\$7,000.00	\$147,000
6080000	SIGNING	L SUM	1	\$110,000.00	\$110,000
7010001	MAINTENANCE AND PROTECTION OF TRAFFIC	L SUM	1	\$300,000.00	\$300,000







# **APPENDIX 4 PRELIMINARY SECTION 404 JURISDICTIONAL DELINEATION**

DEC - 6 2011



**DEPARTMENT OF THE ARMY**  
LOS ANGELES DISTRICT, CORPS OF ENGINEERS  
TUCSON RESIDENT OFFICE  
5205 EAST COMANCHE STREET  
TUCSON, ARIZONA 85707

December 1, 2011

REPLY TO  
ATTENTION OF

Office of the Chief  
Regulatory Division

Ms. Jennifer Christelman  
Town of Marana  
11555 W. Civic Center Drive  
Marana, Arizona 85653

SUBJECT: Preliminary Jurisdictional Determination regarding the presence of geographic jurisdiction

Dear Ms. Christelman,

I am responding to your request (File No. SPL-2011-00011-JWL) on behalf of the Town of Marana, Town of Oro Valley and Pima County for a Department of the Army preliminary jurisdictional determination (PJD) for the proposed Tangerine Road expansion project located on the east side of I-10 between I-10 and La Canada Boulevard in (Sections 31-36, T11S, R12E), (Sections 31-34, T11S, R13E), (Sections 1-6, T12S, R12E), (Sections 2-6, T12S, R13E), Marana, Oro Valley, Pima County, Arizona.

The Corps' evaluation process for determining whether or not a Department of the Army permit is needed involves two tests. If both tests are met, then a permit is required. The first test determines whether or not the proposed project is located in a water of the United States (i.e., it is within the Corps' geographic jurisdiction). The second test determines whether or not the proposed project is a regulated activity under Section 404 of the Clean Water Act. As part of the evaluation process, pertaining to the first test only, we have made the jurisdictional determination below.

**Based on available information, the proposed project site may contain Waters of the United States in the approximate locations noted on the enclosed figures.** The basis for the preliminary JD can be found on the enclosed "Preliminary Jurisdictional Determination Form." Please sign and date this form and return to the issuing office within fifteen (15) days of receipt. Please note preliminary JDs are non-binding, written indications that there may be waters of the United States, including wetlands, on a parcel or indications of the approximate location(s) of waters of the United States or wetlands on a parcel. Preliminary JDs are advisory in nature and may not be appealed (33 C.F.R. 331.2). The party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination for this site. The option to obtain an approved JD in this instance and at this time has been declined. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S.

Please be reminded that preliminary JDs may not be appealed through the Corps' administrative appeal process set out at 33 CFR Part 331. Preliminary jurisdictional determinations are fully explained in Regulatory Guidance Letter 08-02, dated June 26, 2008. Further, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This determination has been conducted to identify the extent of the Corps' Clean Water Act jurisdiction within the proposed project site. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

If you have any questions, please contact me at (520) 584-1677 or via e-mail at [Jesse.Laurie@usace.army.mil](mailto:Jesse.Laurie@usace.army.mil).

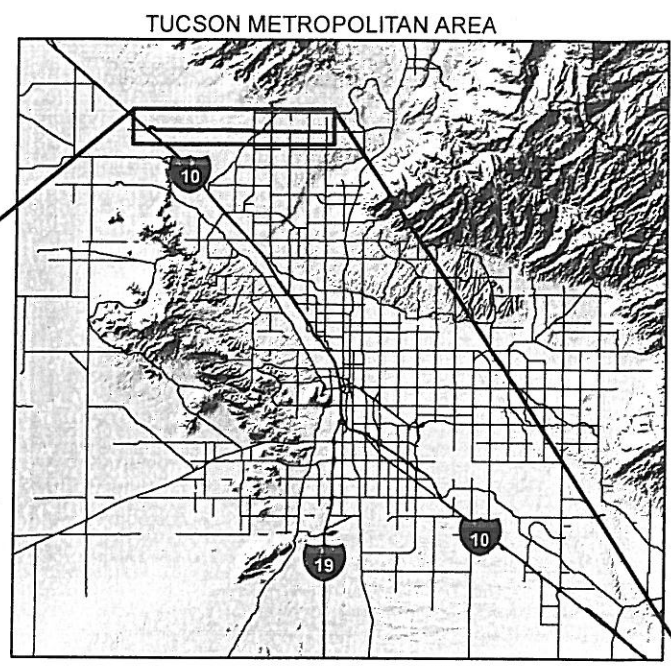
Please be advised that you can now comment on your experience with Regulatory Division by accessing the Corps web-based customer survey form at: <http://per2.nwp.usace.army.mil/survey.html>.

Sincerely,

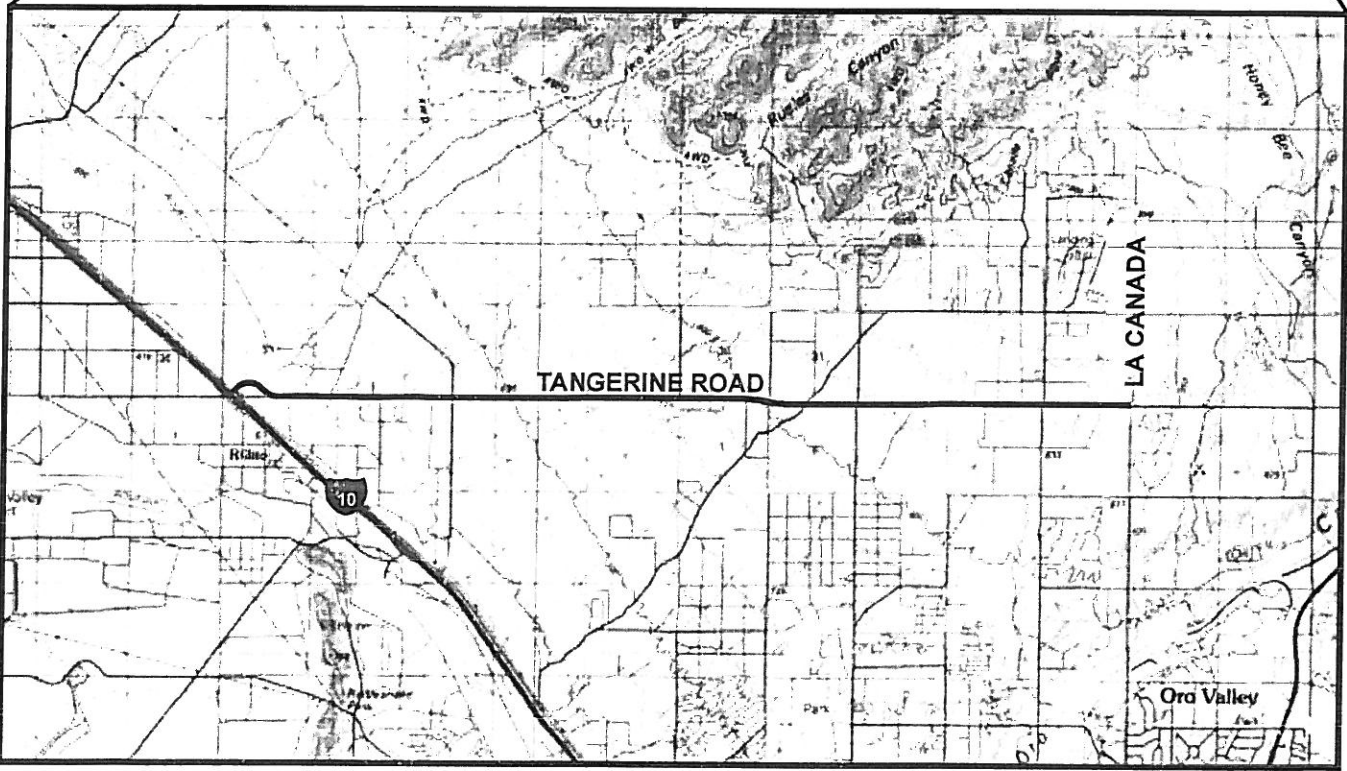
A handwritten signature in black ink, appearing to read 'J.W. Laurie', with a long horizontal flourish extending to the right.

Jesse W. Laurie, R.G.  
Project Manager  
Arizona Branch, Regulatory Division

Enclosures



Approximate Scale 1 Inch = 10 Miles



T.11S.,R.12E. Portion of Sections 31-36,  
 T.11S.,R.13E. Portion of Sections 31-34,  
 T.12S.,R.12E. Portion of Sections 1-6,  
 T.12S.,R.13E. Portion of Sections 2-6,  
 Pima County, Arizona  
 Marana, Ruelas Canyon, &  
 Oro Valley USGS 7.5' Quadrangles



**LEGEND**

— Project Area

**TANGERINE ROAD:  
 I-10 TO LA CANADA BOULEVARD**

Vicinity Map  
 Figure 1



## PRELIMINARY JURISDICTIONAL DETERMINATION FORM

**This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:**

District Office	Los Angeles District	File/ORM #	SPL-2011-00011-JWL	PJD Date:	Dec 1, 2011
State	AZ	City/County	Marana/Oro Valley/Pima County	Name/ Address of Person Requesting PJD	Town of Marana Ms. Jennifer Christelman 11555 W. Civic Center Drive Marana, AZ 85653
Nearest Waterbody:	TNW - Santa Cruz River				
Location: TRS, Lat/Long or UTM:	T11S, R12E, S31-36; T11S, R13E, S31-34; T12S, R12E, S1-6; T12S, R13E, S2-6				
Identify (Estimate) Amount of Waters in the Review Area:	Name of Any Water Bodies on the Site Identified as		Tidal:	N/A	
Non-Wetland Waters:	Stream Flow:	Section 10 Waters:	Non-Tidal:	N/A	
33,491 linear ft width 6.370 acres	Ephemeral				
Wetlands: 0 acre(s)	Cowardin Class:	Riverine			
			<input type="checkbox"/> Office (Desk) Determination		
			<input checked="" type="checkbox"/> Field Determination:	Date of Field Trip: Jan 20, 2011	

**SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):**

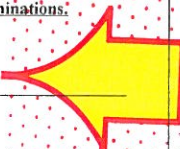
- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: WestLand Resources, Inc.
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
  - USGS NHD data.
  - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite quad name: Marana, Ruelas Canyon, & Oro Valley 7.5' Qu
- USDA Natural Resources Conservation Service Soil Survey. Citation:
- National wetlands inventory map(s). Cite name:
- State/Local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is:
- Photographs:
  - Aerial (Name & Date): Pima Association of Governments: 2008
  - Other (Name & Date): Ground Photos 7/23, 7/25, 10/21/10&1/20, 2/7/11
- Previous determination(s). File no. and date of response letter:
- Other information (please specify): Project Area Lat/Long: 32.4232, -111.08022

Sign to keep for your records

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

*[Signature]* 01 Dec 11  
 Signature and Date of Regulatory Project Manager  
 (REQUIRED)

Signature and Date of Person Requesting Preliminary JD  
 (REQUIRED, unless obtaining the signature is impracticable)



**EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:**

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

**PRELIMINARY JURISDICTIONAL DETERMINATION FORM**

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office  File/ORM #  PJD Date:

State  City/County  Person Requesting PJD

Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
<input type="text"/>	<input type="text"/>	<input type="text"/>	n/a	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	n/a	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Notes:

See attached table.  
 Note: All potential waters of the United States are non-section 10 - non wetland

Features Upload Table - RGL 08-02 Preliminary Jurisdictional Delineation  
Tangerine Road: I-10 to La Canada Blvd.

<u>Waters Name</u>	<u>Cowardin Code</u>	<u>HGM Code</u>	<u>Area (acres)</u>	<u>Linear (ft)</u>	<u>Waters Types</u>	<u>Latitude (dd nad83)</u>	<u>Longitude (dd nad83)</u>	<u>Local Waterway</u>
A	R6	RIVERINE	0.022	435.02	DELINEATE	32.423786	-110.997931	Santa Cruz River
B	R6	RIVERINE	0.050	396.25	DELINEATE	32.423826	-111.000730	Santa Cruz River
C	R6	RIVERINE	0.133	873.05	DELINEATE	32.423929	-111.005107	Santa Cruz River
D	R6	RIVERINE	0.025	498.61	DELINEATE	32.423969	-111.009885	Santa Cruz River
E	R6	RIVERINE	0.014	169.28	DELINEATE	32.423505	-111.011643	Santa Cruz River
G	R6	RIVERINE	0.011	146.98	DELINEATE	32.423552	-111.014568	Santa Cruz River
I	R6	RIVERINE	0.187	575.78	DELINEATE	32.423925	-111.020603	Santa Cruz River
J	R6	RIVERINE	0.034	316.11	DELINEATE	32.423479	-111.023339	Santa Cruz River
K	R6	RIVERINE	0.046	417.72	DELINEATE	32.423842	-111.024048	Santa Cruz River
L	R6	RIVERINE	0.012	174.00	DELINEATE	32.423798	-111.025917	Santa Cruz River
L1								
(Canada Agua I Wash)	R6	RIVERINE	0.069	480.29	DELINEATE	32.423726	-111.029915	Santa Cruz River
L2	R6	RIVERINE	0.036	449.57	DELINEATE	32.423765	-111.030610	Santa Cruz River
N	R6	RIVERINE	0.038	591.31	DELINEATE	32.423790	-111.036479	Santa Cruz River
O	R6	RIVERINE	0.201	530.65	DELINEATE	32.424075	-111.039028	Santa Cruz River
P	R6	RIVERINE	0.019	496.58	DELINEATE	32.423930	-111.042361	Santa Cruz River
Q	R6	RIVERINE	0.073	581.59	DELINEATE	32.423734	-111.044533	Santa Cruz River
S	R6	RIVERINE	0.148	359.18	DELINEATE	32.423737	-111.050160	Santa Cruz River
T	R6	RIVERINE	0.014	182.04	DELINEATE	32.423478	-111.052373	Santa Cruz River
U	R6	RIVERINE	0.015	167.93	DELINEATE	32.423462	-111.054059	Santa Cruz River
V								
(Canada Agua II Wash)	R6	RIVERINE	0.150	372.10	DELINEATE	32.423743	-111.057013	Santa Cruz River
V1	R6	RIVERINE	0.004	199.48	DELINEATE	32.423453	-111.058578	Santa Cruz River
W	R6	RIVERINE	0.123	577.05	DELINEATE	32.423933	-111.061862	Santa Cruz River
X	R6	RIVERINE	0.026	517.24	DELINEATE	32.424201	-111.064159	Santa Cruz River
Y1	R6	RIVERINE	0.027	434.49	DELINEATE	32.424456	-111.065765	Santa Cruz River
Y2	R6	RIVERINE	0.441	1677.30	DELINEATE	32.424703	-111.068341	Santa Cruz River
Y3	R6	RIVERINE	0.035	544.73	DELINEATE	32.424594	-111.071889	Santa Cruz River
Z	R6	RIVERINE	0.158	442.55	DELINEATE	32.424596	-111.075292	Santa Cruz River
Z1	R6	RIVERINE	0.019	191.68	DELINEATE	32.424351	-111.076812	Santa Cruz River
AA	R6	RIVERINE	0.033	384.02	DELINEATE	32.424589	-111.078288	Santa Cruz River
AB	R6	RIVERINE	0.020	162.18	DELINEATE	32.424320	-111.080863	Santa Cruz River
AC	R6	RIVERINE	0.158	581.86	DELINEATE	32.424661	-111.088490	Santa Cruz River
AD								
(Prospector Wash)	R6	RIVERINE	0.225	435.41	DELINEATE	32.424542	-111.089340	Santa Cruz River





Features Upload Table - RGL 08-02 Preliminary Jurisdictional Delineation  
Tangerine Road: I-10 to La Canada Blvd.

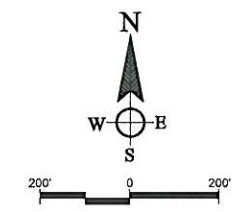
<u>Waters Name</u>	<u>Cowardin Code</u>	<u>HGM Code</u>	<u>Area (acres)</u>	<u>Linear (ft)</u>	<u>Waters Types</u>	<u>Latitude (dd nad83)</u>	<u>Longitude (dd nad83)</u>	<u>Local Waterway</u>
AE	R6	RIVERINE	0.157	460.82	DELINEATE	32.424561	-111.092917	Santa Cruz River
AF	R6	RIVERINE	0.453	938.10	DELINEATE	32.424647	-111.094696	Santa Cruz River
AF1	R6	RIVERINE	0.327	1385.18	DELINEATE	32.424717	-111.096615	Santa Cruz River
AF2	R6	RIVERINE	0.139	858.94	DELINEATE	32.424580	-111.100935	Santa Cruz River
AG	R6	RIVERINE	0.113	531.33	DELINEATE	32.424585	-111.103511	Santa Cruz River
AH	R6	RIVERINE	0.248	745.82	DELINEATE	32.424591	-111.108400	Santa Cruz River
AI	R6	RIVERINE	0.037	568.24	DELINEATE	32.424601	-111.111506	Santa Cruz River
AJ	R6	RIVERINE	0.057	543.39	DELINEATE	32.424530	-111.114117	Santa Cruz River
AK	R6	RIVERINE	0.108	619.88	DELINEATE	32.424509	-111.115433	Santa Cruz River
AL	R6	RIVERINE	0.075	531.49	DELINEATE	32.424514	-111.116726	Santa Cruz River
AM	R6	RIVERINE	0.045	517.09	DELINEATE	32.424535	-111.118055	Santa Cruz River
AN	R6	RIVERINE	0.051	511.70	DELINEATE	32.424554	-111.119964	Santa Cruz River
AO	R6	RIVERINE	0.147	608.15	DELINEATE	32.424690	-111.120893	Santa Cruz River
AP	R6	RIVERINE	0.099	680.60	DELINEATE	32.424476	-111.125199	Santa Cruz River
AQ	R6	RIVERINE	0.106	1,083.73	DELINEATE	32.424626	-111.128634	Santa Cruz River
AR	R6	RIVERINE	0.090	731.44	DELINEATE	32.424550	-111.130454	Santa Cruz River
AS	R6	RIVERINE	0.114	902.52	DELINEATE	32.424630	-111.131658	Santa Cruz River
AT	R6	RIVERINE	0.430	1,285.59	DELINEATE	32.424617	-111.135974	Santa Cruz River
AU	R6	RIVERINE	0.372	1,786.35	DELINEATE	32.424591	-111.139743	Santa Cruz River
AV	R6	RIVERINE	0.057	439.90	DELINEATE	32.424720	-111.144598	Santa Cruz River
AW	R6	RIVERINE	0.494	3540.65	DELINEATE	32.424377	-111.150974	Santa Cruz River
			<u>6.285</u>	<u>33,632.95</u>				



\*\*\*PRELIMINARY (RGL 08-02)\*\*\*  
**SECTION 404 JURISDICTIONAL DELINEATION**  
 U.S. Army Corps of Engineers, Los Angeles District  
 Application No. SPL-2011-00011-JWL  
 Boundary of area surveyed for jurisdictional waters of the United States  
 Ordinary High Water Mark  
 Waters of the United States  
 Wetlands (if legend is blank no wetlands occur with survey area.)  
 Site Visit (Y/N) Date: 01 Dec 11  
 200' Scale 2008 Date of Photograph  
 T. LAURIE Corps Project Manager  
 Sheet 1 of 5  
 \*\*\*PRELIMINARY (RGL 08-02)\*\*\*



- LEGEND**
-  Flow Arrow
  -  Culvert Crossing
  -  Photo Direction & Number
  -  Data Point Number  
Width or NJ = Non Jurisdictional



T.11S.,R.12E. Portion of Sections 31-36,  
 T.11S.,R.13E. Portion of Sections 31-34,  
 T.12S.,R.12E. Portion of Sections 1-6,  
 T.12S.,R.13E. Portion of Sections 2-6,  
 Pima County, Arizona  
 Marana, Ruelas Canyon, & Oro Valley USGS 7.5'  
 Quadrangles

Image Source: Pima Association of Governments 2008

**TANGERINE ROAD:  
 I-10 TO LA CANADA BOULEVARD**  
 Preliminary Section 404 Jurisdictional Delineation  
**SHEET 1 OF 5**



MATCHLINE - SEE SHEET 3

MATCHLINE - SEE BELOW LEFT



**\*\*\*PRELIMINARY (RGL 08-02)\*\*\***  
**SECTION 404 JURISDICTIONAL DELINEATION**  
 U.S. Army Corps of Engineers, Los Angeles District  
 Application No. SPL-2011-00011-JUL  
 Boundary of area surveyed for jurisdictional waters of the United States  
 Ordinary High Water Mark  
 Waters of the United States  
 Wetlands (If legend is blank no wetlands occur with survey area.)  
 Site Visit: Y Date: 01 Dec 11  
 200' Scale 2008 Date of Photograph  
J. LAURIE Corps Project Manager  
 Sheet 2 of 5  
**\*\*\*PRELIMINARY (RGL 08-02)\*\*\***

**LEGEND**

- Flow Arrow
- Culvert Crossing
- Photo Direction & Number
- Data Point Number  
Width or NJ = Non Jurisdictional

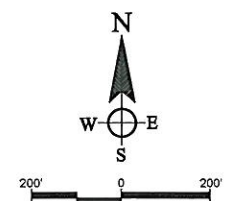
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MATCHLINE - SEE SHEET 1



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 T.12S.,R.13E. Portion of Sections 2-6,  
 Pima County, Arizona  
 Marana, Ruelas Canyon, & Oro Valley USGS 7.5'  
 Quadrangles

Image Source: Pima Association of  
 Governments 2008



**TANGERINE ROAD:**  
**I-10 TO LA CANADA BOULEVARD**  
 Preliminary Section 404 Jurisdictional Delineation  
**SHEET 2 OF 5**



\*\*\*\* PRELIMINARY (RGL 08-02) \*\*\*\*  
**SECTION 404 JURISDICTIONAL DELINEATION**  
 U.S. Army Corps of Engineers, Los Angeles District  
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 Site Visit (Y/N) Date: 01 Dec 11  
 200' Scale 2008 Date of Photograph  
 J. LAURIE Corps Project Manager  
 Sheet 3 of 5  
 \*\*\*\* PRELIMINARY (RGL 08-02) \*\*\*\*

MATCHLINE - SEE SHEET 4

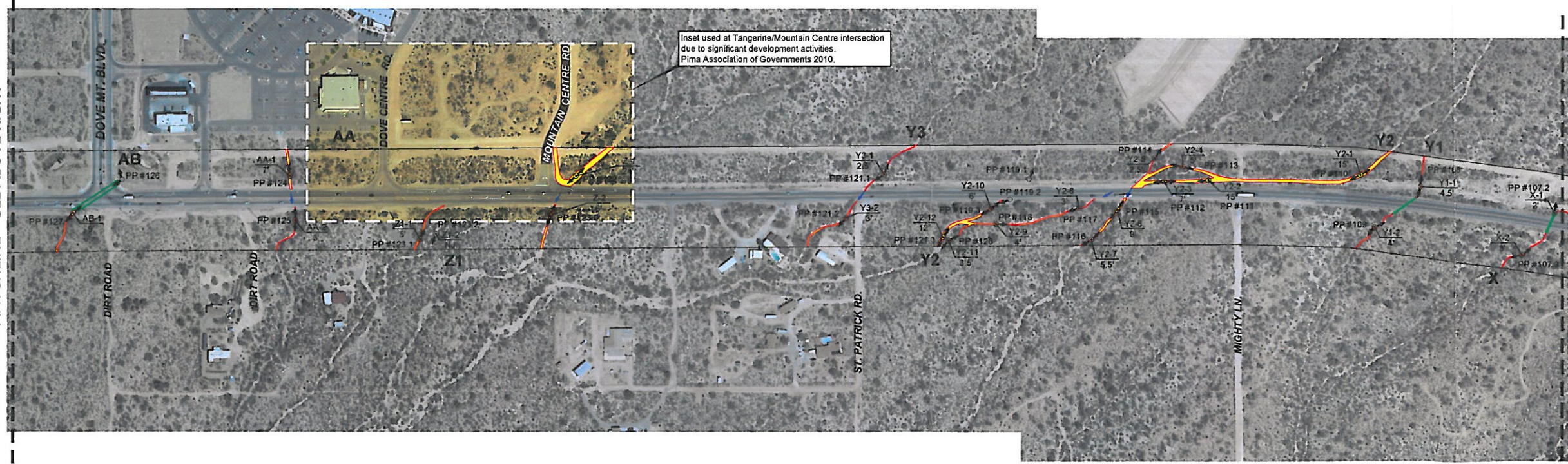
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- LEGEND**
- Flow Arrow
  - Culvert Crossing
  - Photo Direction & Number
  - Data Point Number  
Width or NJ = Non Jurisdictional

MATCHLINE - SEE ABOVE RIGHT

MATCHLINE - SEE SHEET 2



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 T.12S.,R.13E. Portion of Sections 2-6,  
 Pima County, Arizona  
 Marana, Ruelas Canyon, & Oro Valley USGS 7.5' Quadrangles

Image Source: Pima Association of Governments 2008

**TANGERINE ROAD:**  
**I-10 TO LA CANADA BOULEVARD**  
 Preliminary Section 404 Jurisdictional Delineation

SHEET 3 OF 5

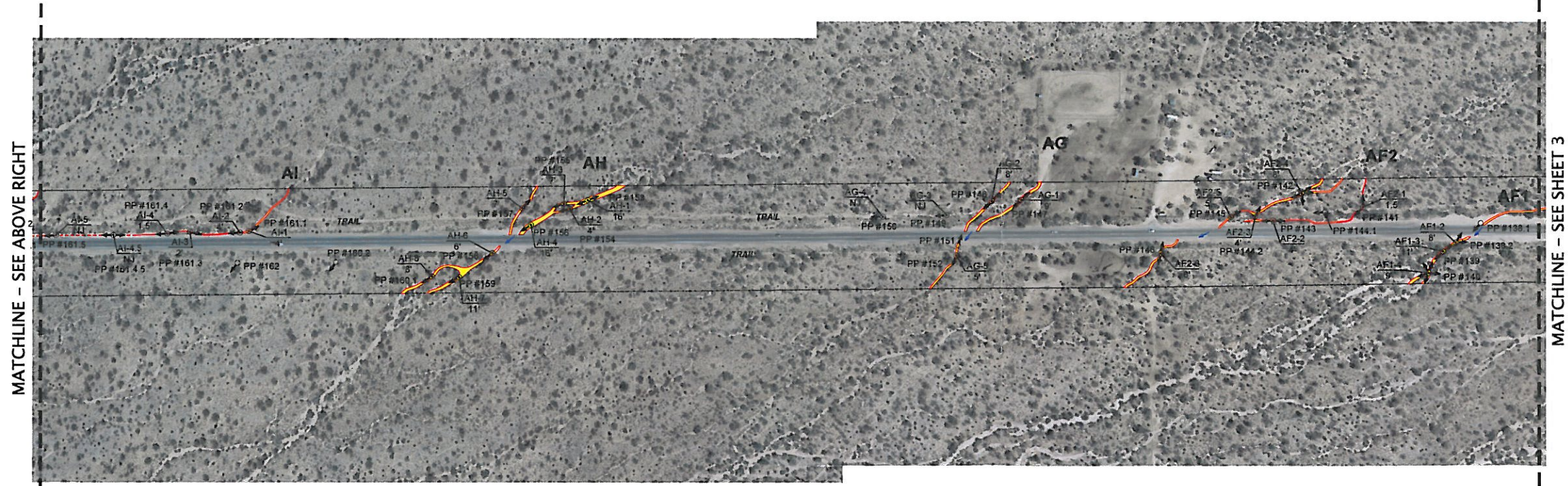
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\*\*\*\*PRELIMINARY (RGL 08-02)\*\*\*\*  
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 200' Scale 2008 Date of Photograph  
 J. LAURIE Corps Project Manager  
 Sheet 4 of 5  
 \*\*\*\*PRELIMINARY (RGL 08-02)\*\*\*\*

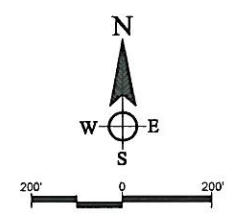


- LEGEND**
- Discontinuous Ordinary High Water Mark
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  - PP#1 ↗ Photo Direction & Number
  - A-1 / 3' Data Point Number / Width or NJ = Non Jurisdictional



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 T.11S.,R.13E. Portion of Sections 31-34,  
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Image Source: Pima Association of Governments 2008



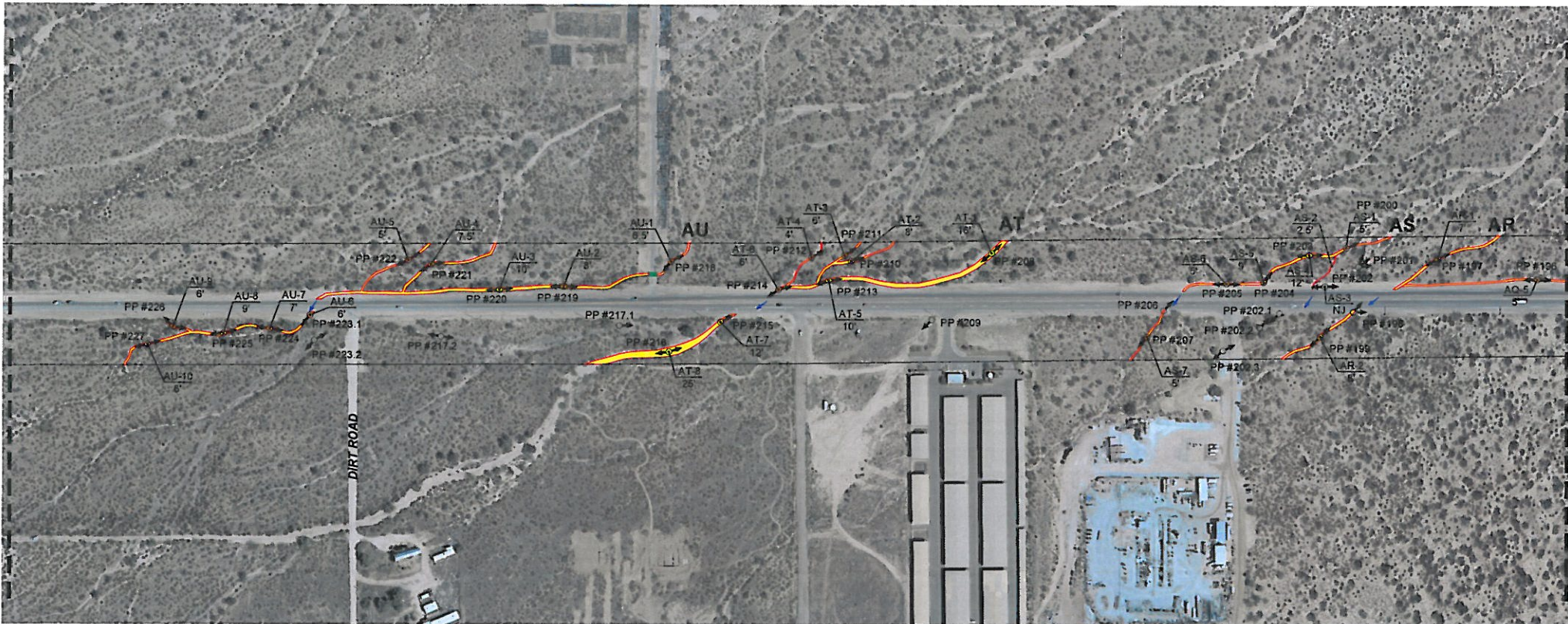
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**I-10 TO LA CANADA BOULEVARD**  
 Preliminary Section 404 Jurisdictional Delineation  
**SHEET 4 OF 5**

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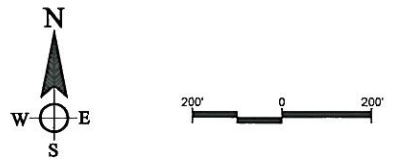
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 200' Scale 2008 Date of Photograph  
 J. LAURIE Corps Project Manager  
 Sheet 5 of 5  
**\*\*\*PRELIMINARY (RGL 08-02)\*\*\***

**LEGEND**

- Flow Arrow
- Culvert Crossing
- PP#1 Photo Direction & Number
- A-1 Data Point Number  
3' Width or NJ = Non Jurisdictional

Image Source: Pima Association of Governments 2008

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 Pima County, Arizona  
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# APPENDIX 5

## UTILITY COORDINATION MEETING MINUTES

November 19, 2010

Utility Company Representative

**Re: Utility Location in Right-of-Way  
Tangerine Road Corridor Project, I-10 Frontage Road to La Cañada Drive  
Psomas Job No. 7TMA090401  
TOM Project No. 2005-061**

Dear Utility Representative:

The Town of Marana has secured the services of Psomas to develop technical reports, a Design Concept Report (DCR) and roadway plans (15% and 30%) for the project limits. This effort includes identification of utilities that may be affected by the improvements and the mitigation of impacts to major utility infrastructure. Additionally, future utility needs are to be identified and documented.

Utilities known to exist within the existing Tangerine Road roadway or within the likely future right-of-way have been mapped according to records provided by the individual utilities. To date some of these locations have been corroborated by Bluestake, where the above ground features and Bluestake markings were picked up in an as-built survey. At this time, additional as-built survey work is in process, and is expected to have been processed in a couple of weeks, allowing Psomas to complete the mapping of overhead and buried utilities.

On behalf of the Town of Marana, Psomas invites you to participate in a discussion with Psomas staff to become familiar with the project and for Psomas to become more familiar with your facilities and future needs. We will meet on **December 2, 2010 at 2:00 p.m.** in the Psomas main conference room at 800 E. Wetmore Rd., Suite 110. The following prior preparation by you or your associates will be appreciated.

- If occupying a joint use pole, indicate the responsible party that owns the pole.
- Provide description of facilities that should be reflected in the DCR. For instance, "...four (4) 2" conduit bank, concrete encased, with fiber optic and 1800 pair copper cable..."
- Mark up mapped utilities, indicating discrepancies or corrections and adding brief descriptors.
- If you operate outside of existing right-of-way, indicate easements obtained and recordation information.

- If the utility operates under an IGA with Pima County or with the Town of Marana, indicate the nature of, and the agency participants in the IGA.
- If relocation is seasonally dependent, please specify the general constraints.
- If a permit is required to expose the utility or to work around the utility, please specify.
- If occupying an easement secured by others, please indicate relationship between you and the easement grantee.
- Supply evidence of prior or senior rights. If unaware of the recorded document that assures senior rights but you suspect they exist, please provide a brief narrative supporting the assertion.

It is anticipated that at the time of our meeting, additional mapping of the individual utilities will have taken place, and will be available for distribution and review. Linework for existing right-of-way will be added as it becomes available.

It is acknowledged that this meeting time may not work for all interested parties. Please contact me if you wish to discuss elements of the project, but will not be available to participate on December 2<sup>nd</sup>. If you have any questions related to this meeting, please do not hesitate to give me a call at (520) 292-2300 or contact me via e-mail at [kmcrae@psomas.com](mailto:kmcrae@psomas.com).

Respectfully,



Kent McRae, P.E.  
Senior Project Engineer  
[kmcrae@psomas.com](mailto:kmcrae@psomas.com)



# MINUTES

## *Tangerine Road: I-10 to La Cañada Dr Utility Coordination Meeting*

**Thursday, December 02, 2010  
Psomas, Main Conference Room  
2:00-3:30 PM**

### **1. Introductions and Purpose**

Scott Leska, Town of Marana P.M. and Alejandro Angel, Psomas P.M. described the nature of the project and estimated time lines. Project will include widening to 4-lanes. The Town will likely acquire a 300 ft. R/W. A portion of the roadway will be similar to the improved Tangerine Rd. in the Town of Oro Valley. A portion of the roadway west of Thornydale may be posted at higher speeds. Early phases of the project may go to construction in 2015. This project uses RTA funding.

Psomas intends to map all above ground and buried utilities and identify potential conflicts.

See attached sign-in sheet for attendees

### **2. Previous Action Items**

Action Item	Responsible	Resolution
none		

### **3. Utility Mapping Update and Discussion:**

- The request was made that Utility companies reply to the bulleted items in the November 19, 2010 meeting invitation via an email to [kmcrae@psomas.com](mailto:kmcrae@psomas.com).
- 2<sup>nd</sup> bullet item on November 19, 2010 meeting invitation
  - Provide the most thorough description the Utility will allow which will result in a clear report that gives accurate assessment of impacts to Utilities.
- 4<sup>th</sup> bullet item on November 19, 2010 meeting invitation
  - The designer will provide this information (easement recordation) – Utility will review and comment
- 5<sup>th</sup> bullet item on November 19, 2010 meeting invitation
  - The Designer will identify utility conflicts that have been traditionally handled between agencies through and intergovernmental agreement (IGA).
  - No IGA's are in place, and there shall be no assumption of how resolution of conflicts will be designed or paid for. The Town of Marana will not pay for utility relocation design.
- 6<sup>th</sup> bullet item on November 19, 2010 meeting invitation
  - Peak seasonal usage and heavy load for Southwest Gas and for Trico were discussed. Tie-over's will be allowed as necessary and only in the off peak season.
  - Response from other Utilities pending.
- 8<sup>th</sup> bullet item on November 19, 2010 meeting invitation
  - Request for information concerning easement subjugations was reiterated, and is still sought from individual Utilities.
  - Discussion concluded that Comcast has a joint use agreement with Trico, and occupies Trico poles east of the north/south power line access alley between Dove Mountain and the Interstate. Qwest occupies Tucson Electric Power poles. Some Qwest line transfer from an

abandoned TEP (wood) pole line over to new steel poles may not take place as a result of interference from TEP's high voltage line on the steel poles.

- Easements and Rights-of-Way
  - Not shown in the PDF initially sent to Utility representatives. A draft location of easements will appear on a new submittal for Utility company review in the first part of January, 2011. To-scale Utility mapping will also be provided for comment and feed back.

#### 4. General:

- Utility staff, through Bluestake requests, has provided invaluable assistance in identifying buried utility locations that have subsequently been mapped by Psomas Survey.
- Potholing is expected to take place in the spring or summer once probably subsurface conflicts have been identified. Potholes frequency is unknown, however the project anticipates roughly 10 locates per mile.
- Trico service area around and near the project described in general terms. From I-10 to Thornydale; both sides of Tangerine.
- High cost to relocate overhead double circuit line discussed. Cost is greater for higher voltage circuits.
- TEP and Trico have considered briefly in the past working together to construct circuits and system reinforcement in this area.
- Cellular phone towers may represent non-traditional conflicts with the proposed roadway improvements. Locations of a few towers were mentioned.

#### 5. New Action Items:

Action Item	Responsible	Resolution
Draft utility mapping to include rights-of-way will be forwarded for review by Utilities. Known easements and their recordation will be supplied.	Psomas	Request Utilities redline, comment, research and declare prior rights.

## TANGERINE ROAD, I-10 TO LA CANADA

### COORDINATION MEETING WITH TRICO

10/25/11, 10 AM

#### Attendees:

Wes Crane - TRICO

Alejandro Angel – Psomas

Larry Ash - TRICO

Brent Bartz – Psomas

Cliff Knowles - TRICO

Chenggang Zhang – Psomas

Frank Gonzales – TRICO

The discussion focused on the area between the TRICO building and Dove Mountain (Sta 490 to Sta 690), approximately 4 miles, as most of the conflicts are in this area.

- **Alternative 1 – Keep as many poles as possible in place**
  - We talked about having a 6:1 slope from the edge of pavement to try to reduce the fill at their pole line to 2-3 ft in most places. There would still be challenges at the proposed bridges (sta 577, Prospect Wash) and at a couple of drainage crossings.
  - Having fill against the poles is a concern because the lower part of the pole does not have as much chemical treatment and could deteriorate. Larry mentioned that they could be wrapped to prevent that issue.
  - Clearance for driveways and of the lines crossing Tangerine (Sta 489,500,515,528+50,542,557+50,726,751,776) is a key concern. Also, TRICO expects that Qwest may want to move to their OH lines because TEP won't want them on their 138kV lines.
  - Access to the poles is another important issue. If a pole needs to be replaced/serviced they need to be able to park their trucks on a slope of 5% or less. We discussed possibly using the multi-use path (10' wide) to get to the poles, but would need to evaluate the effect of the trucks on the pavement for the path.
  - TRICO has a Regulator Station at Sta 510+00. No additional fill can be placed at that location because the regulators already have the minimum clearance from existing grade. Relocation of the regulators would cost ~50k. We looked at the cross-section for that area and determined that we can probably match grade without affecting the regulators.
  - TRICO To determine which poles would need relocation and potential cost

- **Alternative 2 – Relocate the entire line in the same alignment**
  - This would eliminate the clearance problem and allow placement of fill against poles. However, we would still need to provide access to the poles via the multi-use path and potentially realign the pole lines in the vicinity of the proposed bridges.
  - Relocating in the same alignment is more complicated because only segments of the line can be de-energized. Larry obtained information on relocation costs and found the cost to be approximately \$215k per mile.
  
- **Alternative 3 – Relocate entire line to the edge of the new ROW (145 ft North of the section line)**
  - This alternative would eliminate all issues related to fill against poles, clearance, access to poles and conflicts near the proposed bridges.
  - Lines are easier to rebuild in a new alignment because the existing line can remain in service until the new line is ready to be energized. Larry obtained information on relocation costs and found the cost to be approximately \$165k per mile. Since there is no development along the north side of the road, relocation of the line should not be an issue.
  - The one issue with this solution is that it is very important for TRICO to be on their own easement and retain their rights. Psomas will look into the feasibility of having Marana dedicate a 10 ft easement to TRICO at the north end of the ROW.
  
- **Alternative 4 – Use a barrier (concrete or Guardrail) to protect the poles**
  - With this alternative, a barrier would be constructed on the north side of Tangerine for the entire 4 mile segment. A 2:1 slope would be constructed behind the barrier to catch existing grade before the TRICO poles. However, because of the limited space between the poles and the road, the multi-use path may have to be eliminated along the north side of the road. This may be acceptable given that there is no development in that area and that there would be a continuous path on the south side of the road.
  - This alternative would probably have the lowest cost because it would reduce the amount of embankment, shorten the culverts, eliminate the path on the north side, and preserve more room for drainage collection channels.
  - Still, one area of conflict would still remain near the proposed bridges where some TRICO poles would need to be relocated or the slopes would need to be treated (i.e. 1:1 with shotcrete or small retaining walls near the poles).

#### **ACTION ITEMS**

- Psomas to provide cross-sections every 300 ft and at the locations where the TRICO lines cross the roadway by the end of the day on 10/25.
- TRICO will use those cross-sections to identify the poles that would need to be relocated under Alternative 1 and estimate the cost of those relocations. TRICO will provide the information back to Psomas in 2 weeks (11/8).

## Alejandro Angel

---

**From:** Kent McRae  
**Sent:** Thursday, November 10, 2011 5:29 PM  
**To:** Alejandro Angel  
**Subject:** TEP meet

I know I didn't catch the entire meeting, but here are some bullet points I observe could be included in the meeting notes.

- TEP prefers to have its pole line a minimum of 7 ft. into the R/W, or off of R/W. Prefers as close as possible to R/W to avoid having conflicts w/ future roadway projects.
- Psomas is attempting to provide approximately 25 ft. from new EP to the 138kV circuit poles.
- Psomas is assuming that the 46kV line will require relocation. Psomas observes that this circuit doesn't have prior rights. TEP has been invited to provide documentation of permits or prior rights for this line if it believes they exist.
- Bridge locations were pointed out to TEP staff along with the fact that the bridges will be built up as much as 14 ft. from existing ground. Bridges occur at three locations, primarily in Phase III of the roadway improvements.
- Conflicts resulting from elevated bridges will need to be assessed by TEP Engineering.
- Psomas believes that aesthetics will not be a factor in this project so far as TEP is concerned.
- TEP staff observes that some of the relocation mentioned will consist of pole replacement, but conductor will remain.
- Retaining walls referred to in the meeting as eyebrows may be used if fill is excessive. Railing required if eyebrow is too tall.
- Clear zone will ultimately be agreed upon by the TOM. Existing conditions that don't have a history of causing accidents may be evidence that relocation is not required.
- Debra Sykes will arrange meeting between (transmission) TEP Engineering and Psomas/Kittelsohn staff, hopefully as soon as next week.

**Kent McRae, P.E.**

**PSOMAS** | *Balancing the Natural and Built Environment*

Senior Project Engineer

Water Resources

333 E. Wetmore Road, Suite 450

Tucson, Arizona 85705 | 520.292.2300

[www.psomas.com](http://www.psomas.com)

## TANGERINE ROAD, I-10 TO LA CANADA

### COORDINATION MEETING WITH TRICO

12/8/2011, 1:30 PM

#### Attendees:

Wes Crane - TRICO

Alejandro Angel – Psomas

See sign in sheet (attached)

Brent Bartz – Psomas

Chenggang Zhang – Psomas

The discussion focused on the area between the TRICO building and Dove Mountain (Sta 490 to Sta 690), approximately 4 miles, as most of the conflicts are in this area. This follow up meeting was held at the Trico headquarters, organized by Wes.

#### • Overview

- Introductions made
- Tangerine Road improvements likely 10 years in the future.
- Review of previously discussed alternatives, and preference on resolution to consider relocating Trico to new easement at northern most edge of new right-of-way (R/W)
- Presumed that the cost to relocate Trico in a Like for Like fashion will be done at the cost of the Town of Marana.
- Grazing lease by Francisco mentioned; presently moving pens / corals north
- Likelihood of CenturyLink placing its coax underground vs. going onto Trico poles.

#### • Design Considerations

- Psomas believes line (double circuit) will move between 80 and 100 ft. to the north.
- Proposed that relocated line be within the new Town of Marana R/W. Town prefers to not provide R/W outside of or to the north of the proposed 300 ft. R/W.
- Obtaining R/W for the roadway does not mean that utilities will have a right to occupy the same R/W. The R/W specialist will consult the Town on the most expeditious way to permit for roadway and for utilities.
- Town of Marana is willing to make its R/W subordinate to the easement required by Trico to operate and maintain its system.
- Thornydale Substation
- Recommended that Psomas contact Southwest Trans-Co concerning improvements to assure no conflicts
- State land permit may take three years to obtain.

- **Trico Considerations**

- Trico will review its updated long range plan for potential guidance on conductor sizing, pole requirements
- Consider likelihood of joint tenants on poles, which may require that the poles be spaced more frequently or classed heavier
- Once the DCR is complete, Trico will have access to 30% plans that will aid in designing to mitigate horizontal and vertical conflicts.
- Relocation may be considered if the Town of Marana and the RTA make arrangements early for new R/W and for payment to Trico.
- Vault in roadway at Dove Mountain could be in conflict, but is probably clear since the roadway will be centered on the section line at Dove Mountain.
- Some pole height adjustment may be required to accommodate changes to roadway profile
- Some consideration will need to be given if communications companies request joint use agreements with Trico. Communications conduits / cables often present significantly more loading than the actual electric company conductors.

- **Agreement (Technical / Legal) Considerations**

- A memorandum of understanding (MOU) will be developed by Trico under Cedric's direction requesting the assistance of Frank Cassidy from the Town.
- The MOU will be prepared in such a manner as to be accepted or ratified by the Town Council. This MOU would be recorded to protect both the Town and Trico from misunderstandings that could arise during formal design or during construction
- It was agreed that Like for Like should be described in the MOU.
- Estimated costs
- Estimated time frame: roadway, overhead elec. relocation
- Limits, or reach of affected lines, plant affected
- Position of new line with respect to section line
- Access off of roadway to poles
- Accommodation of communication company's plant (fiber, coax)

TRICO/MARANA TANGERINE RD MEETING 12/08/11

Name	Company	Position	email
Alejandro Angel	Psomas	Proj. Manager	aangel@psomas.com
Clifford Knowles, PE	TRICO	Standards Engr	cknowles@trico.coop
Kent McRae	Psomas		
Brent Bartz	Psomas	Proj. Engr.	bbartz@psomas.com
Chenggang Zhang	Psomas	Projed Eng.	chenggang.zhang@psomas.com
Paul Baughman	Marana	Civil Engineer	pbaughman@marana.com
Scott Leske	"	Proj Mgr	sleske@marana.com
Bill Binder	Trico	Construction Supervisor	bbinder@trico.coop
Larry Ash	Trico	Field Supervisor	lash@trico.coop
Wesley Crane	Trico	Sr. Dist. Designer	wcrane@trico.coop
Chuck Wilcox	TRICO	RIGHT-OF-WAY COORDINATOR	cwilcox@trico.coop
Cedric Hay	Trico	Dir. Contracts/Reg. Affairs	chay@trico.coop



**Tangerine Road**  
**Tucson Water Department Meeting**  
**New 36-Inch Reclaimed Water Line Thornydale / Tangerine**  
**Town of Marana, May 7, 2012**

**Attendees:**

Scott Leska – Town of Marana

Paul Arias – Town of Marana

Paul Baughman – Town of Marana

Rogelio Gaxiola-Pacheco – Tucson Water Department

Jignesh Patel – Tucson Water Department

Alejandro Angel – Psomas

Kent McRae – Psomas

**Discussion Items:**

1. Psomas staff introduced the project and clarified that Kittleson is currently responsible for what is termed the first phase. The first phase is presently from La Cañada to Thornydale. Psomas and Kittleson will complete the 30% plans and DCR by August 2012. Project is RTA funded. Purpose of meeting is to help assure no modifications of newly constructed water main once cross drainage and other roadway design is completed and the roadway project goes to construction.
  - a. The extent of the first phase may change. First phase is planned to go to construction 2015-2016.
  - b. Psomas and Kittleson will compete to do the construction plans for the Town, but are not assured to be the design consultants for the roadway plans.
2. Tucson Water staff offered that the water line is funded for 2012-2013.
  - a. Purpose of new reclaimed water main is to accommodate increased demand on reclaimed water system resulting from increases in golf course irrigation in the area.
  - b. Staff anticipates that 50% design will be completed in two weeks, and anticipates that final design will be complete by July 1, 2012.
  - c. Project will be handled by City Procurement and will go to bid in October 2012 and be completed by June 30, 2013.
3. Psomas requested that pothole data collected for the Tucson Water design be shared.

- a. Tucson Water staff is in the process of obtaining approval from City of Tucson Manager to perform pothole work. The intended pothole locations have been previously identified and forwarded to Psomas.
  - b. Tucson Water staff anticipates being able to share the data.
  - c. Psomas to provide horizontal control to Tucson Water; ditto for vertical control.
4. Right-of-way and vertical and horizontal alignment discussed.
  - a. Tucson Water staff has designed new pipe to fall within existing right-of-way, said right-of-way being adjacent to State lands.
  - b. Some discussion that certain right-of-way near this location is subject to scrutiny.
  - c. Psomas/Kittleston will provide plan and profile base files for Tucson Water staff's reference. Tucson Water is reported to be using Civil3D 2011.
5. Other administrative discussion:
  - a. Town of Marana signature line on City of Tucson water plans not required. Approval of permit is sufficient authorization to construct. Scott to verify; requests that Rogelio follow up with email requesting verification.
  - b. Moratorium on pavement is understood to be in force following completion of the Tangerine Rd. improvements.

## KEY PROVISIONS

### MEMORANDUM OF UNDERSTANDING BETWEEN TRICO AND THE TOWN OF MARANA

(DRAFT 2012/05/16)

1. This agreement covers the overhead line owned by Trico Electric Cooperative (Trico) that runs along the north side of Tangerine road from Trico's business property to 900 ft. west of Dove Mountain Boulevard (approximately 4 miles in Sections 31-35, Township 11 S, Range 12 E) (the Line).
2. A portion of the Line will need to be relocated because of the proposed widening of Tangerine Road to a four-lane divided highway between I-10 and La Cañada Drive (the Project). Based on the RTA plan and the anticipated funding availability, it is estimated that the widening of Tangerine Road between I-10 and Dove Mountain Boulevard will be constructed between the years 2021 and 2026.
3. The proposed road realignment will place the relocated portion of the Line (from approximately the Thornydale Substation to 900 ft west of Dove Mountain Blvd, 2.3 mi). in the northernmost 10 ft. of the proposed 300 ft. Tangerine Road Right-of-Way (from 140 to 150 ft. north of the section line) (the New Right-of-Way).
4. The Town of Marana (the Town) will acquire a lease from the State Land Department for the New Right-of-Way and will provide senior rights to Trico in the northern 10 ft. of the New Right-of-Way. The Town will ensure that the application to the State Land Department includes overhead utility lines as one of the uses for the New Right-of-Way. Trico will abandon the existing State Land lease for the Line. All necessary environmental and archaeological clearances for the New Right of Way shall be obtained by the Town.
5. The new roadway will be uncurbed within the limits of this agreement in order to facilitate access to the new Trico line. It shall be designed to ensure that Trico will have access to its facilities before, during and after construction.
6. The Town will be responsible for the costs of both the New Right of Way and the installation of the proposed line. However the Town's responsibility is limited to the replacement of the existing line with a comparable line. Upgrades in line capacity, materials (such as poles), appurtenances or other elements will be paid by Trico unless the need for the upgrades is caused directly by the Tangerine Road Improvement Project (not indirectly due to population growth or development facilitated by the project ) in which case they will be paid by the Town.
7. Based on information provided by Trico, at 2011 prices Trico's estimated typical costs for replacing the existing facilities like-for-like are approximately \$163,000 per mile. This price does not include time and/or materials for the removal of the existing facilities, any mitigation due to impacts to the feeder exits at the Thornydale substation, or replacement of special facilities such as regulators, reactors, etc. It is acknowledged that materials are sensitive to fluctuations in commodity prices.

8. Trico will have the right to sublease their poles to other utilities such as communications. However Trico would be responsible for the additional costs to upgrade their facilities. This would include but is not limited to, the cost associated with potentially shorter runs between poles (which would require more poles), and the need to increase the height of the poles for clearances required by the sub-lessees.
9. If Trico decides to upgrade or relocate their lines prior to the construction of the Tangerine Road roadway project, the Town will consider advancing the right-of-way acquisition and line relocation, subject to funding availability. Trico shall notify the Town of Marana of its intent to upgrade or relocate the facilities at the earliest opportunity.

DRAFT

## TANGERINE ROAD, I-10 TO LA CANADA

### COORDINATION MEETING WITH TEP SUBTRANSMISSION ENGINEER

1/05/2012, 2:00 PM

#### Attendees:

Majid Farahani - TEP

Kent McRae – Psomas

Warren McElyea - TEP

Chenggang Zhang – Psomas

Matthew Ashby - Kittleson

The on grade meeting and discussion took place at 2:00 near the AEPCo Thornydale substation. The discussion focused on the area between the TRICO building and Dove Mountain (Sta 489 to Sta 690), as most of the conflicts are in this area. The area between Dove Mountain and Thornydale (Sta 690 to Sta 960) has similar condition to the area just west of Dove Mountain.

#### Overview

- Moderate description of roadway design constraints that have led to this meeting, including drainage channel on north side of Tangerine Road, and existing TEP and Trico State Land Permits on both sides of Tangerine Road.
- Designer anticipates that existing 46kV line between Sta 489 and Sta 568 will be in conflict and will be moved at the Utility's expense.
- Designer anticipates that modifications to the dual circuit line between Sta. 568 and Sta. 960 will be at the Owner's (Town of Marana, Oro Valley, and Pima County) expense.
- Existing 46/138kV line is built to 138kV standards from Sta 576+30 (Psomas) to 803+75 (Kittleson). 46kV line existing from Sta 488+92 to structure at Sta 568+10. Single circuit from Sta 803+75 to the east end of the project.
- Minimum ground clearance for 138kV conductors is 21 ft.
- For the subject 138kV subtransmission main, TEP is presently plans to consider ACSS conductor, which sags more than ACSR currently in use. This potential for additional sag with ACSS is due the higher allowable temperature and current that the ACSR. The Designer believes that the mitigation costs attributable to Marana/Oro Valley should be limited to the same type of facility existing at the time of construction. The cost to allow for potential future upgrades should be borne by the utility.
- Critical clearance may be at mid-span, depending on roadway profile and side slope to daylight or match existing ground.

- TEP subtransmission engineering uses Civil3D. Project CAD linework is in State Plane coordinates.
- An access Management Plan (AMP) has been established to control access to the proposed Tangerine Road which will limit the number and location of future side streets. TEP staff does not believe that the AMP will guarantee that no conflicts related to side streets and access will arise in the future. Therefore, TEP considers that sag under worst case scenario be evaluated along entire reach of roadway. The Designer believes that the cost for clearance issues associated with potential future driveways should be borne by each developer seeking access. Marana and Oro Valley are responsible for clearance conflicts between TEP facilities and the proposed roadway improvements.
- Future side streets are unlikely to be located near box culverts or bridges, making the ground clearance at those locations less critical.
- If pole heights are modified beyond a certain threshold, or if the alignment is changed, TEP will be required to re-certify its facilities through the ACC.

### **TEP System Modification**

- Fill against steel poles may warrant sandblasting and re-coating the pole to 1 ft. above future finish grade.
- It will be necessary to check if prep/sandblasting and re-coating using the appropriate substitute for the shop-applied “core coat” is acceptable from an environmental standpoint.
- Fill against wooden poles may warrant re-coating from a point below existing grade to a point 1 ft. above finish grade. Wooden pole coating methods and acceptability not discussed specifically.
- Use of shallow retaining wall at poles discussed briefly. It requires that service truck be able to work on pole unhindered.
- Clearance issues may be resolved by raising a pole or moving a pole towards the new right-of-way. Relocation toward the south edge of right-of-way is acknowledged to require possible ACC action. It is also acknowledged that TEP is currently within an easement from the State Land Department and relocating poles is not thought to be feasible.
- TEP has limitations on how much it may raise a pole. Raising of one pole may necessitate raising of poles to the east and the west. The implied purpose of raising poles is to provide increased clearance at the mid points along the sagged conductor.

### **Requests of Psomas and Kittelson**

- Provide TIN data to TEP for its reference in its evaluation of clearance under future conditions.
- Verify that TIN file can be used to create surface in Civil3D.
- Provide roadway engineering base file to TEP.

- Provide updated cross sections.

### **Requests of TEP**

- TEP is requested to model the potential sag at mid-length span. It is understood that wind, in addition to sag, will be considered. TEP suggests that it may take two months to set up its 3-D model and complete an evaluation of the sag in the line.
- Provide Psomas details of retaining wall that may be used at poles if fill against pole is unacceptable, but pole height is acceptable.
- Determine if steel pole prep and field applied poly coating environmental concerns can be addressed satisfactorily.
- Determine if wooden pole can be treated in the field to take extra fill.
- Provide cost estimates for modification alternatives:
  1. Treat poles in the field to take extra fill
  2. Change to higher poles at same alignment for poles in conflict
  3. Relocate poles closer to new southern right-of-way to avoid conflicts. Requested that cost estimate address constructed improvements, engineering, and administrative costs such as re-certification through the ACC.

# MINUTES

## ***Tangerine Road: I-10 to La Cañada Dr Utility Coordination Meeting***

**Thursday June 28, 2012**

**Town of Marana, Civic Center Drive, Gold Room**

**11:00-12:15 PM**

### **1. Introductions and Status of Utility Review**

Scott Leska, Paul Baughman, and Alejandro Angel described the utility review status of the 15% plans. Since the plans were submitted in early March, review comments were received from most of the utility companies. However, some comments are still pending including TEP and Oro Valley Water. Century Link has reviewed it's base maps with Psomas for the 15% design and will forward formal comments shortly. Psomas would like to receive all the comments from all the utilities to minimize conflicts and avoid unknown impacts. All Utilities should copy the Town of Marana on their comments to ensure their comments are tracked in the town's system.

### **2. Design Update**

#### **a. Changes from Value Analysis**

The design team will incorporate some changes based on the recommendations of an RTA value analysis study that took place in March. Some of the changes that will impact utilities include:

- Shifting Tangerine 25 feet north of the section lines between Thornydale Road and La Canada Drive. This should significantly reduce impacts to TEP.
- The new right-of-way will be 250 ft instead of 300 ft for Tangerine Road.
- The design will use separate profiles for the eastbound and westbound lanes. As a result, the eastbound lanes will be lower, and the amount of embankment (and impacts to utilities on the south side of the road) will be reduced.
- The pedestrian path will only be built along one side of the road (north side east of Thornydale, south side west of Thornydale). This will narrow the road prism and also reduce utility impacts.

#### **b. Project Phasing**

Town of Marana is pursuing two construction phases for Tangerine Road. First phase is La Canada Drive to Dove Mountain Blvd.

#### **c. Design/Implementation Schedule**

The final design for the segment between La Canada Drive and Dove Mountain Blvd will be conducted 2013-2014. The construction for the segment will be 2015-2016. The second phase, Dove Mountain Blvd to I-10, will likely happen around 2025, pending on funding allocation and new Tangerine Interchange construction.

#### **d. Pothole Data**



Certain utilities will be potholed to more accurately determine horizontal and vertical position. This information will be used to update the utility base in connection with the 30% plans.

### **3. Information Needed by Utilities from Design Team**

- TEP requested the locations for designed or platted side streets in order to conduct its review of conflicts, if any, resulting from sway and sag. Locations of side streets proposed in the future by land owners or others will be evaluated at that point in time which they are submitted and will not impact this project.
- Psomas will send a pdf of the 15% plans to CenturyLink.
- Trico requested detailed information on the shift of the roadway to the north at Thornydale.

### **4. Information Needed by Design Team from Utilities**

- TEP needs to provide standards or requirements for mid sag, clearance, span, fill limits for wood and steel poles, eyebrow walls, pole access. Debra believes they can provide this by mid-july.
- Review comments from CenturyLink, Oro Valley Water, T-Mobile, Cricket, and TEP are needed. Centurylink contractor recently assigned to work on this project will become familiar with potential impacts according to proposed limits of roadway improvements and where facilities actually lie with respect to these improvements.
- Finalization of the Memorandum of Understanding between Marana and TRICO
- Utilities are encouraged to determine if conduit or other accommodations will be needed in either of the two proposed bridges (near Thornydale substation and at Prospect wash)

### **5. Other Discussions**

- Pima County Waste Water will relocate its existing force main sewer 40' north, east of Thornydale Road to avoid conflicts with the project. They also plan to expand the existing lift station near Dove Mountain Boulevard. This is problematic because the current plans show ROW acquisition from the lift station parcel for the road. It was observed that Souren should approach Town of Marana staff outside of the utility coordination meeting to discuss alternatives to that conflict.
- South West Gas needs standby person for any work near high pressure main.
- Tucson Water is waiting on pothole information from their waterline relocation project near Thornydale Road. The construction of the project (a new 36" reclaimed transmission main) will complete December 2013.
- CenturyLink personnel have indicated they will walk the entire route and provide a determination of what solution will be pursued to resolve conflicts, and whether existing lines are likely to be relocated overhead or underground

- A regional drainage report is outstanding, which may impact design. This report will address mostly water collected at the western end of this project (west of Breakers Road).
- Joint utility trench may be considered if it is determined that multiple utilities are interested in extending or expanding in the same area.

## **6. New Action Items**

- An intermediate submittal (prior to 30% plan submittal) will be made to utilities showing revised roadway geometry, including drainage features. Comments received from this intermediate submittal will be addressed prior to finalization of the 30% plans to the extent that the schedule permits. Otherwise, the comments will be addressed in final design.
- SWG personnel request that utilities be a consideration when either the Consultant or the Town approach the State Land Department for right of-way. The new leases should allow not only for the road but for utilities.

