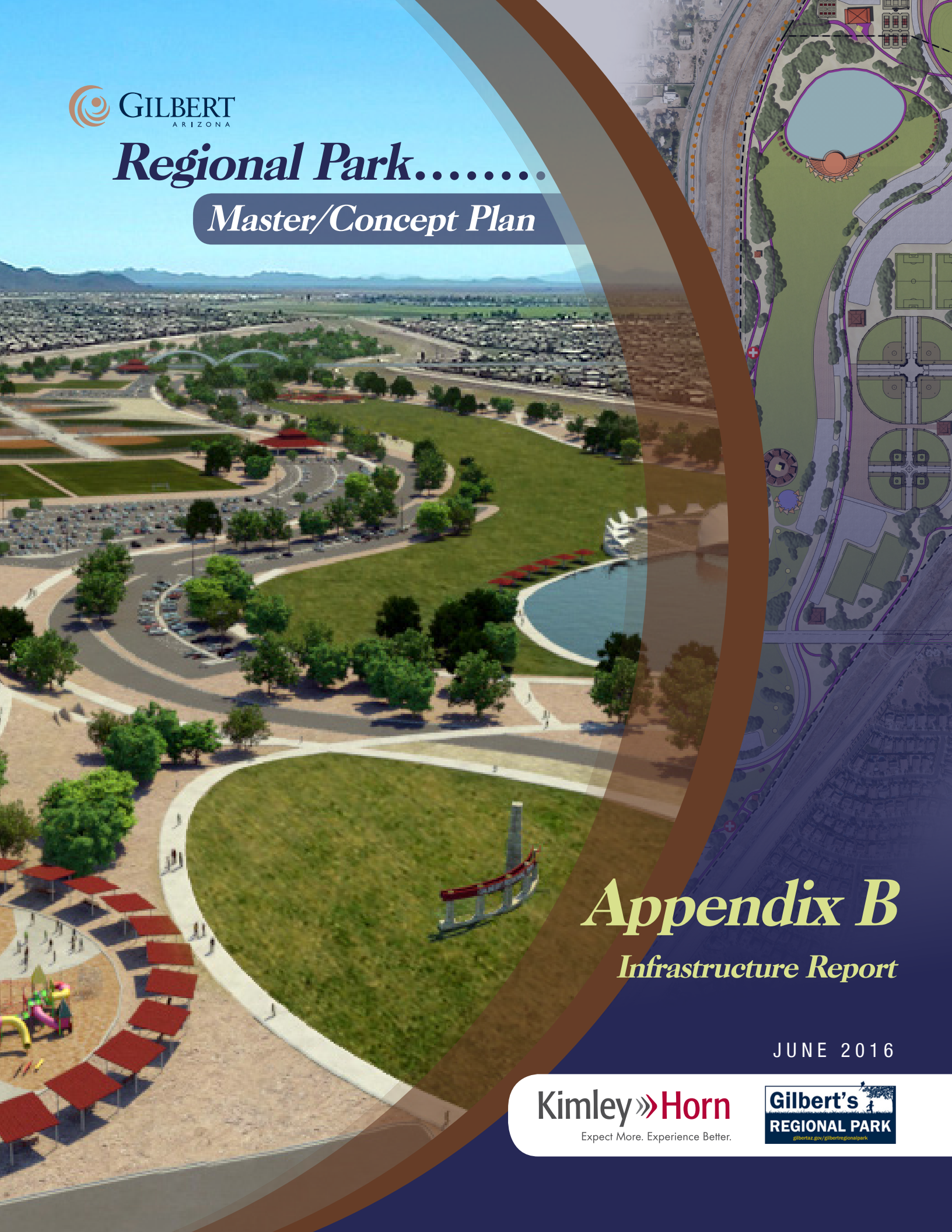
GILBERT
ARIZONA

Regional Park.....

Master/Concept Plan



Appendix B

Infrastructure Report

JUNE 2016

Kimley»Horn
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Gilbert's REGIONAL PARK
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1.0 INTRODUCTION

1.1 BACKGROUND

This report documents the existing infrastructure and provides infrastructure recommendations for a proposed 272-acre regional park facility at the southwest corner of the intersection of Queen Creek Road/Higley Road in Gilbert, Arizona. The site will include various sport, playground, and other park-related uses and is assumed to be built out by 2027.

1.2 REPORT PURPOSE AND OBJECTIVES

As part of the Town of Gilbert's (TOG) planned development of the new regional park, considerations for infrastructure improvements required to provide necessary utility services to the park have been made. General outlines of each of the existing utilities in the area are provided in this section, along with high-level recommendations for providing service connections to the proposed park facilities. Utilities considered here include electrical, potable water, irrigation water, wastewater, and communications.

As the area slated for development as the new regional park is primarily bounded by water/floodways/canals and the street frontage is limited, convenient access to most existing utilities is anticipated to be available only in the northeast corner of the proposed park area. With the majority of the rest of the proposed park area within a Non-exclusive Recreational Use Easement from the Flood Control District of Maricopa County (FCDMC), development of permanent facilities requiring utility services away from the TOG-owned parcel in the northeast corner will be limited. Further discussion regarding proposed connections to utilities and routing of utilities within the park will be guided by this assumption.

The Gilbert Regional Park Master / Concept Plan includes a full topographic survey of the entire Chandler Heights basin area and surrounding EMF, Queen Creek and Sonoqui Wash. The survey was completed in January of 2016 utilizing the North American Datum 1983 (NAD83) for horizontal control and the North American Vertical Datum of 1988 (NAVD88).2.1 Background / site location

The proposed development, a 272-acre regional park facility, is located at the southwest corner of the intersection of Queen Creek Road/Higley Road in Gilbert, Arizona. The project location is shown in **Figure 1**.

Major streets adjacent to the development include Higley Road, Queen Creek Road, Greenfield Road and Chandler Heights Road. The recommended vision concept plan is illustrated in **Figure 2**. The site opportunities and constraints map can be found in **Figure 3.**

Figure 1. Vicinity Map

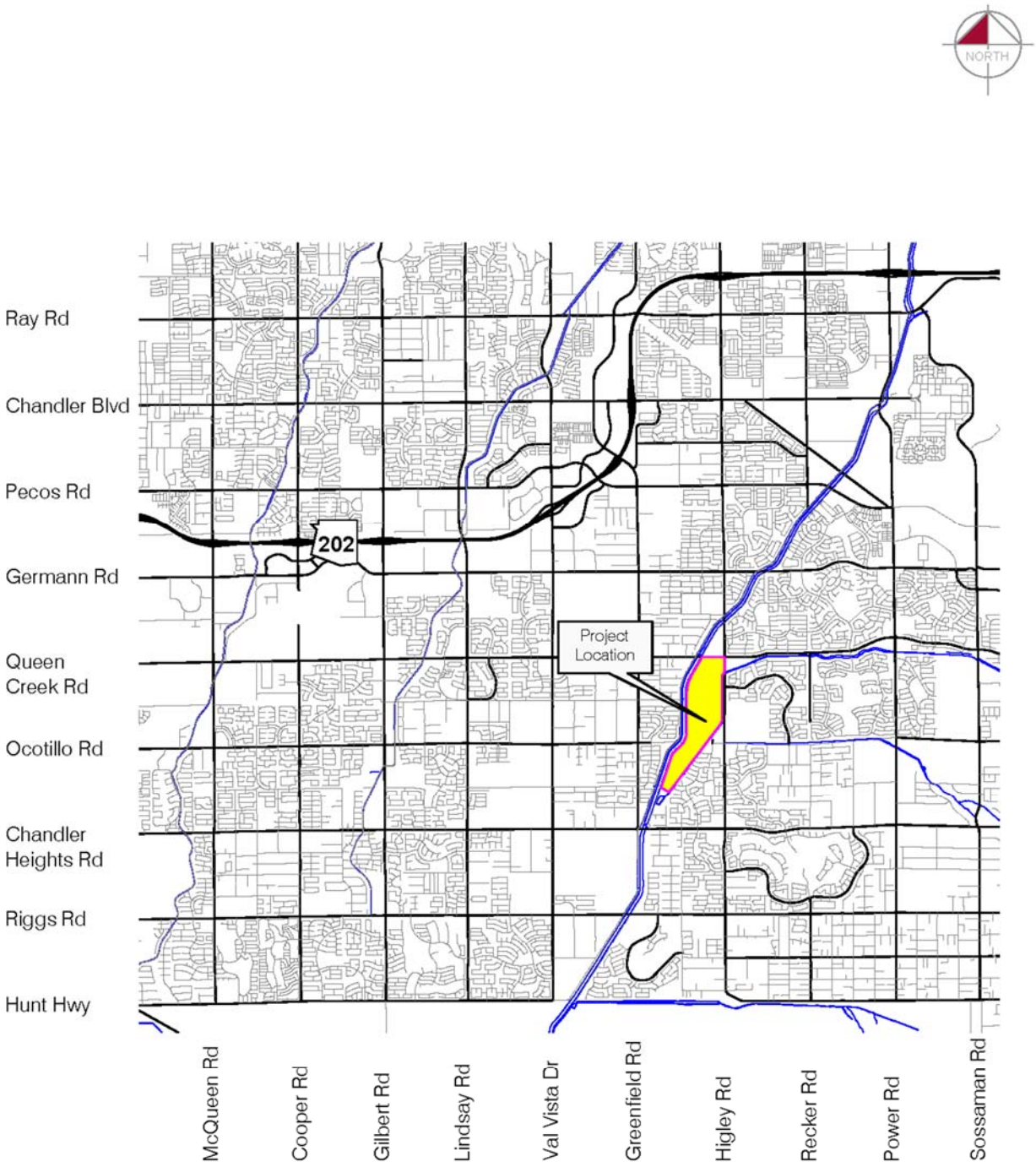
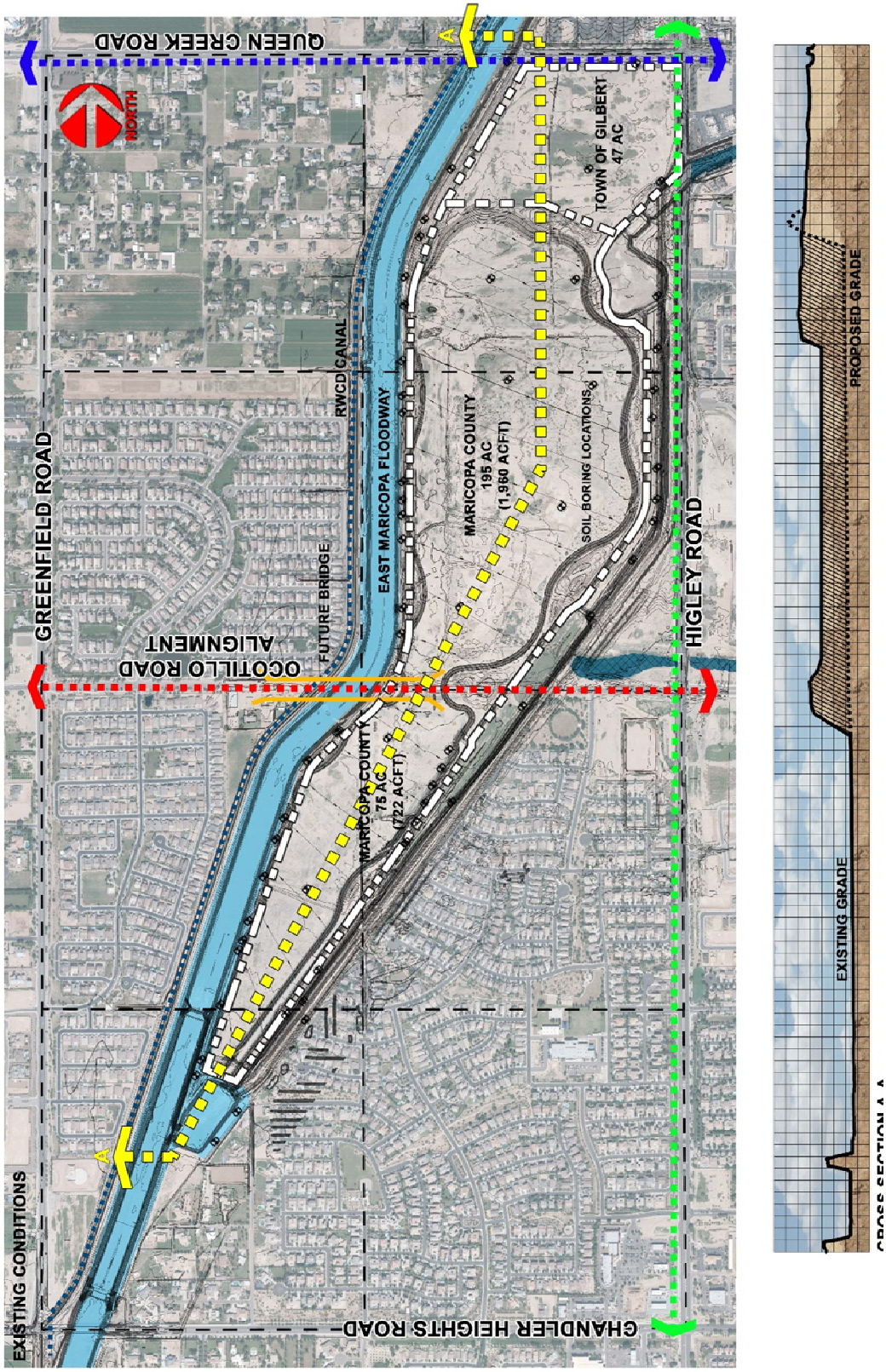


Figure 2. Site Plan

Figure 3. Opportunities & Constraints Map



2.0 EXISTING CONDITIONS

2.1 PROJECT MEETINGS

The consultant team conducted the following meetings to further the discussion regarding existing infrastructure and establish the project requirements for the master plan and final design.

Table 1 – Project Meetings

No.	Meeting	Remarks	Subject	Town Attendees
1	Traffic Impact Study	December 17, 2016 at 3:00PM	Traffic Impact Study	**Attended: Jack Gierak, Leslie Bubke; Consultant: Sean Wozny, Mike Grandy**
2	Gilbert Planning Meeting regarding Recharge Park Expansion on NE of Higley Road	January 20, 2016 at 10:00AM	Meeting with TOG staff on the recharge park and future expansion of east Higley Road & Ocotillo Road Bridge	**Jack Gierak, Eliana Hayes, Mark Horn, Brian Quill, Patty Jordan, Jessica Marlow, Eric Braun, Rob Giles; Consultant: Robert Lyons, Cullen Kinoshita (Aqua)**
3	Greenfield Treatment Facility Meeting	January 20, 2016 at 10:00AM	Meeting with staff to discuss irrigation water source options	Jack Gierak, Eliana Hayes, Mark Horn, Brian Quill, Patty Jordan, Jessica Marlow, Eric Braun, Rob Giles; **Attended: Jack Gierak, Mark Horn, Brian Quill, Patty Jordan, Jessica Marlow, Eric Braun, Rob Giles, Dave Gossman; Consultant: Robert Lyons, Cullen Kinoshita (Aqua)**
4	Reclaimed Water / Well Opportunities Meeting / Potable Water	January 20, 2016 at 10:00AM	Meeting with staff to discuss potable water and irrigation water source options and how the Town's Integrated Water Management Plan may impact the project from an irrigation standpoint,	Jack Gierak, Eliana Hayes, Mark Horn, Brian Quill, Patty Jordan, Jessica Marlow, Eric Braun, Rob Giles; **Attended: Jack Gierak, Mark Horn, Brian Quill, Patty Jordan, Jessica Marlow, Eric Braun, Rob Giles, Dave Gossman; Consultant: Robert Lyons, Cullen Kinoshita (Aqua)**
5	Gilbert Planning Meeting Ocotillo Bridge	January 20, 2016 at 2:30PM	Meeting regarding any initial / previous planning for Ocotillo Road Bridge	Invited: Jack Gierak, Eliana Hayes, Leslie Bubke, Curtis Yardley, Kristin Myers; **Attended: Jack Gierak, Eliana Hayes, Leslie Bubke, Curtis Yardley; Consultant: Sean Wozny, Michael Grandy, Robert Lyons**
6	CIP Planning Meeting	January 20, 2016 at 2:30PM	Meeting to discuss TOG CIP Planned and Current Projects surrounding the proposed project site	Invited: Jack Gierak, Eliana Hayes, Leslie Bubke, Curtis Yardley, Kristin Myers; **Attended: Jack Gierak, Eliana Hayes, Leslie Bubke, Curtis Yardley; Consultant: Sean Wozny, Michael Grandy, Robert Lyons**
7	SRP Electric Meeting to Discuss 69KV Poles on Ocotillo Alignment	January 27, 2016 at 8:30AM	Meeting with SRP to discuss existing power pole alignment	Jack Gierak, Tom Condit, Eliana Hayes, Leslie Bubke; **Attended: Jack Gierak, Leslie Bubke; Consultant: Sean Wozny, Robert Lyons, Pete Syntax, Michael Grandy; Utility Attended: John Ballard SRP, Judy Campbell SRP 12kV, Nenad (Dan) Stevanovic SRP 69kV**
8	Fogging Issue	January 27, 2016 at 8:30AM	Fogging Issue	Jack Gierak, Mark Horn, Patty Jordan, Rob Giles, Rod Buchanan, Doug Hurley; **Attended: Jack Gierak, Mark Horn, Patty Jordan, Rob Giles, Rod Buchanan; Consultant: Sean Wozny, Jeff Kratzke**
9	Gilbert Planning Meeting regarding APN 304-70-007C	January 28, 2016 at 10:00AM	Meeting to discuss triangular piece of property owned by the town on the NWC of Higley and Ocotillo	**Attended: Jack Gierak, Mark Kramer, Linda Edwards, Nichole McCarty, Rob Giles; Consultant: Sean Wozny**
10	Project Analysis Update Meeting	February 2, 2016 at 8:00AM	Meeting to discuss current status of infrastructure analysis	Jack Gierak, Eliana Hayes, Rod Buchanan, Jocelyn Smith; Consultant: Sean Wozny, Robert Lyons
11	Pathway and Trail Connectivity Assessment	January 28, 2016 at 2:30PM	Trail Assessment Meeting	**Attended: Jack Gierak, Eliana Hayes, Rod Buchanan, Rob Giles, John Kennedy, Melanie Dykstra, Leslie Bubke, Kristin Myers**
12	Explore potential opportunities for using RWCD water resources	February 16, 2016 at 11:00AM	Explore potential opportunities for using RWCD water resources	**Jack Gierak, Eliana Hayes, Mark Horn, Jessica Marlow, Eric Braun, Rod Buchanan, Jacob Ellis, Jack Vincent; Consultant: Sean Wozny, Robert Lyons, Doug Macdonald (Aqua)**
13	SRP Undergrounding/Relocate Aesthetic Funds	February 29, 2016 at 10:00AM	SRP Undergrounding/Relocate Aesthetic Funds	**Leslie Bubke, Kristin Myers, Tom Condit, Eliana Hayes, Ballard John, Rob Giles, Rod Buchanan, Jocelyn Smith, Laura Lorenzen; Consultant: Sean Wozny; Utility Attended: John Ballard, SRP**
14	Follow up meeting with RWCD to explore potential opportunities for using RWCD water resources	March 15, 2016 at 10:30AM	Explore potential opportunities for using RWCD water resources	**Jack Gierak, Eliana Hayes, Mark Horn, Jessica Marlow, Eric Braun, Rod Buchanan, Jacob Ellis, Jack Vincent; Consultant: Sean Wozny, Robert Lyons, Doug Macdonald (Aqua); Utility Attended: Brad Strader, Rusty Rea, Karlene Martorana, Tabatha Langland**
15	Internal Meeting with Gilbert Staff and FCDMC to Discuss Three Master Plan Concepts	March 28, 2016 at 9:00AM	Vet Three Concepts with Gilbert and FCDMC	**Attended: Jack Gierak, Rod Buchanan, Rob Giles; Consultant: Sean Wozny; Agency Attended: Scott Vogel, Jeffrey Shelton with FCDMC**

3.0 DATA COLLECTION

3.1 UTILITY FACILITIES AND PROVIDERS WITHIN SITE AREA

The proposed site location is situated within and is surrounded by existing utility infrastructure within Queen Creek, Higley and the Ocotillo alignment. The following utility facilities and companies were notified and maps were collected for the proposed project area. Bluestake design tickets and utility mapping obtained can be found in the appendix of this report. Table 2 provides the existing utilities and providers within the project site area.

Table 2 – Existing Utilities Facilities

No.	Utility Company	Utility	Material	Size	Depth	Location
1	CenturyLink	Communications	Fiber Optic	Conduit size unknown	18-24 inches	Queen Creek Road north and south along park frontage
2	CenturyLink	Communications	Fiber Optic	Conduit size unknown	18-24 inches	Higley Road, west side, along park frontage
3	Cox Communications	Communications	Coaxial / Fiber Optic	Direct Bury / Conduit	18-24 inches	Higley Road - 10 feet east of center line
4	Southwest Gas	Natural Gas	PE	6-inch	24-30 inches	Queen Creek Road south along park frontage, 30 ft south of section line
5	Southwest Gas	Natural Gas	PE	6-inch	24-30 inches	Higley Road, west side, along park frontage
6	Town of Gilbert	Sanitary Sewer	SDR	30-inch	17 feet	Queen Creek Road - 10 feet south of section line
7	Town of Gilbert	Sanitary Sewer	SDR	33-inch	18 feet	Ocotillo Road Alignment
8	Town of Gilbert	Sanitary Sewer	SDR	12-inch	10 feet	Higley Road - 75 feet (Varries) east of center line
9	Town of Gilbert	Potable Water	PVC	16-inch	4 feet	Queen Creek Road - 8 feet north of section line
10	Town of Gilbert	Potable Water	DIP	30-inch	10 feet	Higley Road - 5 feet east of center line
11	Town of Gilbert	Potable Water	PVC	16-inch	4 feet	Higley Road - 30 feet (Varries) east of center line
12	Town of Gilbert	Reclaimed Water	Unknown	18-inch	9 feet	Higley Road - 40 feet (Varries) east of center line
13	Town of Gilbert	Reclaimed Water	Unknown	18-inch	23 feet	Ocotillo Road Alignment
14	City of Mesa	Reclaimed Water	Unknown	72-inch	8 feet	Queen Creek Road - 38 feet south of section line
15	Salt River Project	Electrical	OHE	69KV & 12KV	OHE	Queen Creek Road - 61 feet south of section line, within 10 ft SRP Easement
16	Salt River Project	Electrical	OHE	69KV	OHE	Higley Road, West Side south of Ocotillo Road
17	RWCD	Irrigation	Concrete Channel	Varries	Varries	West of EMF
18	Salt River Project	Communications	None	None	None	None
19	Salt River Project	Water	None	None	None	None
20	Salt River Project	Ground Water	None	None	None	None
21	Salt River Project	Irrigation	None	None	None	None
22	Salt River Project	Generation	None	None	None	None

3.2 AS-BUILT PLANS

The consulting team collected existing as-built plans for the proposed project area. Table 3 provides a listing of the collected as-built plan sets. The following as-built plans were obtained from the Town and can be found at the following sharefile path link: https://kimley-horn.securevdr.com/d-s0ac5f6367484723b

Table 3 – As-Built Plans

As-Built Plan Set	Year	File Name
Coronado Ranch Improvement Plans	2001	1-608.pdf
Ocotillo Road Sewer Interceptor & Reclaimed Water Lines	2002	1-654.pdf
Shamrock Estates, Phase 1	2004	1-845.pdf
Shamrock Estates, Phase 2B	2008	1-846A.pdf
Shamrock Estates, Phase 2 - Ocotillo Road Improvement Plans	2008	1-846B.pdf
Queen Creek Road Sanitary Sewer Extention	1999	3-258.pdf
Town of Gilbert South Gilbert Water System Improvements Zone 2 Transmission Pipelines Phase II	1998	3-275.pdf
Town of Gilbert Improvement Distrit 19	2003	3-367.pdf
Higley Rd. 12-Inch Sanitary Sewer	2013	3-437.pdf
Higley Rd. 16-inch & 30-inch Water Transmission Mains; 18-inch & 42-inch Reclaimed Water, Queen Creek Rd. 42-inch Reclaimed Water Transmission Main	2006	3-464.pdf
Higley Road to Recker Road Roadway Improvements	2008	3-488.pdf
Ocotillo Road to Queen Creek Road - Higley Road Bridge at Sonoqui Wash	2007	3-496.pdf
Ocotillo Road to Queen Creek Road - Road Improvements Queen Creek Bridge Widening Phase 1	2007	3-497.pdf
Ocotillo Road to Queen Creek Road - Road Improvements Queen Creek Bridge Widening Phase 2	2007	3-498.pdf
Higley Road Improvements - 20-inch & 36-inch Water Line	2006	3-499.pdf
Queen Creek Road Improvements - Val Vista Drive to East Maricopa Floodway	2011	3-622A.pdf

4.0 EXISTING UTILITIES

4.1 ELECTRICAL

The project team met with the Salt River Project (SRP) to provide an introduction to the master plan / concept for the Gilbert Regional Park. The goal of the meeting was identify the existing SRP electrical infrastructure in place and define the process for future development for both electrical distribution and transmission infrastructure. SRP facilities groups provided an initial review of the park site as summarized in the table below.

Table 4 – SRP Initial Site Review Summary

No.	SRP Response Group	Conflict Type	Comment	Responder
1	Communications Engineering	No Conflict		T. Damron
2	Distribution Design and Construction East Valley	No Conflict		C. Colins
3	Distribution Planning	No Conflict		E. Palomino
4	Land	Potential Conflict	Electric Facilities within SRP Easements	Cincie Bannerman
5	Line Asset Management	Apparent Conflict	There are 69KV lines along Ocotillo and Queen Creek Roads. The final design whall require the review of roadway and park improvements to make sure design doesn't interfere with maintenance access and set (30 feet along each side of pole).	LaVerne Steah

Existing electrical infrastructure in the vicinity of the proposed park area includes the following:

- SRP 69 kv Transmission and 12 kv distribution overhead electrical along Queen Creek Road (SRP facilities located in existing SRP easement)
- SRP 69 kv transmission overhead electrical along the Ocotillo Road alignment (SRP facilities located in existing SRP easement)
- SRP 12kV overhead along Higley Road

Electrical service to the proposed park can be provided along the Queen Creek Road frontage on the north side of the proposed park area and/or along Higley Road. Electrical service will be provided for the proposed facilities on the TOG-owned portion of the park area, as well as lighting and other minor electrical demands elsewhere in the park. Key electrical loads to consider in design of electrical service and internal system include:

- Facilities on TOG-owned portion of the park
- Proposed ASR well (see irrigation section)
- Proposed irrigation system pump(s) and controls
- Lighting

SRP PROCESS

SRP provided additional information regarding the electrical design process and review / permit timeframes for both transmission and distribution infrastructure which can be found in the appendix of this report.

In addition to considerations for providing electrical service to the proposed park facilities, some consideration should be made concerning the existing SRP 69 kv transmission line running along the Ocotillo Road alignment through the proposed park area. While an underground conversion of this line is possible, the expense would likely outweigh the benefit of performing the conversion. Aesthetic allocation funds may be applied for the underground conversion of this line. With the overhead 69 kv transmission lines in place, restrictions on improvements along the SRP easement would affect park design, including what kind of vegetation can be planted.

4.2 WATER SOURCE OPTIONS

The consultant team met with the Town of Gilbert Water Services / Engineering staff on January 20th, 2016 to discuss and validate irrigation, potable water and sanitary sewer options for the proposed park master plan.

IRRIGATION WATER SOURCE OPTIONS

The Town of Gilbert recognizes reclaimed water as a dependable supply source and has as its policy to whenever possible, incorporate the use of reclaimed water. Gilbert's reclaimed water distribution system is continuously pressurized. System pressure is typically between 30 and 60 psi which may require the end user to install a reservoir and booster pump system if higher pressures are needed.

Gilbert currently operates two water reclamation facilities (WRF) that treat sewage and produce A+ quality reclaimed water, with a loss of approximately 8 to 10% of the influent total to sludge (solids) treatment. The Greenfield WRF is a joint facility operated in partnership with the City of Mesa and the Town of Queen Creek. The plant capacity is currently 16 MGD, with 8 MGD of capacity available to Gilbert, and is planned to be expanded to treat up to 42 MGD, with Gilbert's share of the capacity at 16 MGD.

Last year, reclaimed water demands on their highest day in July used all but 300k gallons of the reclaimed water available, so 0.3 MGD is the reclaimed water volume that is potentially currently available. Currently, Queen Creek is not utilizing its 1 MGD allotment of reclaimed water from the Greenfield plant. Mesa and Gilbert have been splitting this 1 MGD. Once Queen Creek has infrastructure in place to utilize its allotment, Gilbert's supply from Greenfield will be reduced by 0.5 MGD.

Another option discussed was to use an ASR well on the park site to supplement water source during peak demands and to also be used to recharge during winter months. The reclaimed water is of high quality and not anticipated to present any issues.

The following existing irrigations water source options were identified from the data collection project phase:

- Queen Creek Road: 42-inch Reclaimed Water Line – This existing line is low pressure and would require coordination with Mesa to operate and therefore it is not preferred to be used for park irrigation source water.
- Higley Road: 42-inch Reclaimed Water Line – Continuation of the Queen Creek Road reclaimed water main line with low pressure and would require coordination with Mesa to operate and therefore it is not preferred to be used for park irrigation source water.
- Higley Road: 18-inch Reclaimed Water Line – Provides irrigation source water for the single family residential developments east of Higley Road.
- Ocotillo Road Alignment: 18-inch Reclaimed Water Line – This existing line maintains 50 psi of pressure and would be the preferred source for reclaimed water for the irrigation water source.

The pump station that services this line has room for additional pumps. Current major users of this water are Seville and Adora Trails.

ROOSEVELT WATER CONSERVATION DISTRICT (RWCD)

The consulting team met with the RWCD on February 16th, 2016 and March 18, 2016 to discuss potential irrigation source water options as well as pedestrian bridge crossings of the RWCD canal.

- Roosevelt Water Conservation District (RWCD) – Conveying water through the RWCD canal from other suppliers to a location near the proposed site through a "Wheeling Agreement".
- RWCD developing a "Long Term Storage Credit Exchange Agreement" to use surface water within the RWCD canal.
- Relocation of an existing RWCD groundwater well near the Appleby Road alignment and providing a piped conveyance from the new well location, north along the RWCD Canal to Queen Creek Road, east across the EMF to a discharge point at the park site.

After further research, RWCD representatives determined that neither a "Wheeling Agreement" nor a "Long Term Storage Credit Exchange Agreement" for water within the canal is feasible due to legal and jurisdictional issues related to "Waters of the United States", and that an exchange agreement for treated effluent water is not an acceptable option for the Town of Queen Creek. Therefore, each of these water resource options were deemed unfeasible.

The third option regarding the relocation of an existing RWCD groundwater well, according to RWCD representatives the capacity of the existing well is approximately 2,500,000 GPD and therefore is capable of accommodating the anticipated peak season irrigation demands for the proposed site. This option would require a "Long Term Storage Credit" agreement between RWCD and TOG to use the groundwater. In addition, the Town of Gilbert would be responsible for capping the existing well, drilling the new well, installing the new well pump and controls, and installing the new conveyance infrastructure. RWCD representatives indicated "order-of-magnitude" costs for drilling the well of $500,000, and approximately $200,000 for the new well pump and control instrumentation. The conveyance infrastructure is anticipated to require installation of approximately 4,800 LF of 8-inch PVC buried transmission pipe, and 500 LF of 8-inch Steel pipe attached to the Queen

Creek Road bridge over the EMF. Preliminary estimates identify construction costs for this conveyance piping to be approximately $150,000. Therefore, the total cost for construction of this potential water source is approximately $850,000.

IRRIGATION WATER OPTIONS SUMMARY

Table 4 outlines several options for providing the required irrigation water for the proposed park area and provides a comparison of costs, schedule, feasibility, and maintenance required for each.

Table 5 – Irrigation Water Options Summary Table

Source	Cost		Schedule	Feasibility	Maintenance
	Initial	Ongoing			
18-inch RW (Ocotillo)	Low	Low	12 months	High - but other sources needed to supplement	Low
New ASR Well	High	Moderate	24 Months	High – Could also reduce required percolation capacity at South Recharge Facility	Moderate
42-inch RW (Queen Creek)	Low	Low	12 months	Moderate - Low pressure line, would also require coordination with Mesa	Low
RWCD - Well Rehabilitation	High	High	42 months	Low - would require ADWR coordination for service area adjustment	Low
RWCD - Wheeling	Low	High	30 months	Low - would trigger designation as "Waters of the US"	Low

IRRIGATION SUPPLY & DEMAND

Demand Calculation

Based off the recommended concept plan the total turf areas include 25 acres for fields and 45 acres for turf areas. The plan also includes 37 acres for landscape plantings (shrubs and trees). Based on these acreages the peak irrigation demand is 2,794 GPM. This results in a peak daily requirement of 1,085,404 Gallons / Day. The seasonal irrigation water requirement is 572 acre-feet per year.

The daily irrigation water application requirement for the sports turf is 11,000 gallons, turf is 8,800 gallons and planting areas is 5,500 gallons. Based on an eight hour, six day a week irrigation watering window the required flow for the sports field is 36 gpm, turf areas 29 gpm, and the planting areas is 18 gpm. Please refer to the Irrigation Report for the detailed demand analysis and calculations. Tables 6a, 6b & 6c provide the irrigation demand summary for the three park concepts.

Table 6a – Irrigation Demand Summary: Water Use Input

Irrigation Water Use: Input			
Landscape Type	Peak Demand per Acre (GPM/ Acre)	Peak Daily Requirement per Acre (Gallons/Day per Acre)	Seasonal Irrigation Requirement per Acre Acre-feet per Acre
Ballfields	35	11,586	6.0
Turf Areas	28	9,269	4.8
Plantings	18	5,798	3.0

8	=Assumed usable average lake depth, ft
6.3	=Estimated annual lake evaporation, ft

Table 6b – Irrigation Demand Summary: Water Use Output

Irrigation Water Use: Output									
Landscape Concept	Irrigated Areas (Acres**)			Peak Demand (GPM/Acre)	Peak Daily Requirement* (Gallons/Day)	Seasonal Requirement* (Acre-Feet per	Lake Area (Acres)	Usable Pond Storage** (Acre-Feet)	Days of Storage For Current Lake Concept*
	Ballfields	Turf Areas	Plantings						
1	24.8	45.2	36.9	2,794	1,085,404	571.7	15.46	107.4	32
2	40.3	13.7	41.6	2,535	967,107	508.4	12.4	85.0	29
3	18.0	39.5	32.8	2,323	993,446	528.8	21.34	155.2	51

*Including evaporation from lake

**Calculated using CAD tools

Table 6c – Irrigation Demand Summary: Pond Storage Requirement

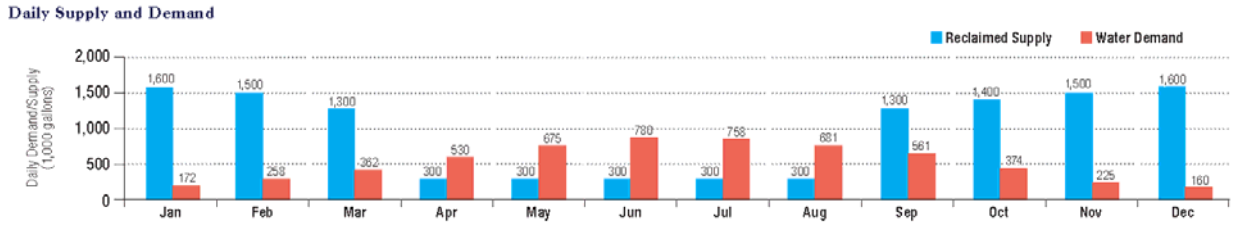
Pond Storage Requirement for the Following Days of Storage (Acre-Feet)					
2	3	5	7	10	14
6.7	10.0	16.7	23.3	33.3	46.6
5.9	8.9	14.8	20.8	29.7	41.6
6.1	9.1	15.2	21.3	30.5	42.7

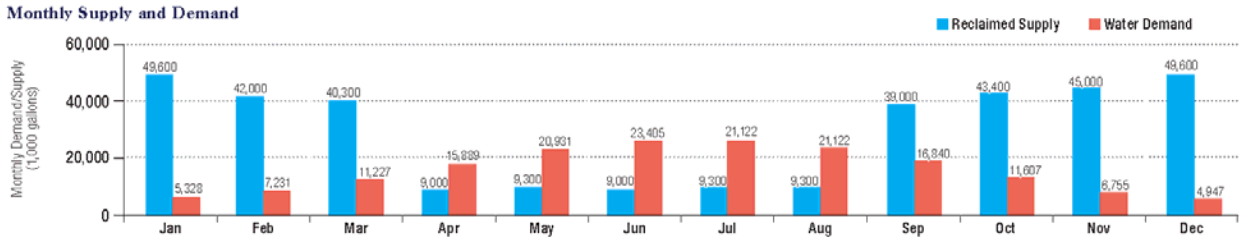
<u>Irrigation Reclaimed Water Supply and Demand Balance</u>

Based on this supply and demand study, it is estimated that the off-peak months of January through March and September through December will provide a reclaimed water supply surplus of approximately 237 million gallons. The remaining months of the year all show a supply deficit totaling approximately 71.5 million gallons, resulting in a net annual supply surplus of approximately 165.5 million gallons from the available reclaimed water source.

If the Town of Gilbert decides to pursue their preference for developing an on-site ASR Well, then the surplus months can be used to recharge the entire volume of groundwater that will need to be withdrawn using their available Long Term Storage Credits during the deficit months. Table 6 provides the irrigation supply summary.

Table 7 – Irrigation Water Supply Summary Table





IRRIGATION RECOMMENDATION

The recommended irrigation alternative is to utilize the existing Town of Gilbert 18-inch reclaimed water main within the Ocotillo Road alignment to provide the park with reclaimed water as the irrigation water source. The park site shall utilize an onsite lake (8-acre surface area lake with depth of 15 feet) to provide the required irrigation source storage. Due to the current reclaimed water line allotments and seasonal use the park will need to utilize an aquafer storage recovery (ASR) well to offset the current reclaimed water deficit during the peak seasonal months. The reclaimed water from the 18-inch line within the Ocotillo alignment shall provide the water to the ASR well during the off peak months where the reclaimed water supply is available. The ASR well will utilize a pump to fill the on-site lake. Irrigation water for the turf fields, turf areas and planting areas will drawdown the reclaimed water from the lake to provide the required irrigation.

POTABLE WATER

Potable water lines around the proposed park area include:

- 16-inch waterline along Queen Creek Road
- 16-inch waterline along Higley Road
- 30-inch waterline along Higley Road

POTABLE WATER SERVICE RECOMMENDATIONS

Potable water service for the proposed park amenities could be provided through two existing 8-inch water stubs from the 16-inch waterline along Queen Creek Road to the TOG-owned parcel in the northeastern part of the proposed park. As any anticipated fire flow required would be for proposed

facilities on this parcel, these stubs would provide the required flows and pressures without a need for additional connections to existing mains elsewhere along the park boundary.

Water for park amenities within the FCDMC portion of the park should be provided through an internal loop of small diameter pipe. Service for restrooms, drinking fountains, etc. can be provided by this internal loop without installing additional connection Town water mains.

Final water design shall require final design water reports and current flow tests of the existing 16-inch water main. Final plan submittals for review and approval by the Town of Gilbert. Review of potable and irrigation water plans with Maricopa County Environmental Services.

4.3 WASTEWATER

Existing wastewater infrastructure surrounding the proposed park area include:

- 30-inch sewer line along Queen Creek Road
- 33-inch sewer line along the Ocotillo Road alignment
- 12-inch sewer line along Higley Road

SANITARY SEWER RECOMMENDATIONS

For the facilities on the TOG-owned portion of the proposed park area, a sewer service connecting to the existing 30-inch sewer line along Queen Creek Road could convey sewer loads to the Town sanitary sewer system.

In order to avoid a costly crossing of the Queen Creek Canal east of the property, the possibility of connecting to the existing 33-inch sewer line along the Ocotillo Road alignment is recommended. Facilities in the FCDMC area both north and south of the Ocotillo Road alignment that require permanent sewer service connections may be serviceable by this 33-inch line.

Final sanitary sewer design shall require a final design sewer reports. Final plan submittals for review and approval by the Town of Gilbert. Review of sanitary sewer plans with Maricopa County Environmental Services.

4.4 COMMUNICATIONS

Existing communications infrastructure surrounding the proposed park area includes:

- Cox Communications along Queen Creek Road
- Centurylink along Higley Road

Permanent external communications equipment that would utilize the available networks would likely be confined to the TOG-owned portion of the proposed park area. Service could be provided at either main park entry along Queen Creek Road or Higley Road.

Communications to and from park mechanical equipment (ASR well, irrigation controllers, lake fill controls, lift/grinder station if needed) could utilize an internal communications network that would limit the number of antenna locations required to integrate the equipment with Town SCADA network.

5.0 TRANSPORTATION

5.1 EXISTING ROADWAY

The existing roadway network within the study area includes the following roadways. The existing intersection lane use and traffic control is shown in Figure 4.

Higley Road currently extends north-south with three lanes in each direction with a raised center median. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway, directly adjacent to the project site. The Town of Gilbert classifies Higley Road as a major arterial roadway and the posted speed limit is 45 miles per hour (mph) in both directions. Higley Road bridges the RWCD Canal and EMF north of Queen Creek Road and bridges crossing of the Queen Creek Channel south of Queen Creek Road.

Existing right-of-way is 73 ft from roadway center line to the west and 70 ft to the east for a total of 143 ft total right-of-way.

The pavement structural section is 1-1/2 inches AC (A-12.5) surface course over 2-1/2 inches AC (A-19) base course (total asphalt pavement section of 4-inches). The asphalt pavement is placed over 15-inches of aggregate base course for a total pavement structural section of 19-inches.

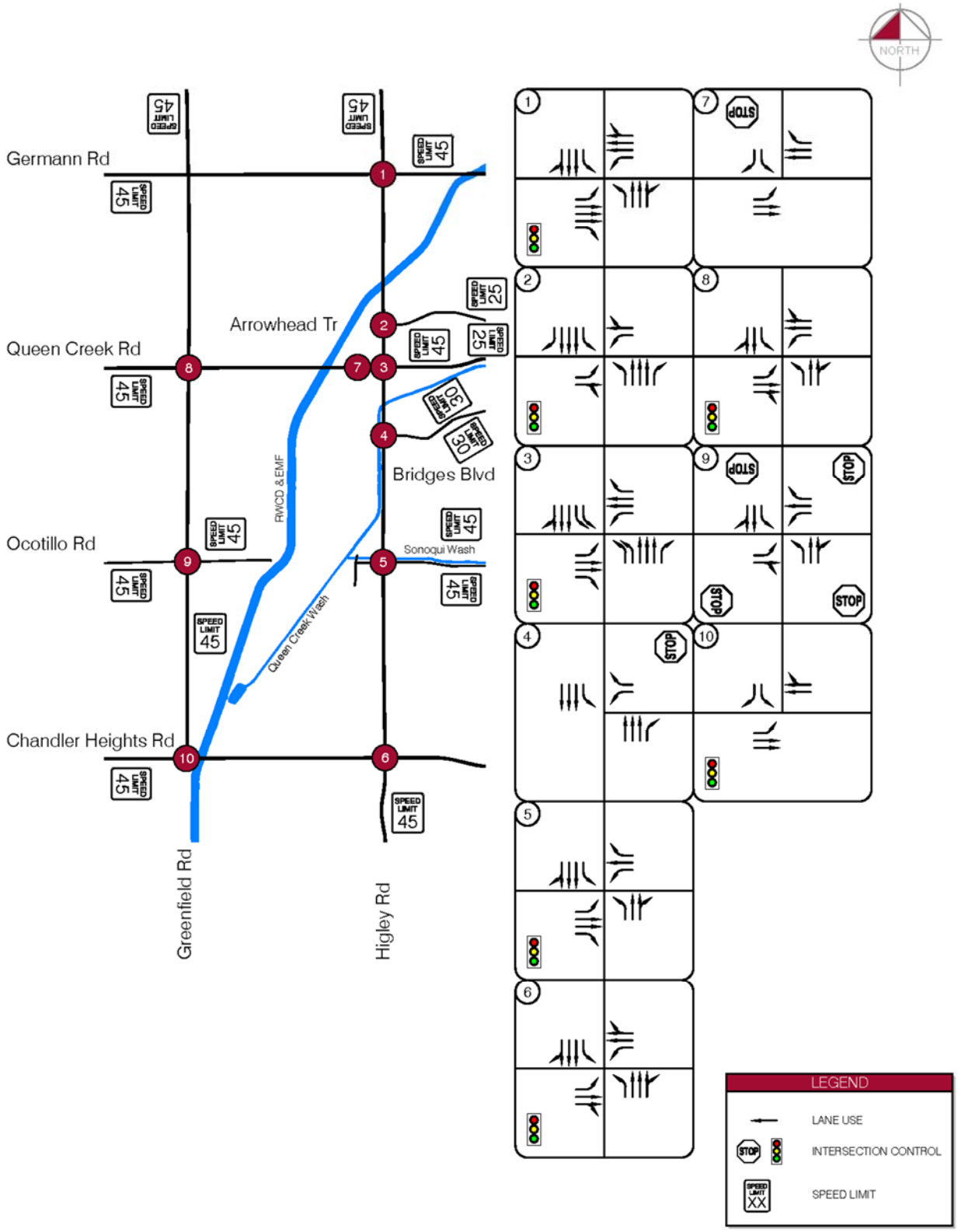
Greenfield Road currently extends north-south with two lanes in each direction with a center two-way left-turn lane (TWLTL). There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. The Town of Gilbert classifies Greenfield Road as a minor arterial roadway and the posted speed limit is 45 mph in both directions.

Queen Creek Road currently extends east-west with two lanes in each direction with the majority of the roadway containing a center TWLTL. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. The center TWLTL transitions into raised medians approaching most major signalized intersections, including the intersections with Higley Road and Greenfield Road. The Town of Gilbert classifies Queen Creek Road as a minor arterial roadway and the posted speed limit is 45 mph in both directions. Queen Creek Road bridges the RWCD Canal and EMF east of Germann Road. Existing right-of-way is 65 ft from roadway center line on both sides for a total right-of-way of 130 ft.

The pavement structural section is 1-1/2 inches AC (A-12.5) surface course over 2-1/2 inches AC (A-19) base course (total asphalt pavement section of 4-inches). The asphalt pavement is placed over 4-inches of aggregate base course over 6-inches of cement treated subgrade for a total pavement structural section of 14-inches.

Chandler Heights Road currently extends east-west with two lanes in each direction with a center TWLTL. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. The Town of Gilbert classifies Chandler Heights Road as a minor arterial roadway and the posted speed limit is 45 mph in both directions. Chandler Heights Road bridges the RWCD Canal and EMF east of Greenfield Road.

Figure 4 – Existing Roadway Network



Germann Road currently extends east-west with three lanes in each direction with a raised center median. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. The Town of Gilbert classifies Germann Road as a major arterial roadway and a road of regional significance. The posted speed limit is 45 mph in both directions.

Ocotillo Road currently extends east-west and is not continuous through the project site between Greenfield Road and Higley Road. The road currently terminates approximately 1,500 ft east of Greenfield Road and approximately 750 ft west of Higley Road due to the RWCD Canal and EMF. Ocotillo Road contains two lanes in each direction with a center TWLTL east of Greenfield Road and one lane in each direction west of Greenfield Road. There is no curb or gutter west of Greenfield Road, but curb and gutter and dedicated bicycle lanes exist on both sides of Ocotillo Road east of Greenfield Road until the roadway ends just west of the RWCD Canal and EMF. East of the RWCD Canal, EMF and Queen Creek channel, Ocotillo Road has two lanes in the westbound direction and one in the eastbound direction with a center TWLTL. This portion of Ocotillo Road has curb and gutter only on the southern portion of the roadway until the intersection with Higley Road, where curb and gutter on both sides of the roadway resumes. The Town of Gilbert classifies Ocotillo Road as a minor arterial roadway and the posted speed limit is 45 mph in both directions.

The Town of Gilbert has identified the need for Ocotillo Roadway improvements within the current capital improvement projects program with design identified to begin in 2020. The Town of Gilbert completed a preliminary design report in 2000 (see appendix of this report) that identified a potential alignment for Ocotillo Roadway improvements. The Ocotillo bridge will need to consider the following crossing areas:

- The crossing of Queen Creek Channel will span 200 foot bottom width with Sonoqui Wash to the north.
- The top width will be approximately 325 feet if the 4:1 side slopes are used.
- The crossing of the Chandler Heights basin connection will also span a 200-foot bottom width, with a top width of approximately 300 feet using 4:1 side slopes.
- The crossing of the EMF will also span a 200 foot bottom width, and the existing top width outside the access roads on each side is approximately 340 feet.
- Immediately west of the EMF is the RWCD canal. The apparent top width to be spanned will be approximately 50 feet.

Arrowhead Trail currently extends east-west with one lane in each direction. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. Arrowhead Trail services commercial retail stores west of Higley Road and provides access to residential areas east of Higley Road. The Town of Gilbert classifies Arrowhead Trail as a collector roadway and the posted speed limit is 25 mph in both directions.

Bridges Boulevard currently extends east-west with two lanes in each direction and a raised center median. There are curb and gutter and dedicated bicycle lanes on both sides of the roadway. The Town of Gilbert classifies Bridges Boulevard as a collector roadway and the posted speed limit is 30 mph in both directions.

APPENDIX A

BLUESTAKE DESIGN TICKET

Your markings should be completed by 5 P.M. on (due date) Arizona 811 cannot guarantee response. It is your responsibility to visually check the job site and make sure all utilities have been marked or have otherwise responded prior to digging. If a response has not been received from every facility owner listed on the ticket, you must contact Arizona 811 to process a priority notice. The marks are valid for 15 working days, excluding weekends and state-recognized holidays. Should your work continue beyond the 15-working-day time period, contact Arizona 811 three weeks from today to process an Update. Do you understand?

Site #1

Ticket No: 2015112400365.000 DESIGN

Send To: Map Ref:

Original Due Date: / / Time: :
Transmission Date: 11/24/2015 Time: 10:25 AM Op: WEB-RIA.HENDRICKSON
Work Start Date: 12/11/2015 Time: 8:00 AM

Due Date: 12/10/2015 Time: 5:00 PM
Location of Work: STREET ADDRESS: N HIGLEY RD, CROSS STREET: E OCOTILLO RD
: DESIGN REQUEST ONLY- PLEASE SEND PRINTS AND PLANS
Type of Work: ALL UTILITIES - NEW SERVICE
Hundred Block: Explosives: N Permit#: NO
ACCESS IS OPEN ADDRESS IS POSTED
Overhead: N Job#: 00000 Offsets: Y

Remarks: ***Boring = NO
: PLEASE EMAIL ALL PLANS TO RIA.HENDRICKSON@KIMLEY-HORN.COM

Company: KIMLEY-HORN & ASSOCIATES-PHOENIX Best Time: 12/07/15
Contact Name: RIA HENDRICKSON Phone: (602)678-3432
Fax Phone:
Alt. Contact Phone:

State: AZ County: MARICOPA City: GILBERT
Address: Street: N HIGLEY RD
Twp: 2S Rng: 6E Sect-Qtr: 15-NE

Lat/Lon: 33.2631920 -111.7293060 33.2631920 -111.7206310
33.2559180 -111.7206310 33.2559180 -111.7293060

CITY OF MESA UTILITIES Type: CHILLED WATER,ELECTRIC,FIBER,GAS,RECLAIMED WATER,SEWER,STORM DRAINS,STREET LIGHTS,TRAFFIC SIGNALS,WATER
COX COMMUNICATIONS - MARICOPA Type: CATV,FIBER
CTLQL - CENTURYLINK Type: COAXIAL,FIBER
ROOSEVELT WATER CONSERVATION DISTRICT Type: IRRIGATION
SALT RIVER PROJECT - MARICOPA COUNTY Type: COMMUNICATION,ELECTRIC,FIBER,IRRIGATION
SOUTHWEST GAS CONTRACT LOCATOR SE Type: GAS
TOWN OF GILBERT Type: FIBER,RECLAIMED WATER,SEWER,STREET LIGHTS,TRAFFIC SIGNALS,WATER

Above, we have provided the names of underground facility owners affected by your excavation. If a telephone number is listed, you must contact that facility owner directly to notify them of your excavation (pursuant to A.R.S. Article 6.3, Section 40-360.32).

Status	Member Name	Facility Type(s)	Marking Color(s)	Contact	Phone Number (s)	Emergency Phone	Last Response	Service Area Code	Excavator Comment	Date
Sent	City of Mesa Utilities	CHILLED WATER, ELECTRIC, FIBER, GAS, RECLAIMED WATER, SEWER, STORM DRAINS, STREET LIGHTS, TRAFFIC SIGNALS, WATER	BLUE,ORANGE W/F,YELLOW,GREEN,RED	Dennis Bott	(480) 390 - 8763	(480) 644 - 4277	No Response	MSAALL01		
Sent	Cox Communications - Maricopa	CATV, FIBER	Orange, Orange w/F	USIC Dispatch (operates 24x7)	(800) 778 - 9140	(800) 778 - 9140	No Response	COXALL01		
Sent	CTLQL - CenturyLink	COAXIAL, FIBER	ORANGE, ORANGE w/F	ELM Locating Recalls and Unknowns:	(623) 780 - 3350	(800) 283 - 4237	No Response	QLNAZ101		

				East						
Sent	Roosevelt Water Conservation District	IRRIGATION	Blue	EJ Rusiski	(480) 988 - 9586	(480) 988 - 9586	No Response	RWCDIR01		
Sent	Salt River Project - Maricopa County	COMMUNICATION, ELECTRIC, FIBER, IRRIGATION	Blue, Orange, Orange w/F, Red	SRP Blue Stake	(602) 236 - 8026	(602) 236 - 3976	No Response	SRPALL01		
Sent	Southwest Gas Contract Locator SE	GAS	YELLOW	ELM Locating Dispatch	(623) 780 - 3350	(602) 271 - 4277	No Response	SWGCLSE		
Sent	Town of Gilbert	FIBER, RECLAIMED WATER, SEWER, STREET LIGHTS, TRAFFIC SIGNALS, WATER	ORANGE w/F,Purple,Green,Red,Blue	Steve Notch - Locate Supervisor	(480) 503 - 6417	(480) 372 - 1240	No Response	GILBRT_1		

Your markings should be completed by 5 P.M. on (due date) Arizona 811 cannot guarantee response. It is your responsibility to visually check the job site and make sure all utilities have been marked or have otherwise responded prior to digging. If a response has not been received from every facility owner listed on the ticket, you must contact Arizona 811 to process a priority notice. The marks are valid for 15 working days, excluding weekends and state-recognized holidays. Should your work continue beyond the 15-working-day time period, contact Arizona 811 three weeks from today to process an Update. Do you understand?

Site #2

Ticket No: 2015112400383.000 DESIGN

Send To: Map Ref:

Original Due Date: / / Time: :
Transmission Date: 11/24/2015 Time: 10:35 AM Op: WEB-RIA.HENDRICKSON
Work Start Date: 12/11/2015 Time: 8:00 AM

Due Date: 12/10/2015 Time: 5:00 PM
Location of Work: STREET ADDRESS: N HIGLEY RD, CROSS STREET: E OCOTILLO RD
: DESIGN REQUEST ONLY- PLEASE SEND PRINTS AND PLANS
Type of Work: ALL UTILITIES - NEW SERVICE
Hundred Block: Explosives: N Permit#: NO
ACCESS IS OPEN ADDRESS IS POSTED
Overhead: N Job#: 000002 Offsets: Y

Remarks: ***Boring = NO
: PLEASE EMAIL ALL PLANS TO RIA.HENDRICKSON@KIMLEY-HORN.COM

Company: KIMLEY-HORN & ASSOCIATES-PHOENIX Best Time: 12/07/15
Contact Name: RIA HENDRICKSON Phone: (602)678-3432
Fax Phone:
Alt. Contact Phone:

State: AZ County: MARICOPA City: GILBERT
Address: Street: N HIGLEY RD
Twp: 2S Rng: 6E Sect-Qtr: 15-SE

Lat/Lon: 33.2559440 -111.7293060 33.2559440 -111.7206010
33.2486700 -111.7206010 33.2486700 -111.7293060

CITY OF CHANDLER Type: RECLAIMED WATER,SEWER,WATER
COX COMMUNICATIONS - MARICOPA Type: CATV,FIBER
CTLQL - CENTURYLINK Type: COAXIAL,FIBER
ROOSEVELT WATER CONSERVATION DISTRICT Type: IRRIGATION
SALT RIVER PROJECT - MARICOPA COUNTY Type: COMMUNICATION,ELECTRIC ,FIBER,IRRIGATION
SOUTHWEST GAS CONTRACT LOCATOR SE Type: GAS
TOWN OF GILBERT Type: FIBER,RECLAIMED WATER,SEWER,STREET LIGHTS,TRAFFIC SIGNALS,WATER

Above, we have provided the names of underground facility owners affected by your excavation. If a telephone number is listed, you must contact that facility owner directly to notify them of your excavation (pursuant to A.R.S. Article 6.3, Section 40-360.32).

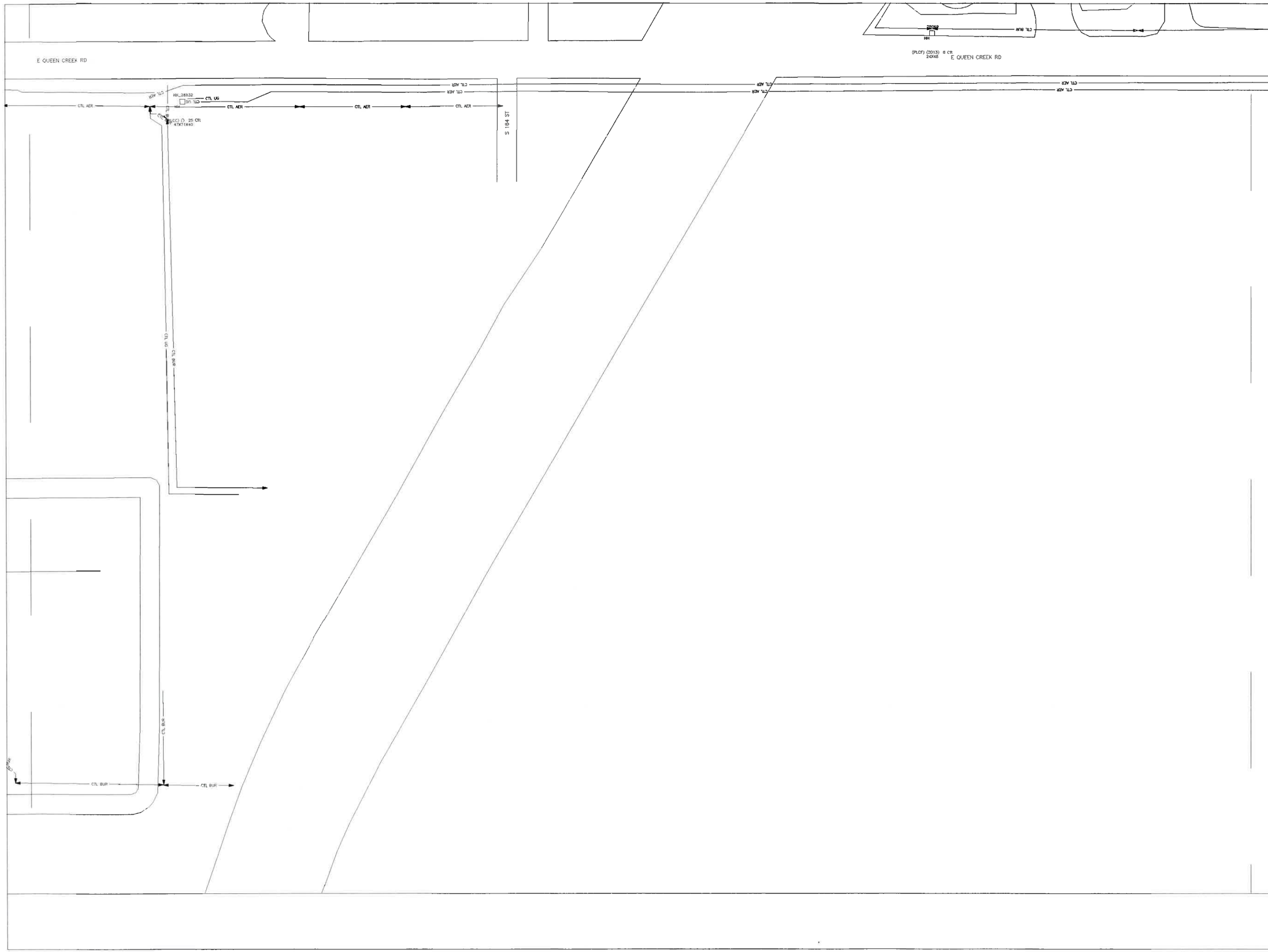
Status	Member Name	Facility Type(s)	Marking Color(s)	Contact	Phone Number (s)	Emergency Phone	Last Response	Service Area Code	Excavator Comment	Date
Sent	City of Chandler	RECLAIMED WATER, SEWER, WATER	Purple, Green, Red, Blue	Jeff Auker (util. field supvr.)	(480) 782 - 3705	(602) 450 - 4477	No Response	CHAN_3		
Sent	Cox Communications - Maricopa	CATV, FIBER	Orange, Orange w/F	USIC Dispatch (operates 24x7)	(800) 778 - 9140	(800) 778 - 9140	No Response	COXALL01		
Sent	CTLQL - CenturyLink	COAXIAL, FIBER	ORANGE, ORANGE w/F	ELM Locating Recalls and Unknowns: East	(623) 780 - 3350	(800) 283 - 4237	No Response	QLNAZ101		
Sent	Roosevelt Water Conservation District	IRRIGATION	Blue	EJ Rusiski	(480) 988 - 9586	(480) 988 - 9586	No Response	RWCDIR01		
Sent	Salt River Project - Maricopa	COMMUNICATION, ELECTRIC, FIBER, IRRIGATION	Blue, Orange, Orange w/F, Red	SRP Blue Stake	(602) 236 - 8026	(602) 236 - 3976	No Response	SRPALL01		

	County									
Sent	Southwest Gas Contract Locator SE	GAS	YELLOW	ELM Locating Dispatch	(623) 780 - 3350	(602) 271 - 4277	No Response	SWGCLSE		
Sent	Town of Gilbert	FIBER, RECLAIMED WATER, SEWER, STREET LIGHTS, TRAFFIC SIGNALS, WATER	ORANGE w/F,Purple,Green,Red,Blue	Steve Notch - Locate Supervisor	(480) 503 - 6417	(480) 372 - 1240	No Response	GILBRT_1		

APPENDIX B

UTILITY MAPS

T2S R1E Sec 15 NE



CALL AT LEAST TWO (2) FULL WORKING
BEFORE YOU BEGIN EXCAVATIO
ARIZONA 811
ARIZONA BLUE STAKE, INC
DIAL 8-1-1 OR 1-800-STAKE-IT (7
IN MARICOPA COUNTY: 602-2
ALL LOCATIONS ARE APPRO
PLEASE CALL ARIZONA BLU
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PRINTS ARE NOT TO

CENTURYLINK CONFIDENTIAL AND PROPRIETARY INFORMATION. DISCLOSED TO GOVERNMENTAL AGENCY PURSUANT TO LAW. NOT TO BE DISCLOSED BY GOVERNMENTAL AGENCY TO ANY THIRD PARTY WITHOUT WRITTEN AUTHORIZATION BY CENTURYLINK INC..

CenturyLink™

WIRE CENTER
HIGLEY
ARIZONA

Grid ID: (Lat/Long)
33.25903/-111.72924

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

T2S R6E Sec 15 NE

CALL AT LEAST TWO (2) FULL WORKING DAYS
BEFORE YOU BEGIN EXCAVATION.
ARIZONA LAW
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-800-782-5348 (782-5348)
IN MARICOPA COUNTY 602-263-1100
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION.
PRINTS ARE NOT TO SCALE

CENTURYLINK CONFIDENTIAL AND PROPRIETARY INFORMATION. DISCLOSED TO GOVERNMENTAL AGENCY PURSUANT TO LAW. NOT TO BE DISCLOSED BY GOVERNMENTAL AGENCY TO ANY THIRD PARTY WITHOUT WRITTEN AUTHORIZATION BY CENTURYLINK INC..

CenturyLink™

WIRE CENTER
HIGLEY
ARIZONA

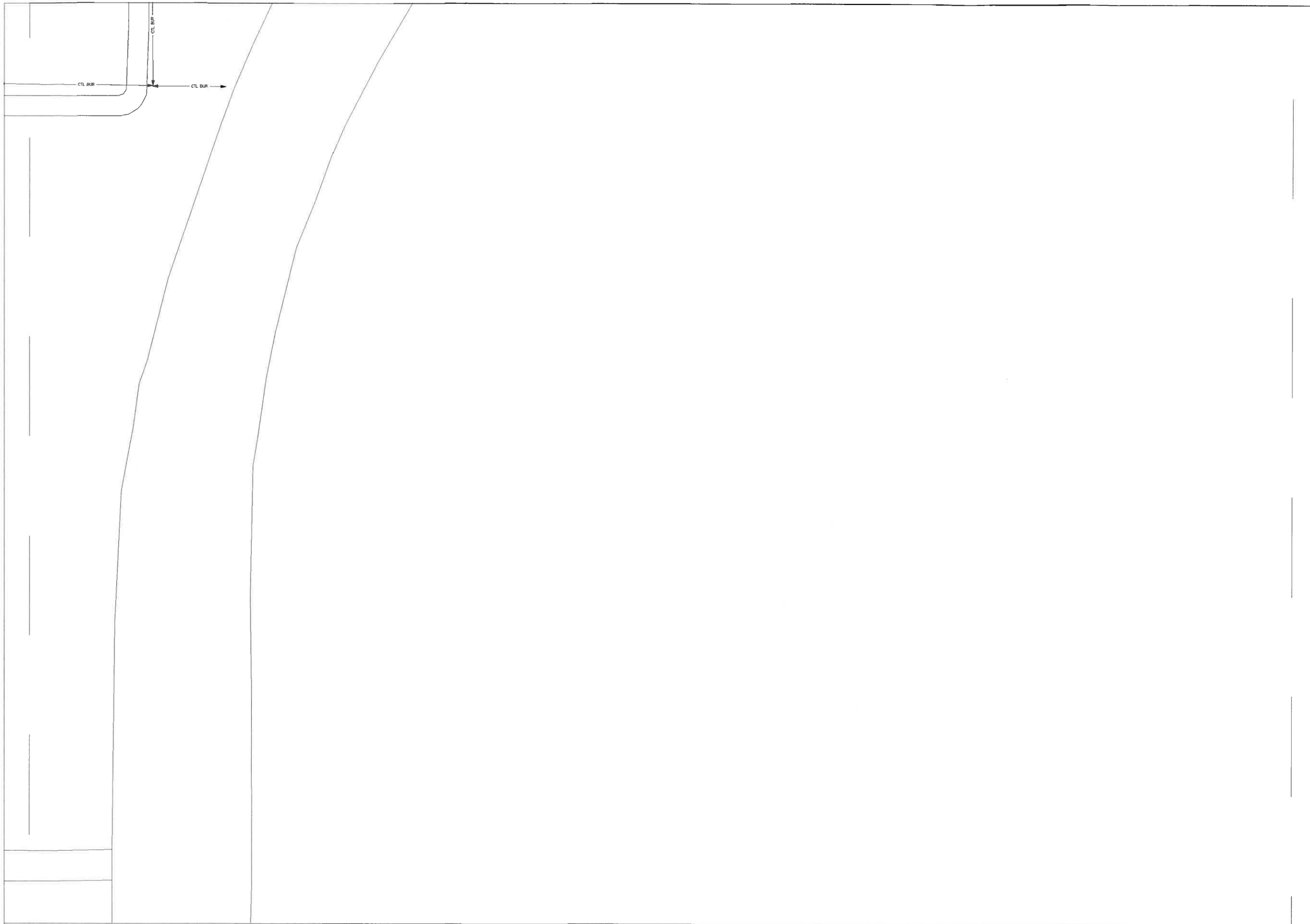
Grid ID: (Lat/Long)
33.25902/-111.72651

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

T2S R10E Sec 15 NE



CALL AT LEAST [illegible] BEFORE YOU [illegible] EXCAVATION.
ARIZONA [illegible]
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-[illegible] (602-263-1100 [illegible] 1-[illegible]-5948)
IN MARICOPA COUNTY
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUE STAKE
FOR LOCATION OF UTILITIES
AND PROCEED ONLY EXCAVATION.
PRINTS ARE NOT TO SCALE

CENTURYLINK CONFIDENTIAL AND PROPRIETARY INFORMATION. DISCLOSED TO GOVERNMENTAL AGENCY PURSUANT TO LAW. NOT TO BE DISCLOSED BY GOVERNMENTAL AGENCY TO ANY THIRD PARTY WITHOUT WRITTEN AUTHORIZATION BY CENTURYLINK INC..

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WIRE CENTER
HIGLEY
ARIZONA

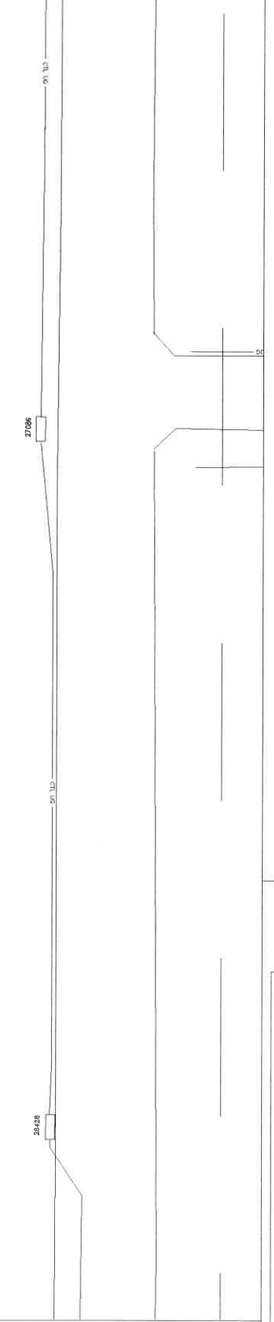
Grid ID: (Lat/Long)
33.25561/-111.72916

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

T2SR6E Sec 15 NE



CALL AT LEAST TWO (2) FULL WORKING DAYS
BEFORE YOU BEGIN EXCAVATION.
ARIZONA 811
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-(800)-STAKE-IT (782-5348)
IN MARICOPA COUNTY 602-263-1100
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION.
PRINTS ARE NOT TO SCALE.

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WIRE CENTER
HIGLEY
ARIZONA

Grid ID: (Lat/Long)
33.25549/-111.72655

1" = 150'

N

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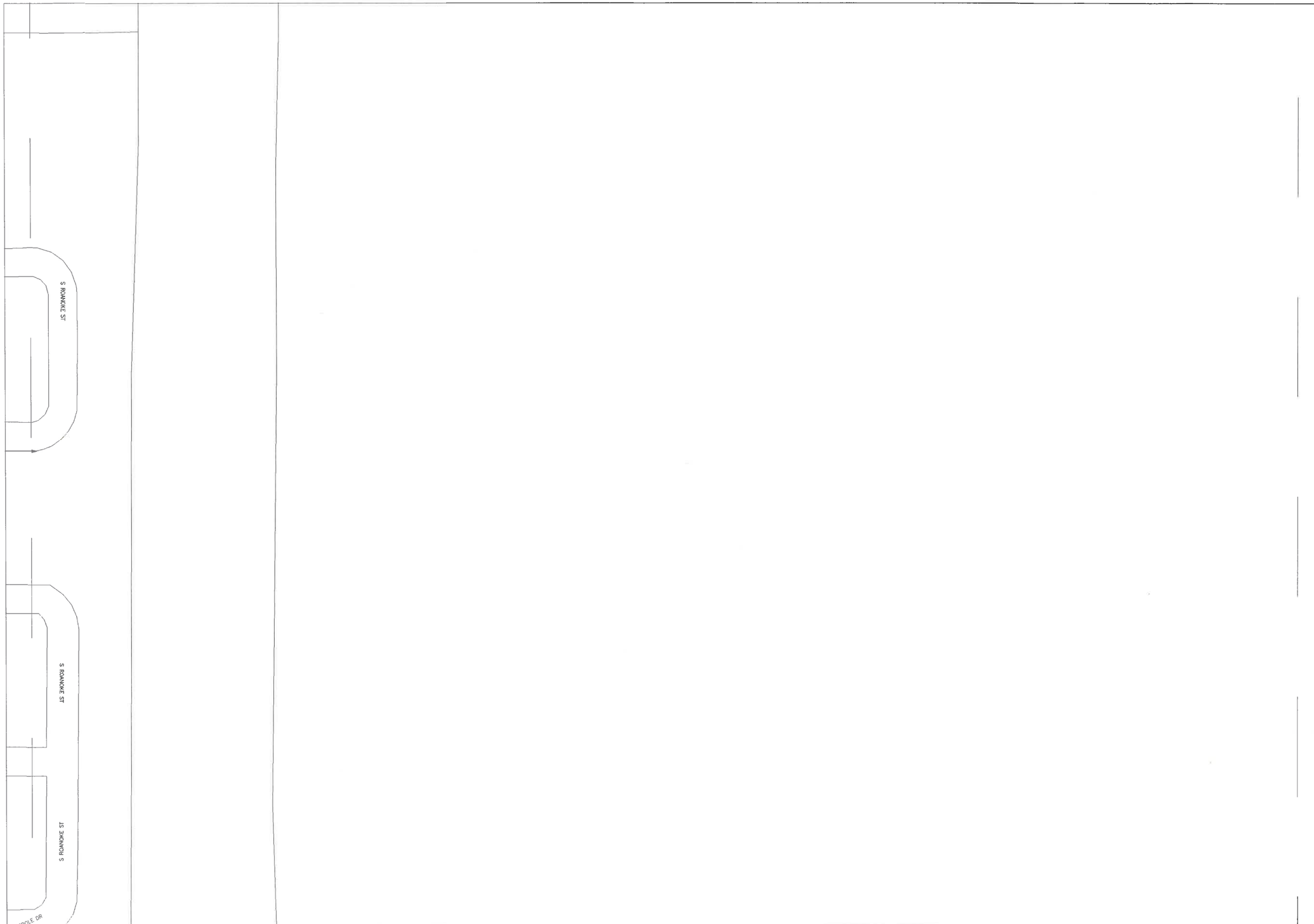
T2S R6E Sec 15 SE



CALL AT LEAST TWO (2) FULL WORKING DAYS
BEFORE YOU BEGIN EXCAVATION.
ARIZONA 811
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-800-STAKE-IT (742-5348)
IN MARICOPA COUNTY 602-263-1100
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION
PRINTS ARE NOT TO SCALE.

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AGENCY PURSUANT TO LAW. NOT TO BE
DISCLOSED BY GOVERNMENTAL AGENCY TO A
THIRD PARTY WITHOUT WRITTEN AUTHORIZATI
BY CENTURYLINK INC..

CenturyLink

WIRE CENTER
HIGLEY
ARIZONA

Grid ID: (Lat/Long)
33.2516/-111.7293

1" = 150'

N

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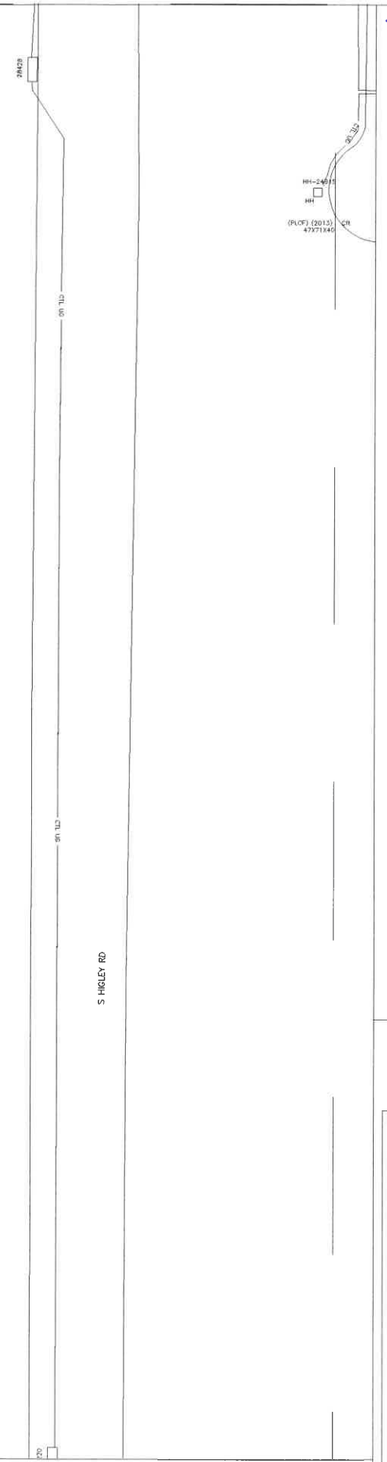
T2S R4E Sec 15 SE



CALL AT LEAST TWO (2) FULL WORKING DAYS
BEFORE YOU BEGIN EXCAVATION.
ARIZONA 811
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-800-STAKE-IT (782-5348)
IN MARICOPA COUNTY 602-263-1100
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION.
PRINTS ARE NOT TO SCALE.

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CenturyLink™

WIRE CENTER
HIGLEY
ARIZONA

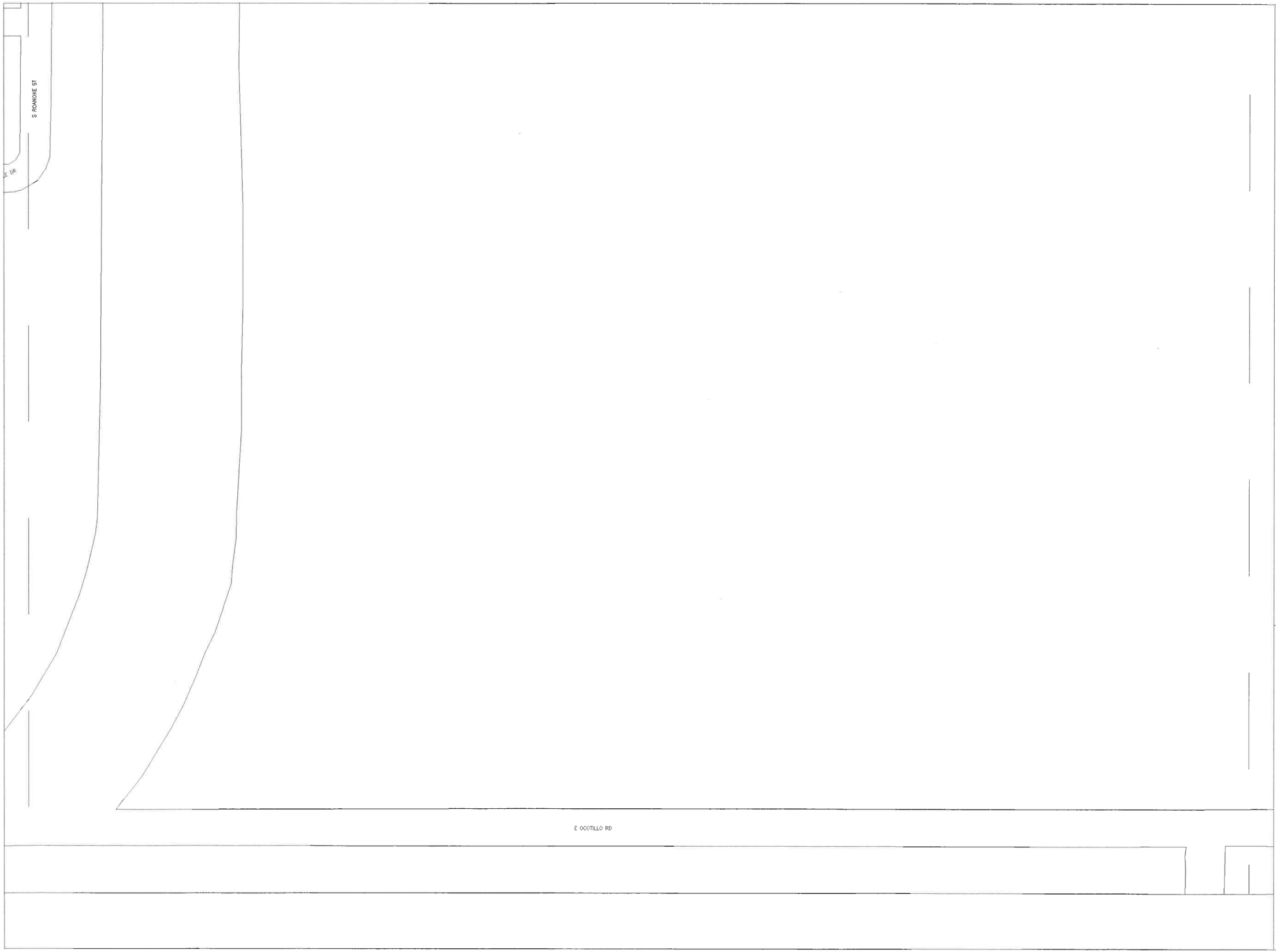
Grid ID: (Lat/Long)
33.25191/-111.72608

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

T2S R1E Sec 15 SE



CALL AT LEAST TWO (2) FULL WORKING DAYS
BEFORE YOU BEGIN EXCAVATION.
ARIZONA 811
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-800-STAKE-IT (782-5348)
IN MARICOPA COUNTY: 602-263-1100
ALL LOCATIONS ARE APPROXIMATE.
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION.
PRINTS ARE NOT TO SCALE.

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CenturyLink™

WIRE CENTER
HIGLEY
ARIZONA

Grid ID: (Lat/Long)
33.24812/-111.72918

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

T3SR1E SEC 15SE

CALL AT LEAST TWO (2) FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION.
ARIZONA 811
ARIZONA BLUE STAKE, INC.
DIAL 8-1-1 OR 1-800-STAKE-IT (732-5348)
IN MARICOPA COUNTY: 602-263-1100
ALL LOCATIONS ARE APPROXIMATE
PLEASE CALL ARIZONA BLUESTAKE
FOR LOCATION OF UTILITIES
AND PRIOR TO ANY EXCAVATION.
PRINTS ARE NOT TO SCALE.

CENTURYLINK CONFIDENTIAL AND PROPRIETARY INFORMATION. DISCLOSED TO GOVERNMENTAL AGENCY PURSUANT TO LAW. NOT TO BE DISCLOSED BY GOVERNMENTAL AGENCY TO ANY THIRD PARTY WITHOUT WRITTEN AUTHORIZATION BY CENTURYLINK INC..

CenturyLink™

WIRE CENTER
HIGLEY
ARIZONA

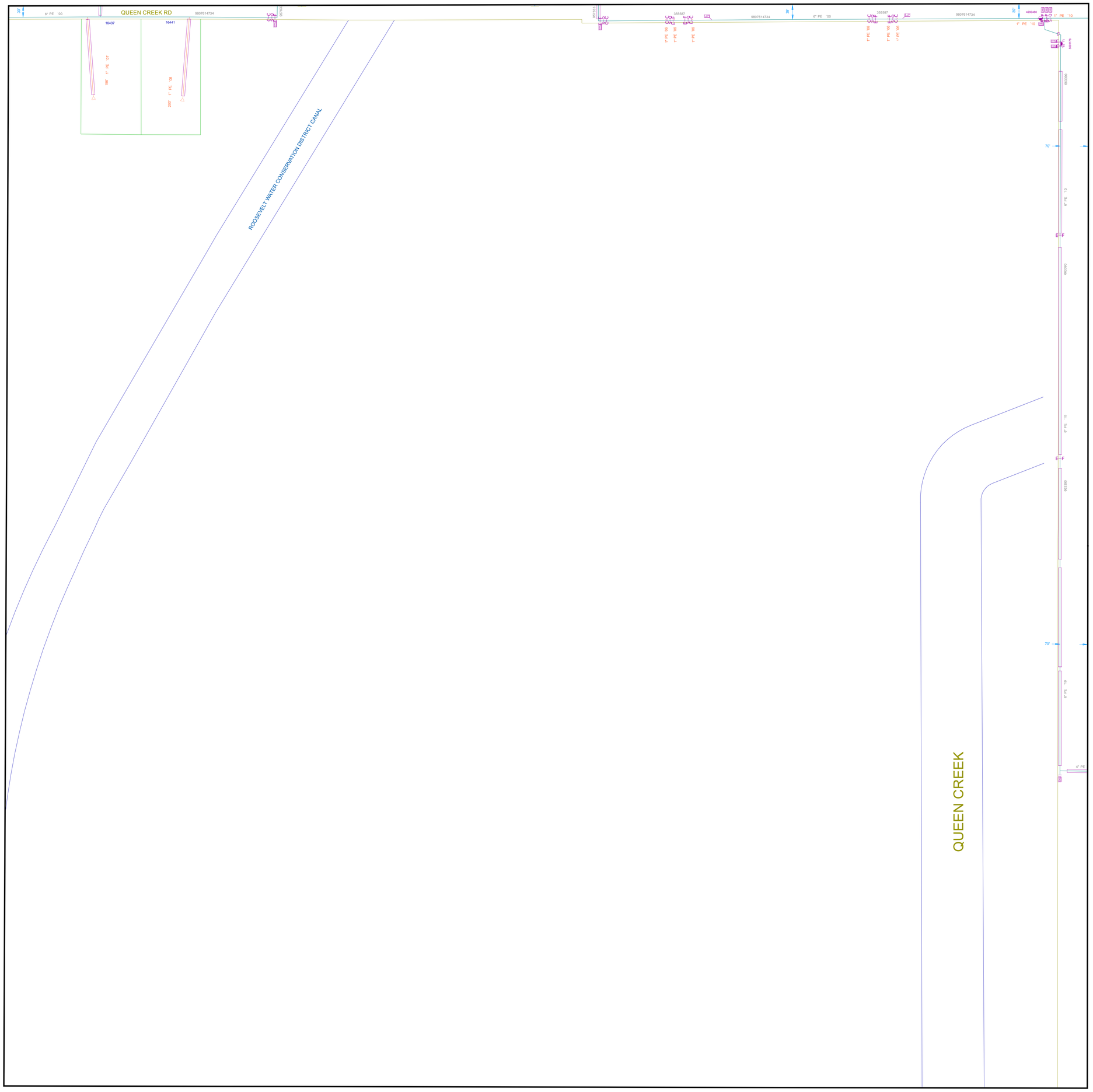
Grid ID: (Lat/Long)
33.24821/-111.72641

1" = 150'

N

DISCLAIMER: All Facility Locations are Approximate and Facilities Must be Spotted by Appropriate Agency Prior to Excavation

S17-67



S17-69

EXISTING MAIN
PROPOSED MAIN
PROPOSED ABANDONED MAIN
MAINS CROSS OVER
MAINS TIED TOGETHER
CASING
END OF PIPE
TWO TYPES OF PIPE JOIN
VALVE - OPEN
VALVE - CLOSED
LINE STOPPER
BRANCH FITTING - 3-WAY TEE
CVT
CURB VALVE TEE
S
BRANCH - WILLIAMSON 3-WAY
S
FITTING - SHORTSTOP
M
FITTING - MUELLER
T
FITTING - QUALITECH
C
FITTING - CONTINENTAL
FITTING - BLOW DOWN
R
REG.STATION - ABOVE GROUND
R
REG.STATION - VAULTED
M
METER SET ASSEMBLY - ABOVE GROUND
M
METER SET ASSEMBLY - VAULTED
P
PRESSURE RECORDER
BOND OVER
ISOLATED FLANGE
ISOLATED WELD
COMPRESSION COUPLING
TEST POINT
TEST POINT IN CASING
ELECTROFUSION
LEAK CLAMP
ANODE
ANODE W/TEST POINT
TP
INSULATOR
RECTIFIER STA. W/GROUND BED
EXISTING SERVICE LINE
RISER - STEEL
RISER - ANNODELESS
SERVICE SLEEVE
GAS LAMP - ANODELESS
GAS LAMP - STEEL
EXCESS FLOW VALVE
EMS
LOCATOR - EMS
LLP
LINE LOCATE POINT
SCADA
LEAK REPAIR SYMBOL
FOREIGN PIPE LINE
RAIL ROAD TRACKS
GATE TAP
GATE TAP NAME
SECTION CORNER
1 6 12 7
POINT OF INTEREST

NOTE:

SOUTHWEST GAS CORPORATION DOES NOT GUARANTEE THE ACCURACY OF THE LOCATIONS OR ELEVATIONS OF THE UTILITIES AS SHOWN ON THE MAP.

None

S17-68
OLD DOC NUMBER

NE1/4 SEC 15 T2S R6E

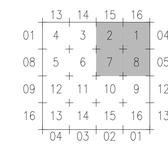
3020060152
USGS NUMBER

NOT TO SCALE
11/19/2015

SOUTHWEST GAS CORPORATION
GAS DISTRIBUTION SYSTEM
CENTRAL ARIZONA DIVISION

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP



1 SECTION

NOTE: FACILITY PICTURES IN THE 55 FOOT BORDER MAY BE INCOMPLETE.

UNLESS OTHERWISE NOTED:

1. ALL GANG OPERATED SWITCHES ARE 400 AMPS.
2. ALL COMMUNICATION CABLE TO BE 25-22AWG.

THESE DRAWINGS OF THE SRP OVERHEAD AND UNDERGROUND ELECTRICAL FACILITIES SHOULD BE CONSIDERED AS A GUIDE TO, BUT NOT AN EXACT LOCATION OF THE LOCATION OF OUR EXISTING FACILITIES. SRP MAKES NO REPRESENTATION AS TO THEIR ACCURACY OR FITNESS FOR A PARTICULAR PURPOSE. FOR MORE INFORMATION, CONTACT SRP BLUE STAKE 602-236-8026 OR DIAL 811 FOR A LOCATE REQUEST TICKET.

SRP®

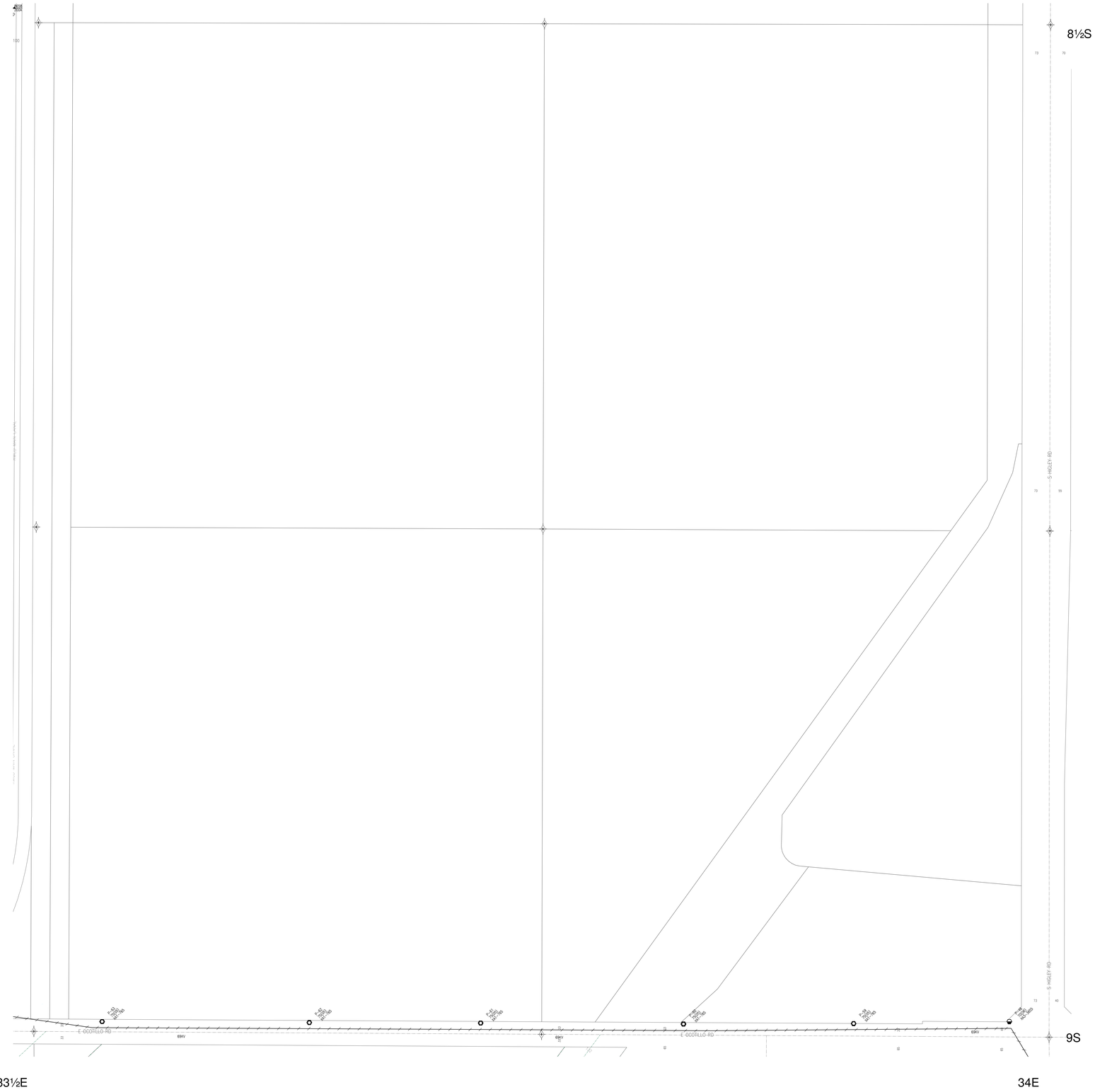
OH LOCATION MAP

YF-22-NE

(T2S R6E 22)

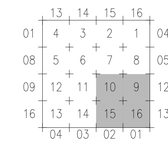
SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127165121

J2CAMPBE



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP



1 SECTION

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N

OH LOCATION MAP

YF-15-SE

(T2S R6E 15)

SCALE: 1" = 100'

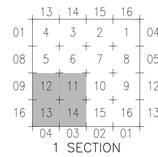
ISSUE DATE: 27-JAN-16

J0127165100

J2CAMPBE

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP



1 SECTION

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SRP®

OH LOCATION MAP

YF-22-SW

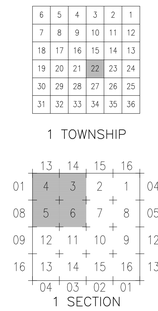
(T2S R6E 22)

SCALE: 1" = 100'

ISSUE DATE: 27-JAN-16

J0127165200

J2CAMPBE



NOTE: FACILITY PICTURES IN THE 55 FOOT BORDER MAY BE INCOMPLETE.

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OH LOCATION MAP

YF-22-NW

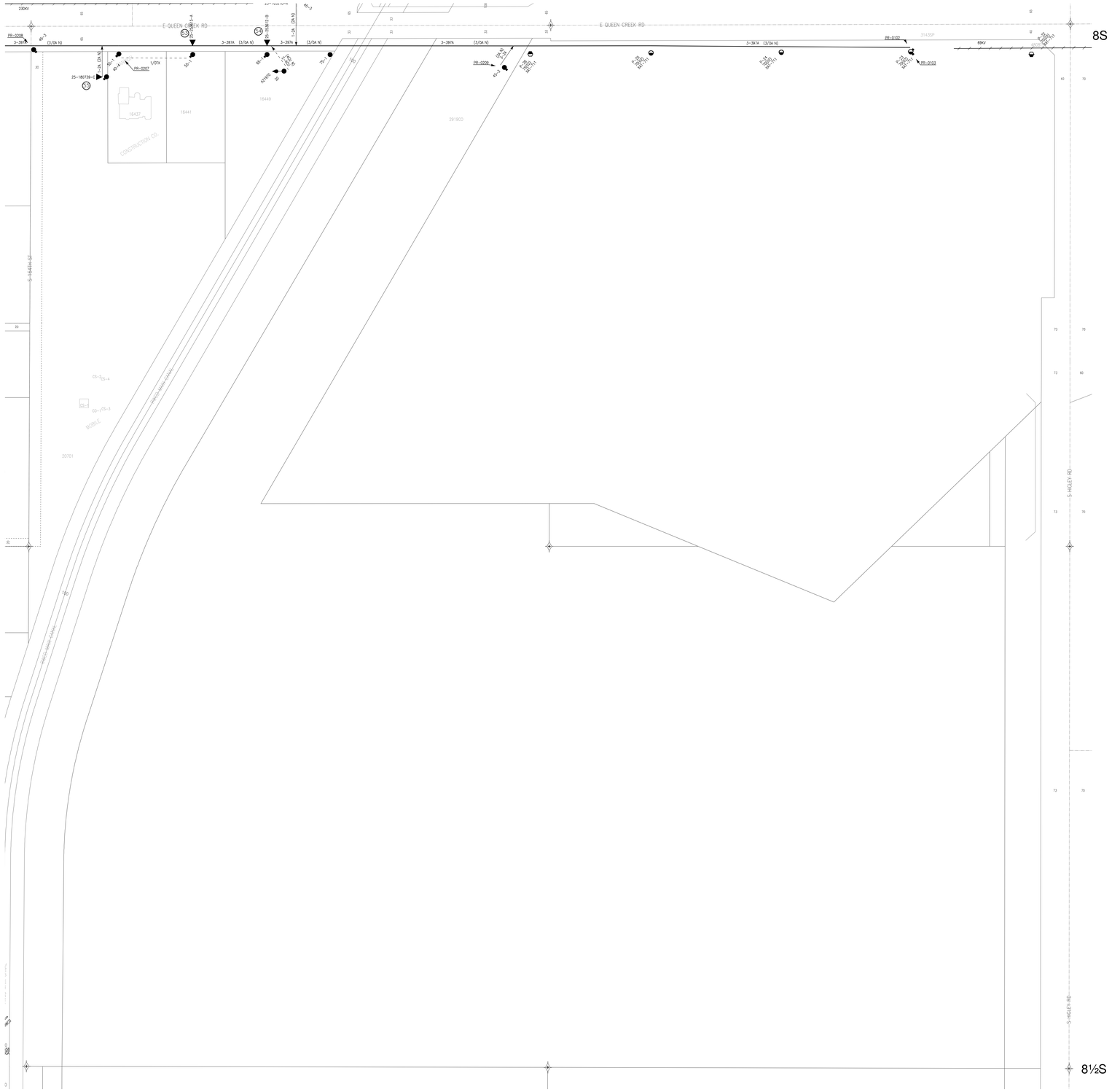
(T2S R6E 22)

SCALE: 1" = 100'

ISSUE DATE: 27-JAN-16

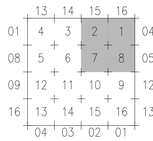
J0127165140

J2CAMPBE



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP



1 SECTION

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2. ALL COMMUNICATION CABLE TO BE 25-22AWG.

N

OH LOCATION MAP

YF-15-NE

(T2S R6E 15)

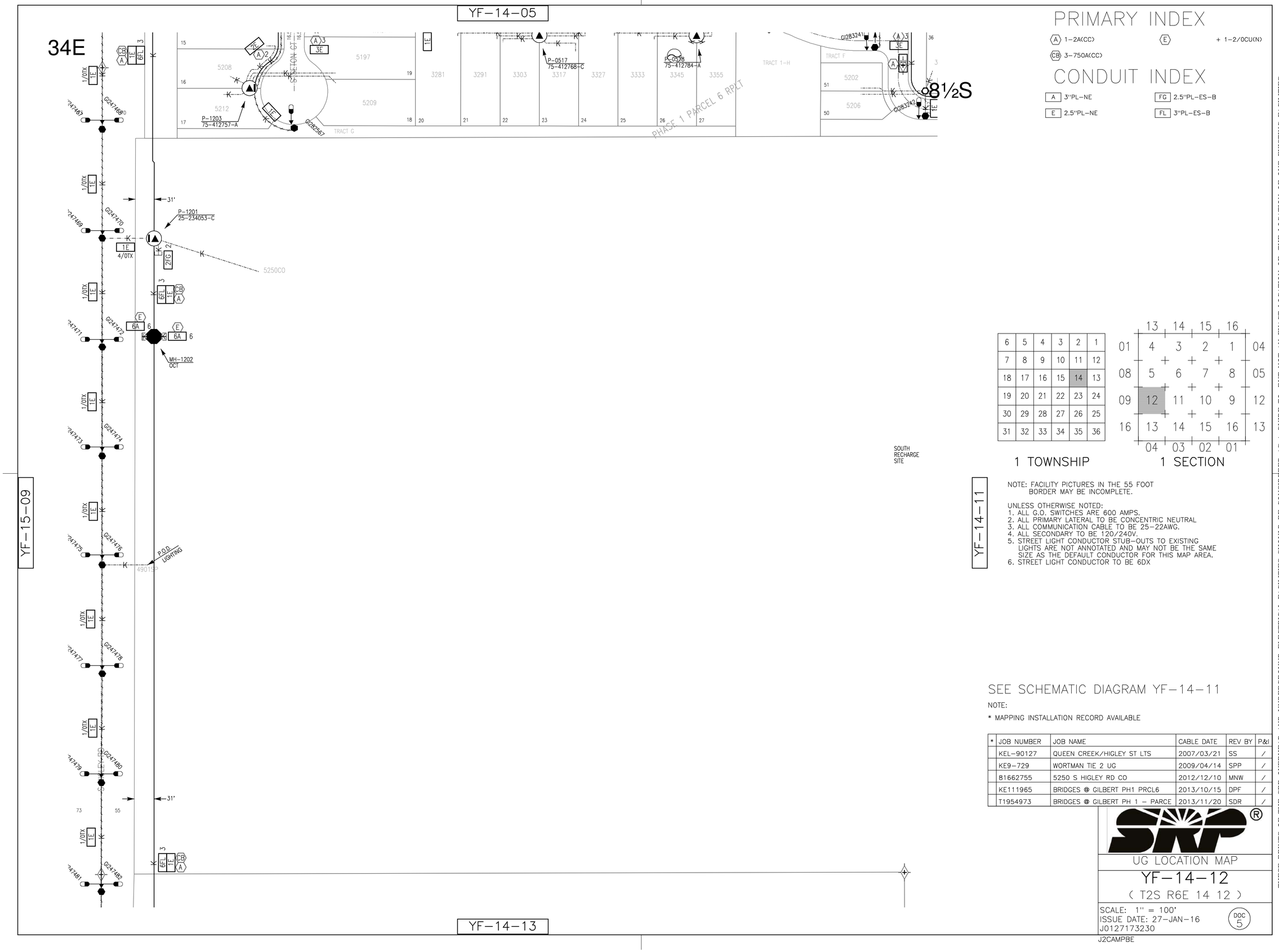
SCALE: 1" = 100'

ISSUE DATE: 27-JAN-16

J0127165027

J2CAMPBE

SRP MAKES NO REPRESENTATION AS TO THEIR ACCURACY OR FITNESS FOR A PARTICULAR PURPOSE. FOR MORE INFORMATION, CONTACT SRP BLUE STAKE 602-236-8026 OR DIAL 811 FOR A LOCATE REQUEST TICKET.
THE DRAWINGS OF UNDERGROUND ELECTRICAL FACILITIES SHOULD BE CONSIDERED AS A GUIDE TO, BUT NOT AN EXACT LOCATION OF OUR EXISTING FACILITIES.



PRIMARY INDEX

(A) 1-2A(CC)
(CB) 3-750A(CC)
(E) + 1-2/0CU(N)

CONDUIT INDEX

A	3"PL-NE	FG	2.5"PL-ES-B
E	2.5"PL-NE	FL	3"PL-ES-B

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

	13	14	15	16		
01	4	3	2	1	04	
08	5	6	7	8	05	
09	12	11	10	9	12	
16	13	14	15	16	13	
	04	03	02	01		

1 SECTION

NOTE: FACILITY PICTURES IN THE 55 FOOT BORDER MAY BE INCOMPLETE.

UNLESS OTHERWISE NOTED:
1. ALL G.O. SWITCHES ARE 600 AMPS.
2. ALL PRIMARY LATERAL TO BE CONCENTRIC NEUTRAL
3. ALL COMMUNICATION CABLE TO BE 25-22AWG.
4. ALL SECONDARY TO BE 120/240V.
5. STREET LIGHT CONDUCTOR STUB-OUTS TO EXISTING LIGHTS ARE NOT ANNOTATED AND MAY NOT BE THE SAME SIZE AS THE DEFAULT CONDUCTOR FOR THIS MAP AREA.
6. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-14-11

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KEL-90127	QUEEN CREEK/HIGLEY ST LTS	2007/03/21	SS	/
	KE9-729	WORTMAN TIE 2 UG	2009/04/14	SPP	/
	81662755	5250 S HIGLEY RD CO	2012/12/10	MNW	/
	KE111965	BRIDGES @ GILBERT PH1 PRCL6	2013/10/15	DPF	/
	T1954973	BRIDGES @ GILBERT PH 1 - PARCE	2013/11/20	SDR	/

UG LOCATION MAP

YF-14-12

(T2S R6E 14 12)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173230

DOC 5

J2CAMPBE

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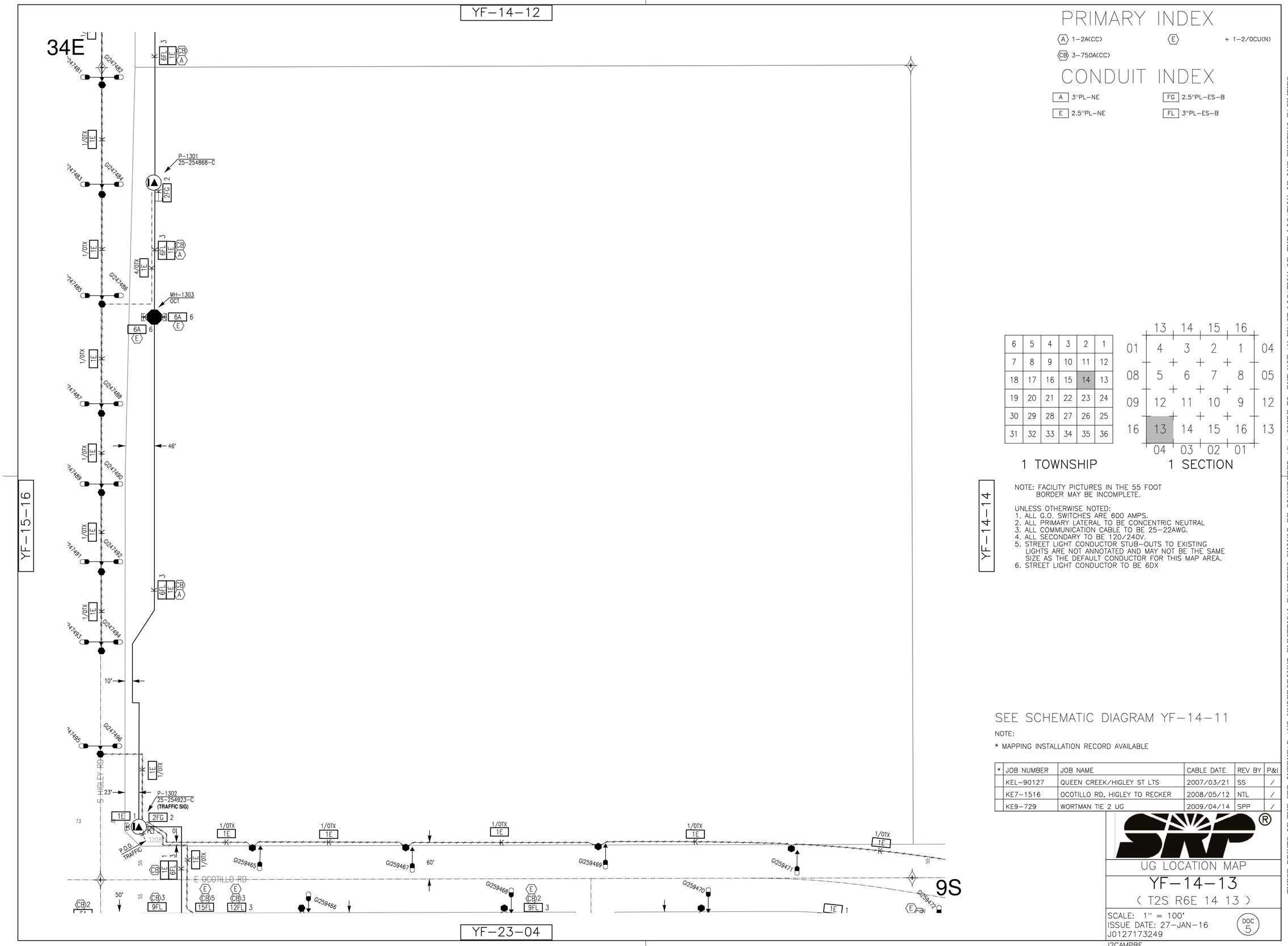

PRIMARY INDEX

(A) 1-2A(CC)	(E) + 1-2/0CU(N)
(CB) 3-750A(CC)	

CONDUIT INDEX

A 3"PL-NE	FG 2.5"PL-ES-B
E 2.5"PL-NE	FL 3"PL-ES-B

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

1 SECTION

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6. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-14-11

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KEL-90127	QUEEN CREEK/HIGLEY ST LTS	2007/03/21	SS	/
	KE7-1516	OCOTILLO RD, HIGLEY TO RECKER	2008/05/12	NTL	/
	KE9-729	WORTMAN TIE 2 UG	2009/04/14	SPP	/

SRP®

UG LOCATION MAP

YF-14-13

(T2S R6E 14 13)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173249

DOC 5

J2CAMPBE

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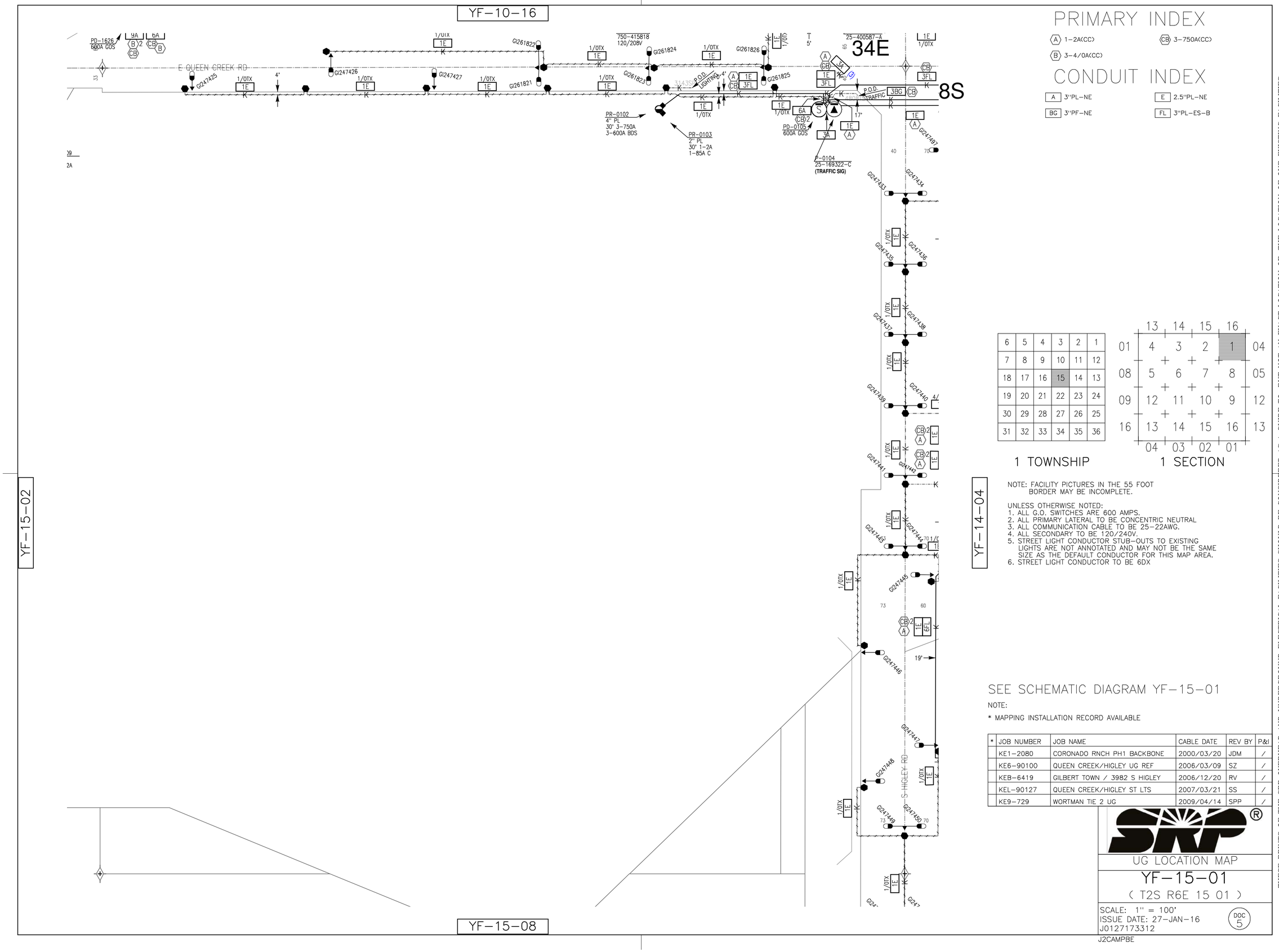

PRIMARY INDEX

- (A) 1-2A(CC)
- (B) 3-4/0A(CC)
- (CB) 3-750A(CC)

CONDUIT INDEX

- A 3"PL-NE
- BG 3"PF-NE
- E 2.5"PL-NE
- FL 3"PL-ES-B

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

1 SECTION

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6. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-15-01

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE1-2080	CORONADO RNCH PH1 BACKBONE	2000/03/20	JDM	/
	KE6-90100	QUEEN CREEK/HIGLEY UG REF	2006/03/09	SZ	/
	KEB-6419	GILBERT TOWN / 3982 S HIGLEY	2006/12/20	RV	/
	KEL-90127	QUEEN CREEK/HIGLEY ST LTS	2007/03/21	SS	/
	KE9-729	WORTMAN TIE 2 UG	2009/04/14	SPP	/

SRP®

UG LOCATION MAP

YF-15-01

(T2S R6E 15 01)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173312
J2CAMPBE

DOC 5

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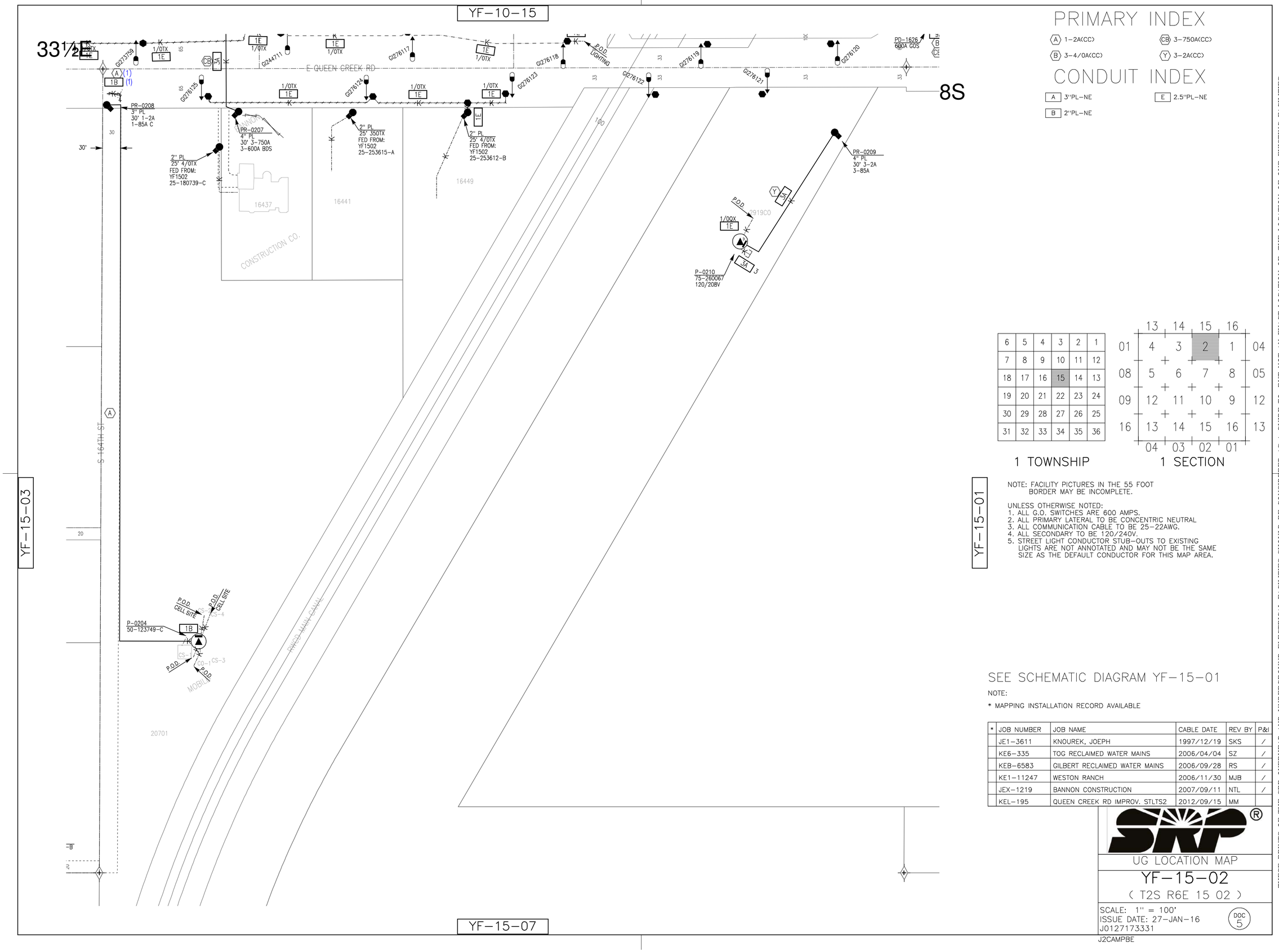

PRIMARY INDEX

- (A) 1-2A(CC)
- (B) 3-4/0A(CC)
- (CB) 3-750A(CC)
- (Y) 3-2A(CC)

CONDUIT INDEX

- [A] 3"PL-NE
- [B] 2"PL-NE
- [E] 2.5"PL-NE

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

1 SECTION

YF-15-01

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SEE SCHEMATIC DIAGRAM YF-15-01

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	JE1-3611	KNOUREK, JOEPH	1997/12/19	SKS	/
	KE6-335	TOG RECLAIMED WATER MAINS	2006/04/04	SZ	/
	KEB-6583	GILBERT RECLAIMED WATER MAINS	2006/09/28	RS	/
	KE1-11247	WESTON RANCH	2006/11/30	MJB	/
	JEX-1219	BANNON CONSTRUCTION	2007/09/11	NTL	/
	KEL-195	QUEEN CREEK RD IMPROV. STLTS2	2012/09/15	MM	

SRP®

UG LOCATION MAP

YF-15-02

(T2S R6E 15 02)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173331

DOC 5

J2CAMPBE

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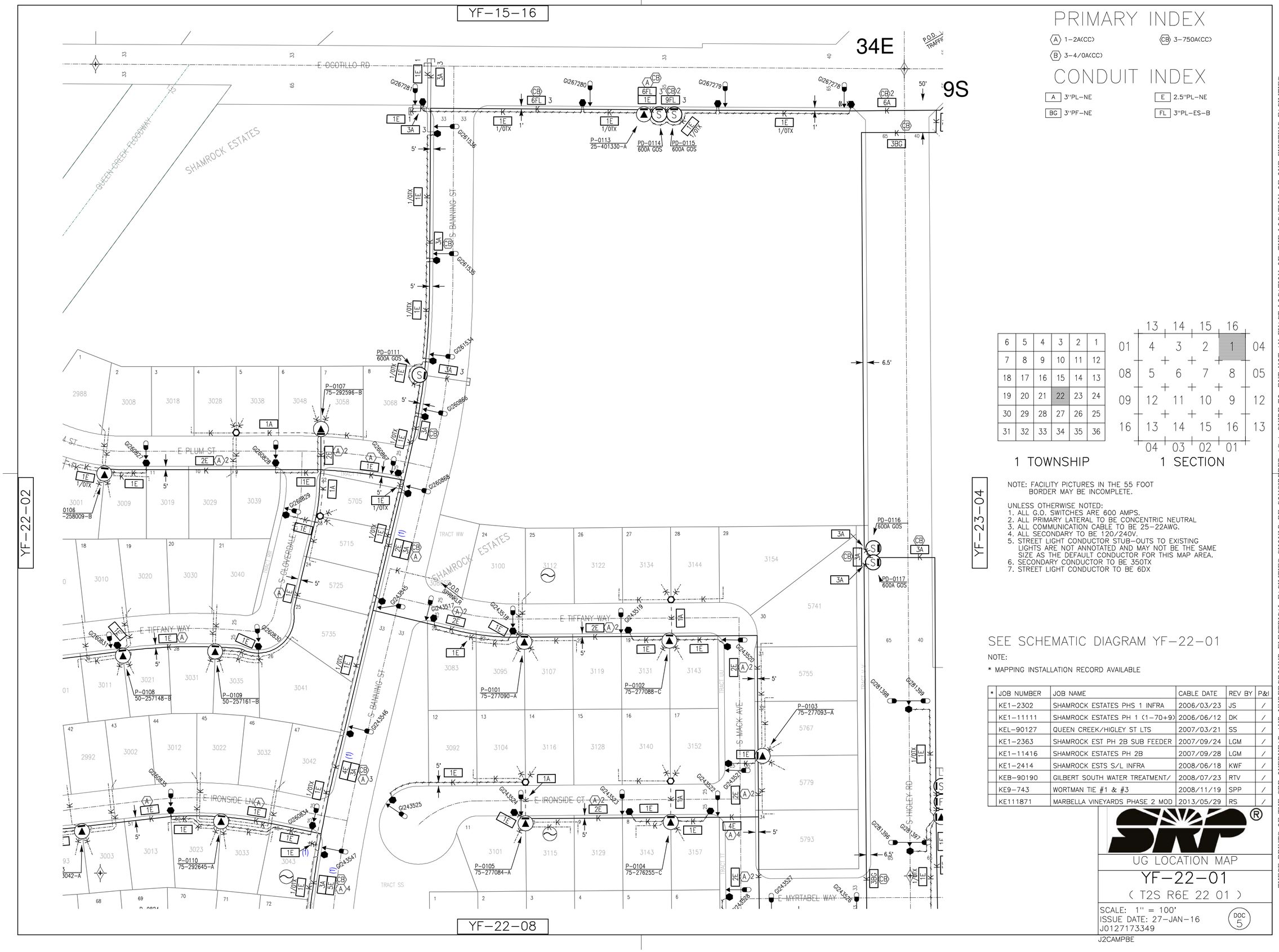

PRIMARY INDEX

- (A) 1-2A(CC)
- (B) 3-4/0A(CC)
- (CB) 3-750A(CC)

CONDUIT INDEX

- A 3"PL-NE
- BG 3"PF-NE
- E 2.5"PL-NE
- FL 3"PL-ES-B

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

	13	14	15	16		
01	4	3	2	1	04	
08	5	6	7	8	05	
09	12	11	10	9	12	
16	13	14	15	16	13	
	04	03	02	01		

1 SECTION

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4. ALL SECONDARY TO BE 120/240V.
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6. SECONDARY CONDUCTOR TO BE 350TX
7. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-22-01

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE1-2302	SHAMROCK ESTATES PHS 1 INFRA	2006/03/23	JS	/
	KE1-11111	SHAMROCK ESTATES PH 1 (1-70+9)	2006/06/12	DK	/
	KEL-90127	QUEEN CREEK/HIGLEY ST LTS	2007/03/21	SS	/
	KE1-2363	SHAMROCK EST PH 2B SUB FEEDER	2007/09/24	LGM	/
	KE1-11416	SHAMROCK ESTATES PH 2B	2007/09/28	LGM	/
	KE1-2414	SHAMROCK ESTS S/L INFRA	2008/06/18	KWF	/
	KEB-90190	GILBERT SOUTH WATER TREATMENT/	2008/07/23	RTV	/
	KE9-743	WORTMAN TIE #1 & #3	2008/11/19	SPP	/
	KE111871	MARBELLA VINEYARDS PHASE 2 MOD	2013/05/29	RS	/

SRP®

UG LOCATION MAP

YF-22-01

(T2S R6E 22 01)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173349
J2CAMPBE

DOC 5

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YF-15-15

33½E

9S

E OCOTILLO RD

QUEEN CREEK FLOODWAY

E PLUM ST

S SIPAPU WAY

E TIFFANY WAY

E IRONSIDE ST

P.O.L.

G1260825

G1260826

G1260833

G1260832

G1260837

G1260838

G1260839

G1260840

P-0106
50-258009-B

P-0201
50-258000-B

P-0202
75-293665-B

P-0203
50-403042-A

YF-22-03

YF-22-07

PRIMARY INDEX

(A) 1-2A(CC)

CONDUIT INDEX

A	3"PL-NE
E	2.5"PL-NE

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP

	13	14	15	16	
01	4	3	2	1	04
08	5	6	7	8	05
09	12	11	10	9	12
16	13	14	15	16	13
	04	03	02	01	

1 SECTION

YF-22-01

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6. SECONDARY CONDUCTOR TO BE 350TX
7. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-22-01

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE1-11416	SHAMROCK ESTATES PH 2B	2007/09/28	LGM	/

SRP®

UG LOCATION MAP

YF-22-02

(T2S R6E 22 02)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173405
J2CAMPBE

DOC 5

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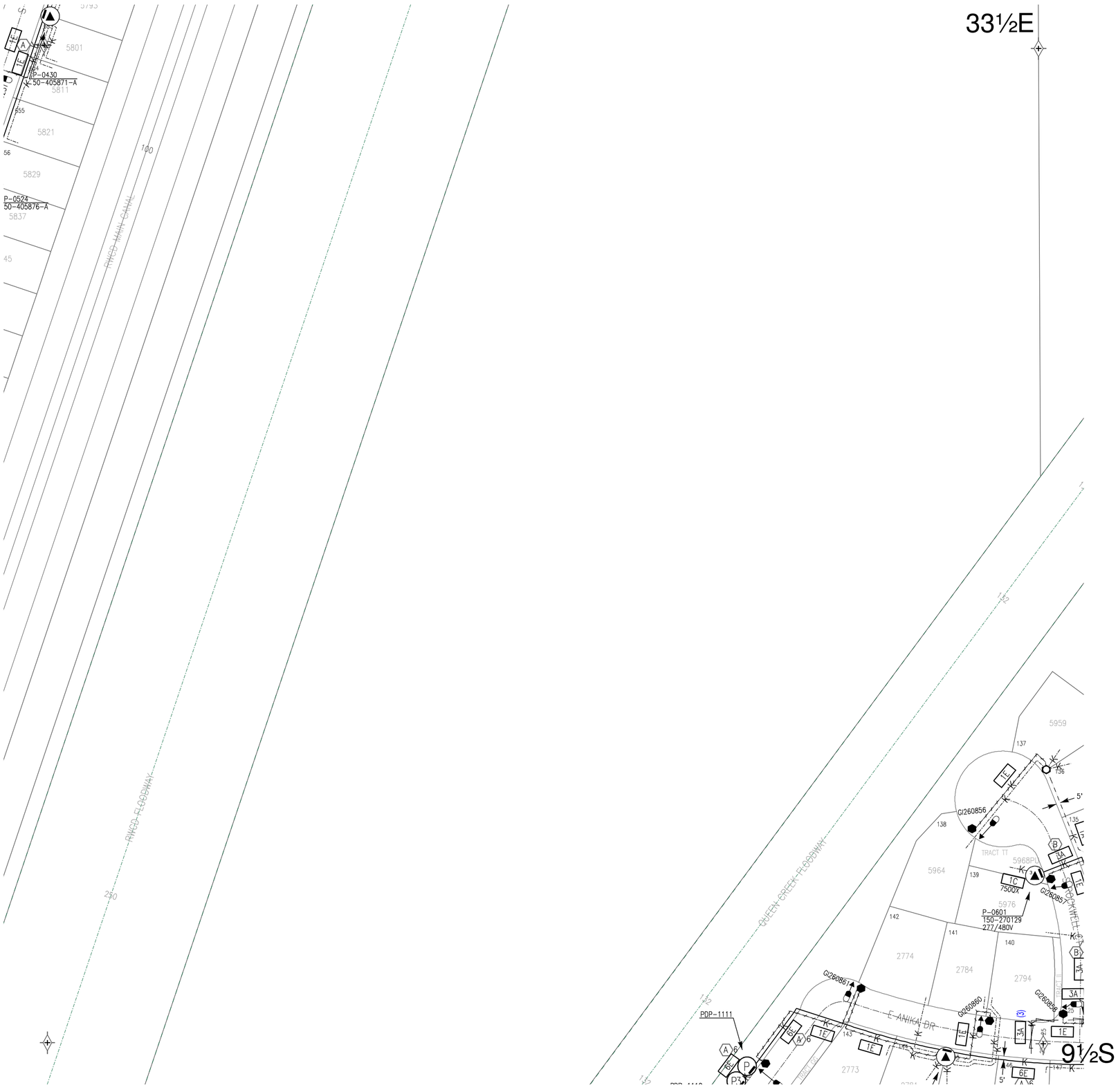
YF-22-03



YF-22-05

YF-22-11

YF-22-07

PRIMARY INDEX

(A) 1-2A(CC) (B) 3-4/0A(CC)

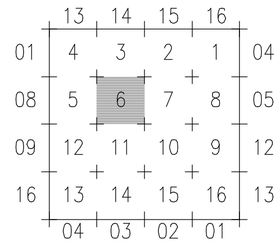
CONDUIT INDEX

A 3"PL-NE E 2.5"PL-NE

C 4"PL-NE

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 TOWNSHIP



1 SECTION

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UNLESS OTHERWISE NOTED:
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2. ALL PRIMARY LATERAL TO BE CONCENTRIC NEUTRAL
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4. ALL SECONDARY TO BE 120/240V.
5. STREET LIGHT CONDUCTOR STUB-OUTS TO EXISTING LIGHTS ARE NOT ANNOTATED AND MAY NOT BE THE SAME SIZE AS THE DEFAULT CONDUCTOR FOR THIS MAP AREA.
6. SECONDARY CONDUCTOR TO BE 350TX
7. STREET LIGHT CONDUCTOR TO BE 6DX

SEE SCHEMATIC DIAGRAM YF-22-03

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KEB-6460	SHAMROCK ESTS PH2 WELL SITE	2006/05/22	DK	/
	KEK-142	SHAMROCK ESTATES PH 2B CONV	2007/08/15	WFM	/
	KE1-11416	SHAMROCK ESTATES PH 2B	2007/09/28	LGM	/
	KE1-11610	FREEMAN FARMS PH3 PCL 4	2012/05/23	JDT	

SRP®

UG LOCATION MAP

YF-22-06

(T2S R6E 22 06)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173422

DOC 5

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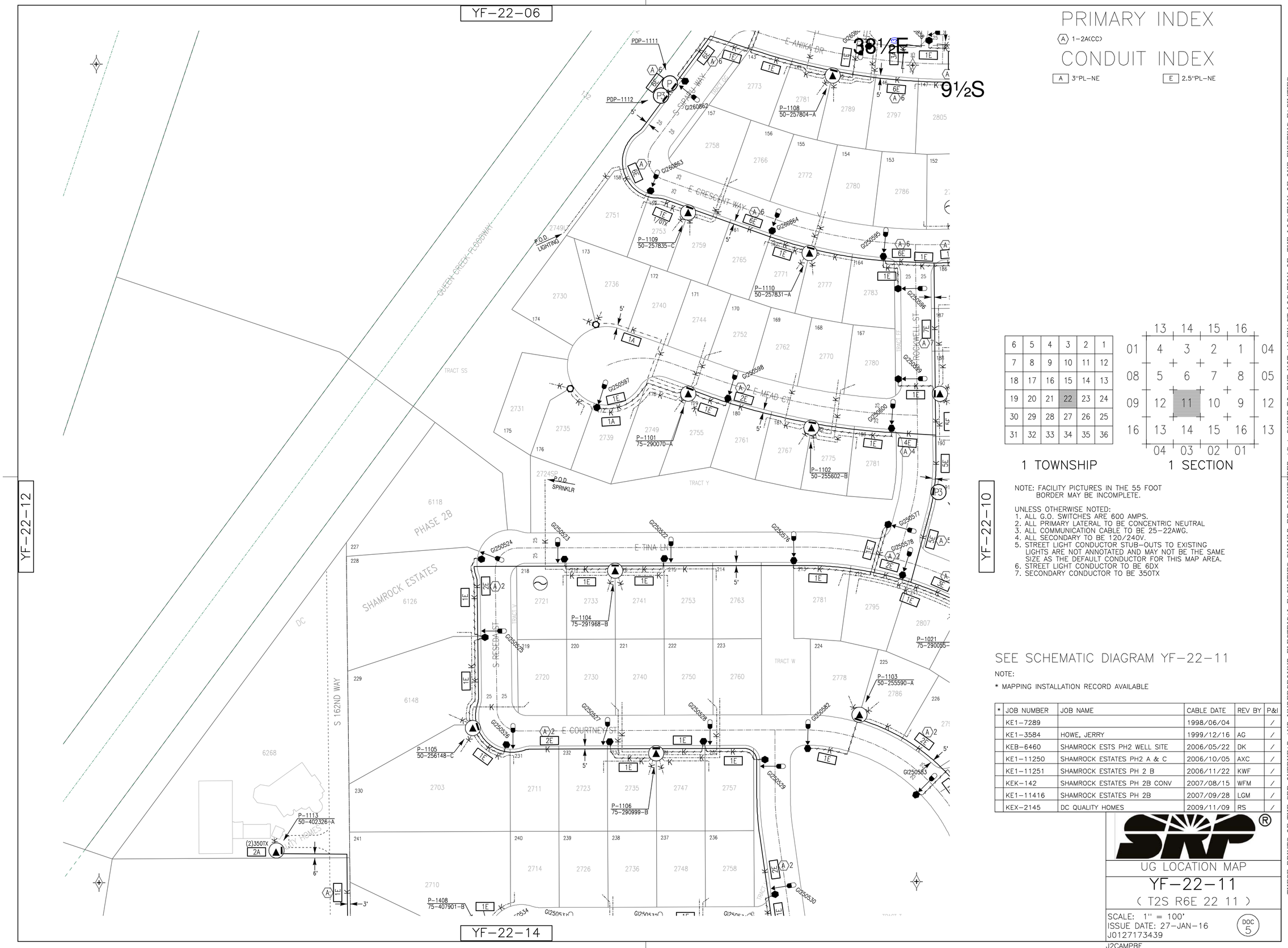
YF-22-06



YF-22-12

YF-22-10

YF-22-14

PRIMARY INDEX

(A) 1-2A(CC)

CONDUIT INDEX

A 3"PL-NE

E 2.5"PL-NE

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
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SEE SCHEMATIC DIAGRAM YF-22-11

NOTE:

* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE1-7289		1998/06/04		/
	KE1-3584	HOWE, JERRY	1999/12/16	AG	/
	KEB-6460	SHAMROCK ESTS PH2 WELL SITE	2006/05/22	DK	/
	KE1-11250	SHAMROCK ESTATES PH2 A & C	2006/10/05	AXC	/
	KE1-11251	SHAMROCK ESTATES PH 2 B	2006/11/22	KWF	/
	KEK-142	SHAMROCK ESTATES PH 2B CONV	2007/08/15	WFM	/
	KE1-11416	SHAMROCK ESTATES PH 2B	2007/09/28	LGM	/
	KEX-2145	DC QUALITY HOMES	2009/11/09	RS	/

SRP®

UG LOCATION MAP

YF-22-11

(T2S R6E 22 11)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173439
J2CAMPBE

DOC 5

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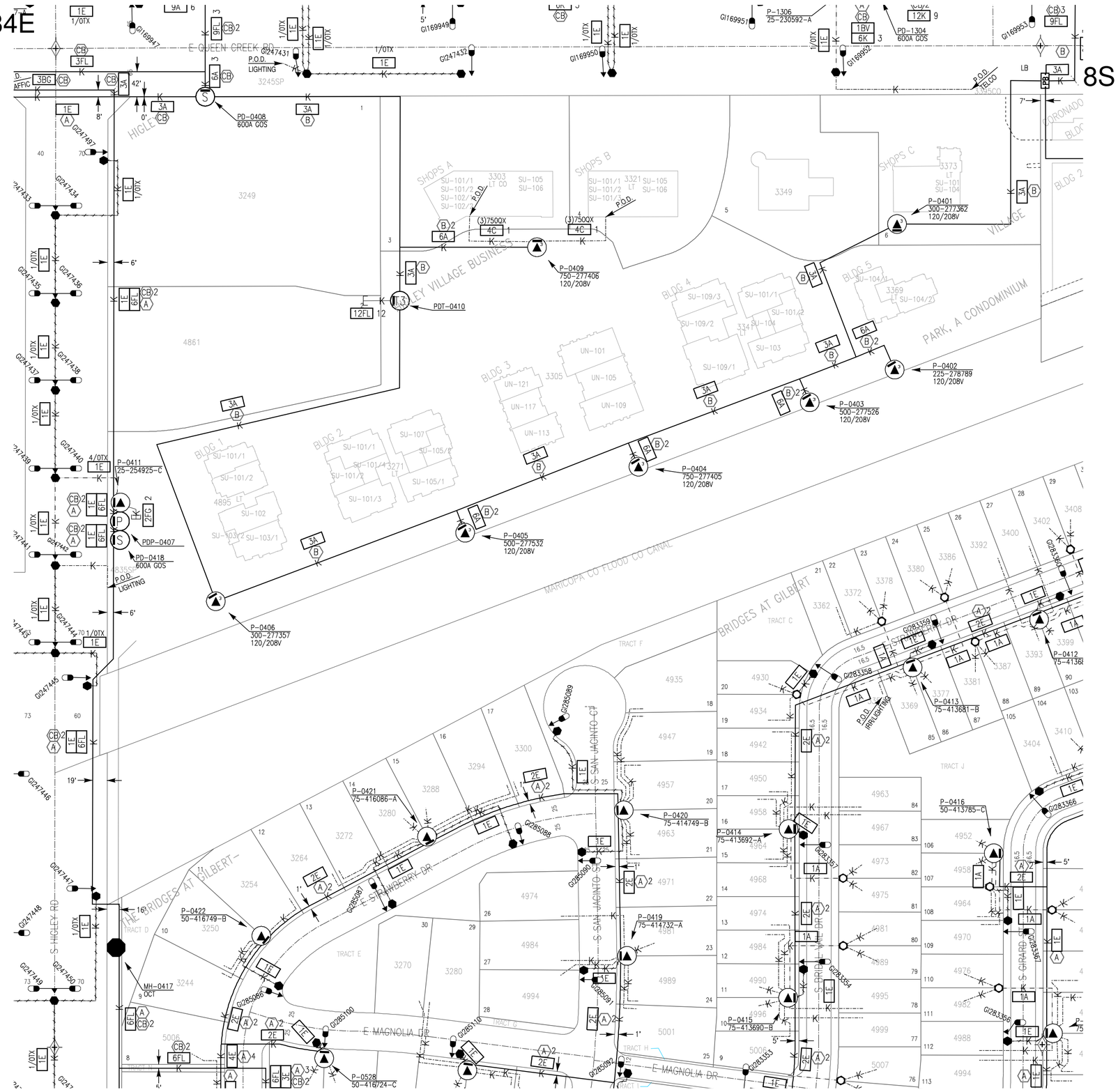
YF-11-13

34E

8S



YF-15-01

YF-14-03

YF-14-05

PRIMARY INDEX

- (A) 1-2A(CC)
- (B) 3-4/0A(CC)
- (CB) 3-750A(CC)

CONDUIT INDEX

A	3"PL-NE	E	2.5"PL-NE
BG	3"PF-NE	FG	2.5"PL-ES-B
BV	2.5"PL-EC	FL	3"PL-ES-B
C	4"PL-NE	K	3"PL-EC-B

6	5	4	3	2	1
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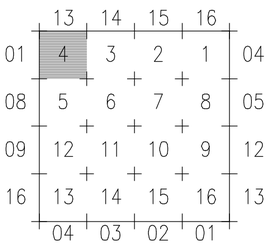

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SEE SCHEMATIC DIAGRAM YF-14-03

NOTE: MORE THAN 10 JOBS WORKED IN THIS 40 AREA.
CONTACT MAPPING SERVICES FOR THE ADDITIONAL JOBS.
* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE6-90100	QUEEN CREEK/HIGLEY UG REF	2006/03/09	SZ	/
	KEB-3124	HIGLEY VILLAGE	2007/03/09	RV	/
	KEL-90127	QUEEN CREEK/HIGLEY ST LTS	2007/03/21	SS	/
	KEB-90157	QUEEN CREEK/HIGLEY IRR CONTROL	2008/05/14	AJM	/
	KE9-729	WORTMAN TIE 2 UG	2009/04/14	SPP	/
	KE111963	BRIDGES BLVD FEEDER	2013/08/07		/
	KE100161	BRIDGES @ GILBERT - PH 1 PCL 3	2013/10/07	CCB	/
	KE100027	BRIDGES @ GILBERT PH 1 PARCEL	2014/03/04	SEE	/
	T1968664	BRIDGES AT GILBERT PHASE 1 PAR	2014/09/10	PGR	/
	T2059432	THE BRIDGES - XFMR RELOCATE	2015/06/22	NVP	/

SRP®

UG LOCATION MAP

YF-14-04

(T2S R6E 14 04)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173149
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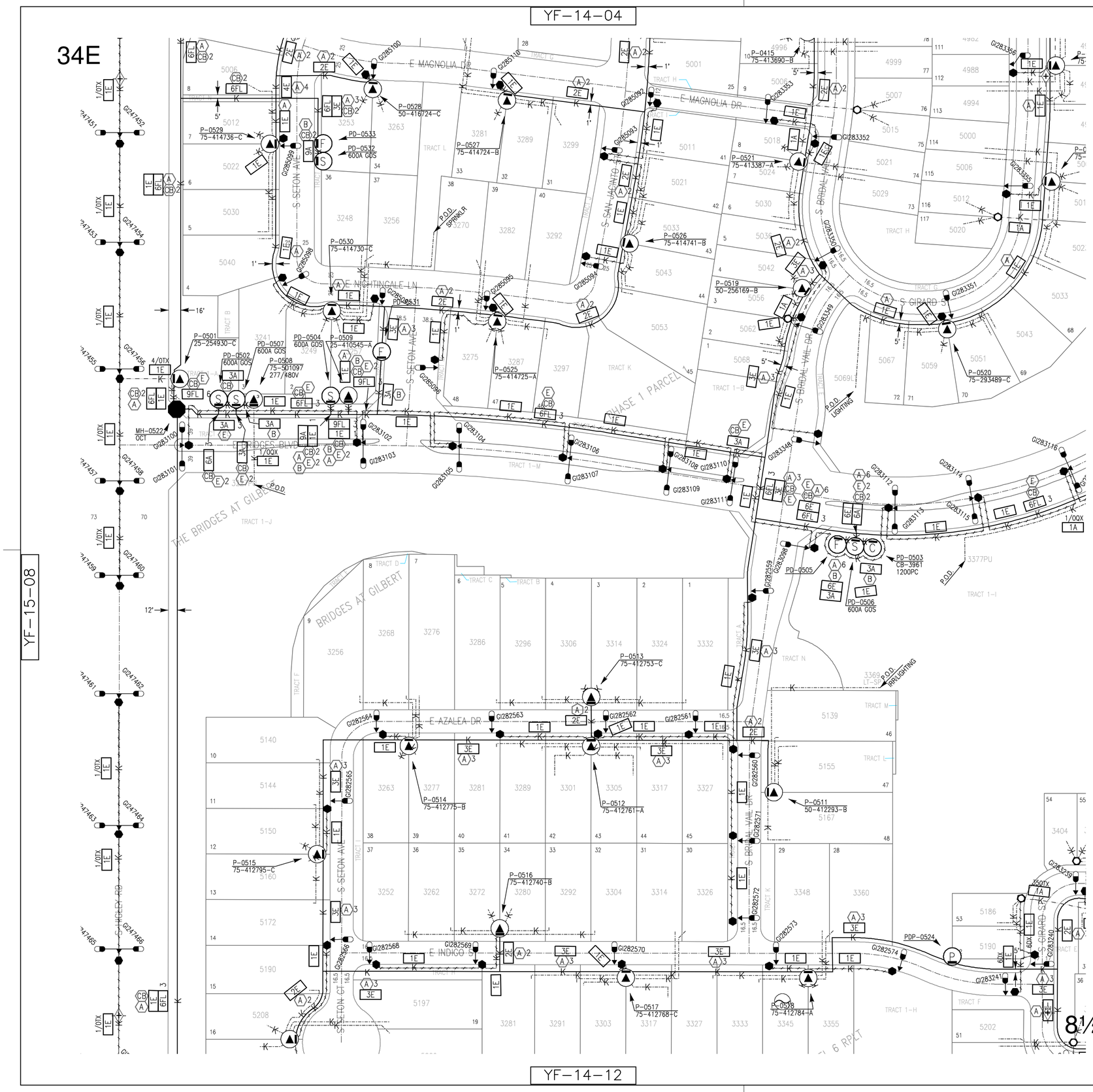
YF-14-04

34E



YF-14-12

YF-15-08

YF-14-06

PRIMARY INDEX

(A) 1-2A(CC)
(B) 3-4/0A(CC)
(CB) 3-750A(CC)
(E) + 1-2/0CU(N)

CONDUIT INDEX

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[E] 2.5"PL-NE
[FL] 3"PL-ES-B

6	5	4	3	2	1
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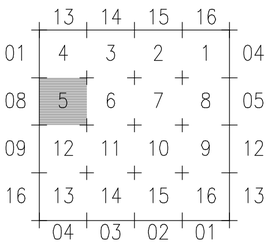

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CONTACT MAPPING SERVICES FOR THE ADDITIONAL JOBS.
* MAPPING INSTALLATION RECORD AVAILABLE

*	JOB NUMBER	JOB NAME	CABLE DATE	REV BY	P&I
	KE100161	BRIDGES @ GILBERT – PH 1 PCL 3	2013/10/07	CCB	/
	KE100031	BRIDGES @ GILBERT PH 1 PARCEL	2013/10/15	CCB	/
	KE111965	BRIDGES @ GILBERT PH1 PRCL6	2013/10/15	DPF	/
	T1954973	BRIDGES @ GILBERT PH 1 – PARCE	2013/11/20	SDR	/
	KE100027	BRIDGES @ GILBERT PH 1 PARCEL	2014/03/04	SEE	/
	T1987288	BRIDGES @ GILBERT – RESIDENTIA	2014/06/09	CEH	/
	T1968664	BRIDGES AT GILBERT PHASE 1 PAR	2014/09/10	PGR	/
	T2022628	BRIDGES @ GILBERT – ST/L RELOC	2014/09/15	PGR	/
	T2056390	THE BRIDGES – XFMR CHANGEOUTS	2015/06/08	SDR	/
	T2059432	THE BRIDGES – XFMR RELOCATE	2015/06/22	NVP	/

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UG LOCATION MAP

YF-14-05

(T2S R6E 14 05)

SCALE: 1" = 100'
ISSUE DATE: 27-JAN-16
J0127173212

DOC 5

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APPENDIX C

SALT RIVER PROJECT ELECTRICAL INFORMATION

SRPs CUSTOMER CONSTRUCTION SERVICES – CUSTOMER CHECKLIST

Ticket Number: 273050 **Project Leader:** Judy Campbell
Project Number: _____ **Design Consultant:** _____
Project Name: Gilbert Regional Park

Project Discovery A

☒ **(1) Please call (602) 236-0777 for general questions, cost estimates, or to initiate a project**

- SRP's Construction Contact Center is open Monday through Friday, 7 a.m. to 5 p.m.
- Receive a Ticket Number from the representative
- SRP Customer Design will contact you within three business days

Project Discovery B

☐ **(2) To begin the process, please provide SRP's Project Leader with the initial information:**

- Site plan (for residential subdivisions, a preliminary plat)
- Completed SRP Plan Review Request form
- Checklist and Request for Design form

☐ **(3) Submit initial set of project plans to SRP's Project Leader**

☐ **(4) SRP will schedule a scoping meeting to cover the following:**

- Meet the SRP team
- SRP will review any discovered potential site conflicts
- Discuss customer's initial plans, electric equipment locations, and electrical needs
- Finish and review the Checklist and Request for Design form
- SRP and Customer will develop a schedule

☐ **(5) Provide first jurisdiction reviewed plans and required documents to begin project start-up**

- Complete list of required documents and description of plans are listed on the SRP Checklist and Request for Design form

Project Start-Up

☐ **(6) Receive and review Redline prints, provide approval (typically 30 days for approval)**

- If changes are requested, SRP's Design Consultant will provide a revised redline that will need approval
- Please be specific with revision requests, third revision will be considered a change order
- SRP will provide a contractor supplied materials list

☐ **(7) Return completed Owner's Agreement(s) to the SRP Project Leader**

- If third party easements are needed, obtaining Owner's Agreements early is critical

☐ **(8) Receive and review SRP Survey information**

- SRP Survey will provide control point locations and additional information related to survey
- For subdivisions only, survey will be completed by customer and exhibits will be provided to SRP. Survey steps 8 and 12 apply to third party easements for subdivisions.

☐ **(9) Receive and review contract, submit executed contract and payment**

- Customer may request dividing the invoice into two payments (25% / 75%)
- 25% payment covers design fees and is non-refundable after Customer Construction Prints are issued
- 75% payment is required 60 days prior to energization
- Contracts are valid for 30 days. Costs may fluctuate if the contract expires and is re-issued.

☐ **(10) Submit shop drawings for review and approval (shopdraw@srpnet.com)**

- Only applies to 400 Amp SES or above

Project Design

- ☐ **(11) Notify SRP's Design Consultant when survey control points are set**
  - SRP Survey will tie down facilities on site
  - SRP Survey cannot complete staking until Owner's Agreements are received
  - For subdivisions only, submit all prepared exhibits to Project Leader. Survey steps 8 and 12 apply to third party easements for subdivisions.
- ☐ **(12) Receive and review easement documents, return executed documents to SRP's Project Leader**
- ☐ **(13) Receive and review Customer Construction Prints, provide approval**
  - The following should be completed prior to SRP issuing the Customer Construction Prints
    - SRP has received approval of Redline prints
    - SRP has received payment and executed contract

Project Customer Construction / Consultation

- ☐ **(14) Contact SRP's Design Consultant to request pre-construction meeting**
  - SRP's Construction Consultant will attend the pre-construction meeting to review the scope of work
  - Please arrange for your civil and electrical representatives to attend the meeting
- ☐ **(15) Submit service request(s) to the Construction Contact Center (602-236-0777)**
  - A service request for each meter needs to be submitted prior to SES inspections
- ☐ **(16) Contact SRP's Construction Consultant for questions and to request inspections**
- ☐ **(17) Receive 75% contract (if applicable), execute contract and return payment**
  - SRP Design Consultant will send this after 60% insepctions are completed
- ☐ **(18) SRP construction is scheduled once the following are completed:**
  - 100% inspections are completed
  - Electrical Clearance from Authority having Jurisdiction is obtained
  - Letter of Authorization for lighting from Authority having Jurisdiction is received
  - Easements are executed
  - All payments and contracts are received

Jobs may be reviewed for cancellation for the following (as specified in the contract):

1. Contract must be executed and invoice must be paid within 30 days of issuance.
2. Customer must schedule a pre-construction meeting within 120 days after SRP provides the customer construction prints.
3. Customer must begin construction within 180 days after SRP provides the customer construction prints.

Distribution Construction Standards and Electric Service Specifications are Available at:
http://www.srpnet.com/electric/business/specs/default.aspx

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Project Number: _____ **Design Consultant:** _____
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SRP CHECKLIST AND REQUEST FOR DESIGN

Project Name: Gilbert Regional Park **Project Number:** TBD

Site address/location: SWC Queen Creek Rd & Higley Rd, Gilbert AZ

Commercial ☑ **Residential Subdivision** ☐ **Apartments/Condos/ Townhomes** ☐ **Individual Residence (less than 5 lots)** ☐

Number of lots or units:_____ **Residential units' square footage range (min to max):**_____

SES Amps: _____ **Service Phase: 1Ph** ☐ **3Ph** ☐ **SES Voltage: 120/240V** ☐ **120/208V** ☐ **277/480V** ☐

Customer Construction Schedule

	Anticipated Need Dates
1st Jurisdictional Reviewed Plans are Available:	_____
Redline/Bidding Documents:	_____
Begin Civil Site Construction (trench and conduit):	_____
ENERGIZE NEED DATE:	_____

Required Items Necessary for SRP to Begin Design

1. Completed SRP Plan Review Request Form.
2. Electronic civil base file (Microstation or CAD) and PDF of dimensioned site plan.
3. One copy of dimensioned site plan or final plat (for subdivisions) to include all existing easements and Public Utility Easements (PUEs); proposed dedicated PUEs must be shown.
4. Hard copy of complete set of plans, after 1st jurisdictional review, including:
   Civil (water, sewer, paving, grading and drainage), on-site and off-site improvements, landscaping.
5. Electrical plans including panel schedules and one line diagram.
6. Street light plans (public and/or private) and completed SRP Lighting Request Form (if applicable).
7. Identify all additional service locations if applicable (landscape controllers, security gates, etc.)
8. Equipment / Product information including:
   SES amps and preferred location specific to each lot or unit, square footages, physical footprint, and Setbacks.

Project Scope Review (reviewed during the Project Scoping Meeting)	**Yes**	**No**
How many phases are planned for this project?		
How many model home lots (if any)? N/A		
Will the Authority Having Jurisdiction (AHJ) require conversion of overhead lines?	☐	☐
Will project impact transmission poles/lines/easements?	☐	☐
Are off-site improvements required?	☐	☐
Is relocation of existing SRP equipment required? (This may involve additional costs)	☐	☐
Are there plans for other utilities to be installed as joint trench with electric?	☐	☐
Are there existing or proposed gas lines? (If so, please reflect this on your CAD and submittal plans.)	☐	☐
Street Lights (letter of authorization (LOA) will be required to proceed)	**Yes**	**No**
Quantity of new private street lights (dusk to dawns)?	☐	☐
Quantity of new municipal street lights?	☐	☐
Are there any street light relocations needed?	☐	☐

Additional Electric Requirements	Yes	No
Please list all other meters required:		
Is temporary power for construction being requested?	☐	☐
Is solar planned or offered as an option?	☐	☐
Type of water heater used or offered in residential units? N/A		
Service entrance equipment (SES) purchased? If Yes: SRP equipment selection or review assistance available upon request. Submit shop drawings to shopdraw@srpnet.com for approval of SESs 400 Amps or above.	☐	☐
Plan Review *NOTE: Accessibility is evaluated by adherence to clearance requirements as per Section 5 and Section 9 of SRP's Electric Service Specifications (www.srpnet.com/electric/business/specs)*	**Yes**	**No**
Are the SESs accessible by truck?	☐	☐
Are there any meter rooms? If yes, check truck accessibility and pull section alignment with door	☐	☐
Is proposed transformer location accessible?	☐	☐
Is a Restricted Access Switch (RAS) required?	☐	☐
Is SRP truck access affected by covered parking on-site?	☐	☐
Are the existing and proposed PUEs shown in the plans?	☐	☐
Will SRP electrical be crossing Roosevelt District property? (RWCD or RID)	☐	☐

Additional Information

- Customer is responsible for all trenching and conduit, as well as purchase and installation of Service Entrance Sections.
- SRP builds a 'loop' system. Customers may be required to provide conduit stub-out(s) to the project property line. Design will evaluate each project, make this determination and provide direction to customer.

Jobs may be reviewed for cancellation for the following (as specified in the contract):

1. Contract must be executed and invoice must be paid within 30 days of issuance.
2. Customer must schedule a pre-construction meeting within 120 days after SRP provides the customer construction prints.
3. Customer must begin construction within 180 days after SRP provides the customer construction prints.

Distribution Construction Standards and Electric Service Specifications are Available at:
http://www.srpnet.com/electric/business/specs/default.aspx

Rev 10/2015

SRP PLAN REVIEW REQUEST FORM

Initiate the SRP processes required to support your new project by completing this "Plan Review Request Form." Please fill out all the required fields (*) and as much of the additional requested information as possible. **DATE SUBMITTED:** _____

REQUESTER INFORMATION

The **REQUESTER** is you. Please provide your individual work place information, or if acting as an individual, your personal information.

*Requester name: Sean Wozny

*Mailing address: 7740 N16th St, Suite 300, Phoenix AZ 85020

*Phone number: 602-321-8350 *Email: sean.wozny@kimley-horn.com

IF APPLICABLE: Please provide the following information about the company for which you are employed.

*Entity/Company: Kimley-Horn

Phone number: 602-321-8350 *Email: sean.wozny@kimley-horn.com

Mailing address (if different than above): same

REQUESTER'S CLIENT (AS APPLICABLE)

Please provide the following information about the company you are representing for this project.

*Company name: Town of Gilbert

*Client contact: Jack Gierak / Sr Project Manager

*Phone number: 480-227-6414 Email: jack.gierak@gilbertaz.gov

PROJECT INFORMATION

*Name (Name used in all project communications): Gilbert Regional Park

*Reference number (created by you or client): (Inquiry 273050)

*Address/location: SWC Queen Creek Rd & Higley Rd, Gilbert AZ
(Specific street address if available, or nearest major cross-streets. Example: NWC Baseline Rd. and Rural Rd.)

Governing municipality: Town of Gilbert

*Type: ☐ Residential ☐ Commercial ☐ Industrial ☐ Other

***QUESTION:** Will your project require new electrical/power service?

☐ NO If **NO**, an SRP Land Agent will be contacting you to discuss compatibilities with existing SRP facilities. Please select the **SAVE AND EMAIL** button below.

☑ YES If **YES**, an SRP representative will contact you to discuss any SRP issues related to your project.

If you answered **YES** to the above, please provide the following information and then select the **SAVE AND EMAIL** button below.

Requester's legal Corporation/LLC/INC/Individual name and address to be placed on contracts (as registered per the ACC):

Name: Town of Gilbert

Address: _____

Authorized signature who will be signing contracts:

Name: Jack Gierak Title: Sr Project Manager

Address: 90 E Civic Center Dr, Gilbert AZ 85296

Phone number: 480-227-6414 Email: jack.gierak@gilbertaz.gov

Client's on-site Project Manager or primary contact:

Name: _____ Title: _____

Address: _____

Phone number: _____ Email: _____

SAVE AND EMAIL

SRP®

APPENDIX D

OCOTILLO ALIGNMENT STUDY

Maricopa County
Department of
Transportation
Planning Division

Ocotillo Road
Greenfield Road to Recker Road
C00-1697-10-00

FINAL

CANDIDATE ASSESSMENT REPORT

FEBRUARY 28, 2000

Prepared By:

Sverdrup

Thomas R. Buick, P.E.
Chief Public Works Officer,
Transportation Director & County Engineer

MARICOPA COUNTY ARIZONA

DEPARTMENT OF TRANSPORTATION

March 2, 2000

Mr. Rick Allred
Engineering Manager
Town of Gilbert
1025 S. Gilbert Road
Gilbert, AZ 85296-3401

Dear Mr. Allred:

Attached for your information and records is the final Candidate Assessment Report for Ocotillo Road, Greenfield to Recker Road.

If you have any questions or require more information, please call me at 602-506-0069.

Sincerely,

Saeed Al-Saffar
Project Manager

Attachment

Phoenix, Arizona 85009 • (602) 506-8600 • (FAX) 506-4858

Maricopa County
Department of
Transportation
Planning Division

Ocotillo Road
Greenfield Road to Recker Road
C00-1697-10-00

FINAL

CANDIDATE ASSESSMENT REPORT

FEBRUARY 28, 2000

Registered Professional Engineer (Civil)
CERTIFICATE NO
21705
ROGER W.
MILES
Date Signed 2-29-00
ARIZONA, U.S.A.

Prepared By:

Sverdrup

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Registered Professional Engineer (Civil)
CERTIFICATE NO. 21705
ROGER W. MILES
Date Signed 2/28/02
ARIZONA, U.S.A.

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CANDIDATE ASSESSMENT REPORT

FOR

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD

WORK ORDER NO: C00-1679-10-00

SECTIONS 14, 15, 22 & 23, T 2S, R 6E, G&SRB&M

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION PLANNING DIVISION

FEBRUARY 2000

Project Name:	Ocotillo Road	**Project Termini:**	Greenfield Road to Recker Road
Requested by:	Chandler School District and the Mayor of Queen Creek		
Improvement Requested:	Provide a roadway along the Ocotillo Road alignment between Greenfield Road and Recker Road.		
PM_{10} Area?	Yes	**Length:**	2.7 km (1.7 miles)
Estimated Cost:	$8,759,103		

EXECUTIVE SUMMARY

Problem Statement:
Ocotillo Road is an east-west two-lane paved road that ends at Greenfield Road and begins again 4.8 kilometers (3.0 miles) to the east at Power Road. It is classified as a secondary Road in the MDCOT transportation system plan. In 1998, the Chandler School District and the Mayor of Queen Creek requested connecting this portion of roadway to provide alternative access to schools in the area for students. This Candidate Assessment Report will address the design of 2.7 kilometers (1.7 miles) of Ocotillo Road from 484 m (1,587') east of Greenfield Road to Recker Road. This portion of the roadway is located within Maricopa County jurisdiction. The roadway alignment east of Recker Road serves as the dividing line between the Town of Gilbert and the Town of Queen Creek. Annexation of the roadway seems unlikely in the near future. The Towns of Gilbert and Queen Creek will coordinate the planning of the portion of Ocotillo Road between Recker Road and Power Road with local developers.

Ocotillo Road is a MCDOT maintained gravel road east of Greenfield Road extending approximately 660 meters (2,165 feet) where it terminates at the Roosevelt Water Conservation District (RWCD) Canal. Between the RWCD Canal and Power Road, Ocotillo Road is a private one-lane dirt farm road that provides access to agricultural fields.

During the field review for this project, it was discovered that a preliminary plat had been submitted to Maricopa County for a new development located north and south of Ocotillo Road from Greenfield Road to the RWCD Canal. This development (JM Estates) includes improvements to both sides of Ocotillo Road but not the RWCD crossing. On Ocotillo Road from Greenfield Road to the RWCD Canal, the proposed improvement consists of the construction of a five-lane urban minor arterial section. Gilbert may annex the JM Estates development in the near future. No other developer funding opportunities are apparent since the adjacent private land is within the floodplain of the Sanoqui Wash or Queen Creek Wash east of the RWCD Canal.

The Ocotillo Road alignment between Higley Road and Power Road is located within the floodplain of Sanoqui Wash. The Flood Control District of Maricopa County is currently studying the unchannelized and unmaintained reaches of the Sanoqui and Queen Creek Washes. **Tim Phillips is the FCDMC's Project Manager for the master hydraulic plan, which is scheduled to be completed in the spring of 2000.** Preliminary discussions with the FCDMC indicate that they will be proposing a new flood control channel adjacent to and south of the Ocotillo Road right-of-way. The Ocotillo Road project can be constructed as a joint project with the wash improvements or after the Sanoqui Wash Improvement have been completed.

Recommendation:

This project should not be programmed and included in the 5-year CIP until after the FCDMC has an approved plan for Sanoqui Wash and until JM Estates, Power Ranch and Sossaman Estates improve their frontage along Ocotillo Road. The scope of this project should be revised at the DCR level to exclude the portion of Ocotillo Road to be constructed by JM Estates. The title should be revised to Ocotillo Road – RWCD Canal to Recker Road.

Alternate 1, Rural Five-Lane Improvement, is the recommended future alternative. This alternative would construct a five-lane urban arterial roadway from the 5-lane urban section proposed by JM Estates east to a new bridge over the East Maricopa Floodway (EMF). This urban roadway section would also cross over a single-barrel box culvert at the RWCD Canal. East of the new EMF Bridge, a five-lane rural arterial roadway will be constructed to Recker Road. This section will also need a bridge structure constructed over the Queen Creek Wash. Over one-third of the project construction cost (almost $2.2 million) would be needed to construct the three structures.

This alternative will require acquisition of right-of-way along the north and south sides of the roadway alignment to provide a consistent total width of 33.5 meters (110 feet). Additional drainage easement strips, 6.1 m (20 ft), would be required north and south of

Ocotillo Road to construct linear retention/detention ditches. This would require the acquisition 8.24 hectares (20.3 acres) of new right-of-way/drainage easements. The total cost for the right-of-way would be $812,000.

Between the EMF and Higley Road, off-site flows would be directed to either the EMF or Queen Creek Wash. Between Higley Road and Recker Road, two new 910 mm (36-inch) pipe culverts would be constructed to convey off-site storm water runoff and tailwater from north of Ocotillo Road into the proposed Sanoqui Wash. Pavement runoff would be directed into linear retention/detention ditches that are located parallel with Ocotillo Road.

The Ocotillo Road alignment should be centered on the section line. This will require the relocation of a 69kV line between the RWCD Canal and Higley Road and a short section of 12kV line located west of the RWCD Canal. JM Estates would relocate the 69kV line between Greenfield Road and the RWCD Canal. Relocation of the power poles and RWCD facilities would be approximately $244,000. In addition, at the southwest corner of Ocotillo Road and the RWCD Canal a private irrigation well along with its associated distribution structures and piping may need to be relocated. The cost to relocate the well site would be approximately $300,000.

The intersection of Higley Road and Ocotillo Road should be signalized. Stop control would be used for both Greenfield Road and Recker Road. The cost for signalization would be approximately $110,000.

Of the 6,437 m (21,120 feet) of project frontage (land adjacent to the proposed R/W) between Greenfield Road and Recker Road, 5,633 m (18,480 feet) is currently under the jurisdiction of Maricopa County. The remaining 804 meters (2,640 feet) of project frontage (land adjacent to the proposed R/W) is within the corporate limits of the Town of Gilbert. The entire roadway is within the jurisdiction of Maricopa County.

BACKGROUND

Project Name:
Ocotillo Road from Greenfield Road to Recker Road.

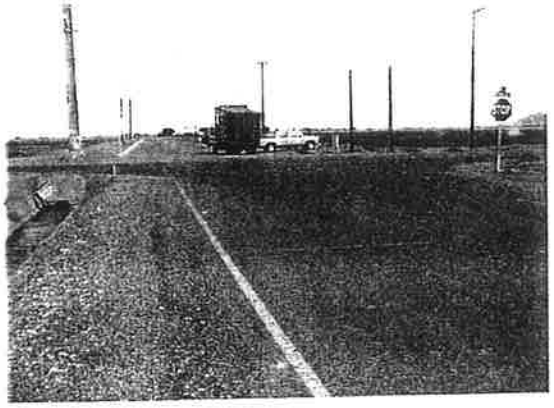
General Description and Project Location:
Ocotillo Road from Greenfield Road to Recker Road is located in southeast Maricopa County as shown in the location map on page 5. It is located east of the City of Chandler, west of the Town of Queen Creek, north of the Chandler Heights community, and south of the Town of Gilbert. Major north-south transportation routes include Gilbert Road, three miles to the west, and Power Road located one mile to the east. Significant east-west roadways in the area include Queen Creek Road, one mile to the north and Chandler Heights Road one-mile south. There are no major transportation generators in the vicinity of the project. However, as the area begins to develop as proposed by Power Ranches, Sossaman Estates, and JM Estates, traffic on the arterial road system will increase. This development is planned to peak around the construction of the Santan Freeway in 2006 and 2007. The Santan Freeway (Loop 202) will be located 3.5 miles to 5.5 miles north of Ocotillo Road from Greenfield Road to Recker Road.

The project is located within undeveloped farm and vacant land. Aside from the proposed residential development east of Greenfield Road (JM Estates), no other residential development abuts the project. However, the Power Ranch Development is located to the north of Ocotillo Road east of Recker Road, Sossaman Estates is located to the south of Ocotillo Road east of Recker Road, and there are a few residences located near the roadway alignment. These include a farm residence located southwest of Ocotillo Road and the RWCD Canal and four residences located southwest of the future intersection of Ocotillo Road and Recker Road. North of Ocotillo Road between Higley Road and Recker Road, the City of Mesa owns property for joint use with the Town of Gilbert as a future wastewater recharge site. The exact use for the property has not been determined. There may be future public recreation facilities developed for this square mile of public land. This property will not have significant direct access requirements on Ocotillo Road as compared to residential or commercial development, which will reduce future traffic demand on Ocotillo Road.

From Higley Road to Recker Road, the Town of Gilbert's border is located 16.764 meters (55 feet) north of the east half of the south section line of Section 14, Township 2 South, Range 6 East. The boundary maps for the Town of Gilbert and the Town of Queen Creek are shown on pages 7 and 8.

Ocotillo Road between Val Vista Drive and Greenfield Road is currently a two-lane paved road with no posted speed limit signs. East of Greenfield Road, Ocotillo Road is a two-way gravel surface for approximately 660 meters (2,165 feet) where it terminates at the Roosevelt Water Conservation District Canal. This portion of gravel roadway is part of the county road system and is being maintained by MCDOT. The gravel road serves as access to adjacent farm fields, a farmhouse, and the RWCD Canal. There are no posted speed limit signs for the gravel road. A concrete lined irrigation delivery ditch

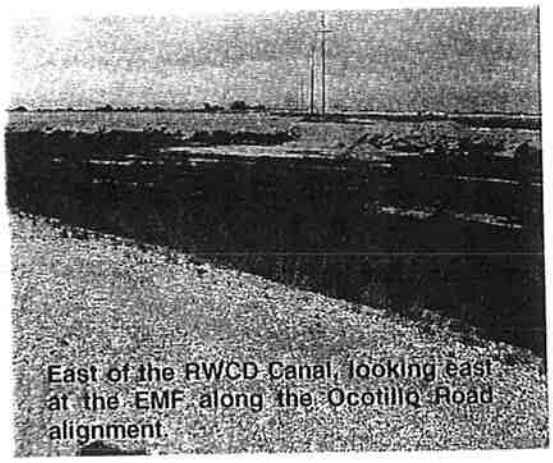
is located along the north side of Ocotillo Road and the 69 kV power lines are located mostly north of the concrete irrigation ditch.



Looking East along Ocotillo Road at the Greenfield Road intersection.

East of RWCD Canal looking west along the Ocotillo Road alignment.

Ocotillo Road does not cross the RWCD Canal or the EMF. East of the EMF to Higley Road, Ocotillo Road is a one-lane dirt road providing access to adjacent parcels, the flood control channels, and the power lines. The land is vacant excepting the irrigation, flood control and power distribution facilities. The RWCD Canal flows in a southwesterly direction across Sections 15 and 22 in Township 2 South, and Range 6 East. On the east side of the RWCD Canal is the EMF. The East Maricopa Floodway is a flood control facility owned and operated by the Flood Control District of Maricopa County (FCDMC). The EMF has a 60.96 meter (200-foot) channel bottom, with 3:1 side slopes, a 4.26 meter (14-foot) berm on either side of the channel and has a total right-of-way width of 106.68 meters (350-feet). Queen Creek is also a FCDMC facility and also crosses the aforementioned Sections 15 and 22 in a southwesterly direction in a channel located within a total right-of-way width of 40.23 meters (132-feet). A 69kV power distribution line is located north of the south section line of Section 14, Township 2 South, Range 6 East.



East of the RWCD Canal, looking east at the EMF along the Ocotillo Road alignment.

East of Higley Road, Ocotillo Road continues as a one-lane dirt road providing access to adjacent parcels. This is also the alignment of Sanoqui Wash for which runoff in this area concentrates along the roadway alignment and flows to the west. Some attempt has been made by local farmers to contain portions of the Sanoqui Wash flow from the east between two parallel levees that end abruptly at Higley Road. Sanoqui Wash flows over Higley Road and then turns to the south flowing into Queen Creek near Chandler

Heights Road. FCDMC is considering improvements to Sanoqui Wash in the future (see the drainage section).

Because there is no paved public roadway along the Ocotillo Road alignment between Greenfield Road and Recker Road, there is currently only one intersection. The intersection of Ocotillo Road and Greenfield Road is unsignalized with stop sign control placed on the eastbound and westbound Ocotillo Road approaches. Ocotillo Road is a two-lane paved rural roadway west of the intersection and a two-lane gravel roadway east of the intersection, with the eastern leg terminating at the RWCD Canal. Greenfield Road is a two-lane paved rural roadway north and south of the intersection.

At Ocotillo Road intersection, looking south along Greenfield Road.

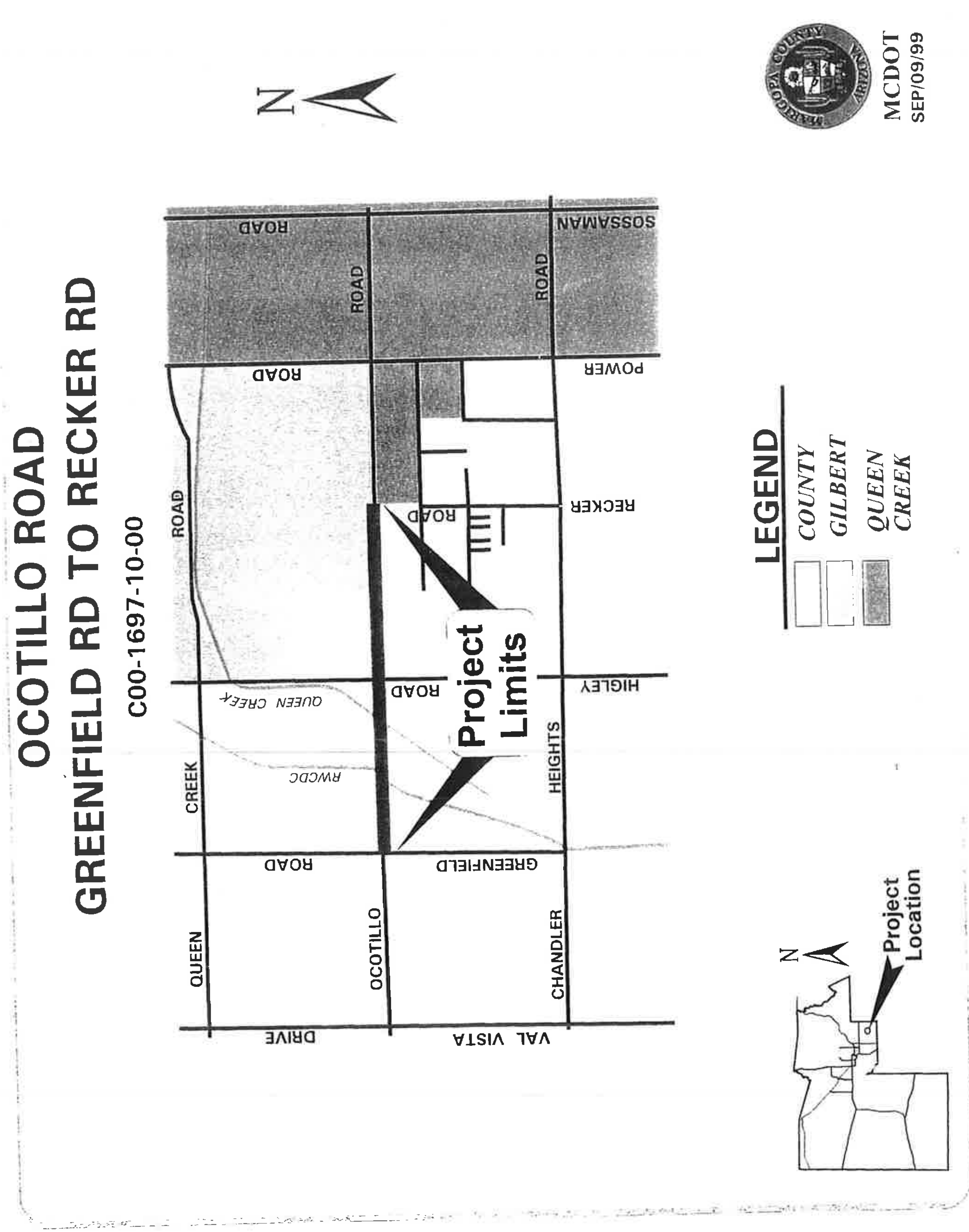
At Ocotillo Road intersection, looking south along Higley Road.

There currently are no planned public roadway improvements for Ocotillo Road at the proposed intersection of Ocotillo Road and Higley Road. Higley Road is a paved two-lane rural highway to the north and south of the Ocotillo Road alignment.

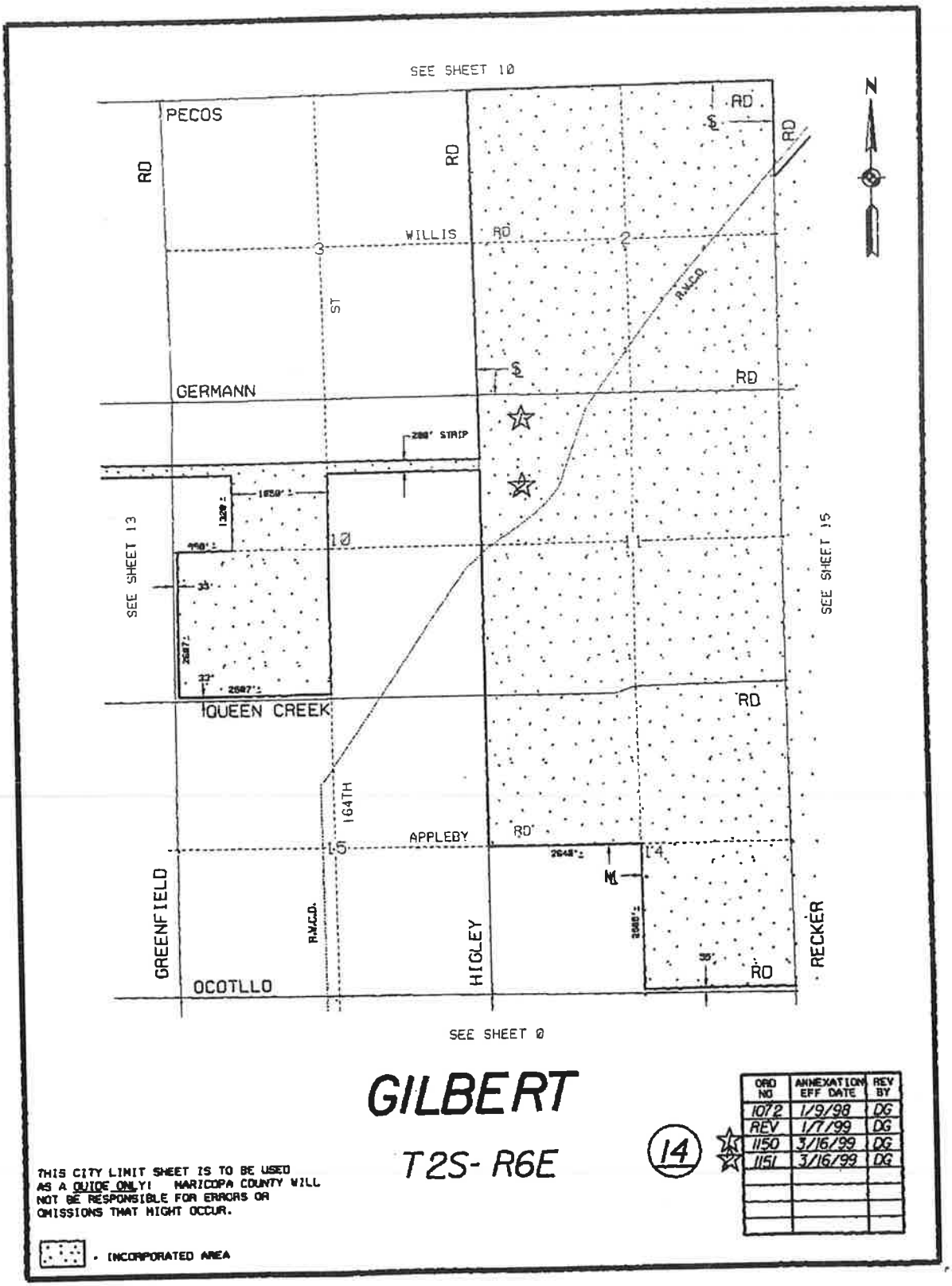
Type and Reason for Improvements:

With several new developments opening up in the near future on the east and west ends of this project, Ocotillo Road will become a necessary component of the regional and local traffic network. Constructing Ocotillo Road to four-lanes with a center turn-lane would provide an additional crossing of Queen Creek, the East Maricopa Floodway and the RWCD Canal with ample capacity needed to accommodate future traffic volumes. The maximum benefit for this project won't be realized unless the developers complete Ocotillo Road from Greenfield Road to the RWCD Canal and from Recker Road to Power Road. Adjacent property access will be greatly enhanced making the adjacent land outside the Sanoqui Wash more developable.

Completion of the Santan Freeway will place the nearest interchange from the west to Queen Creek at Val Vista Drive and north of Germann Road. The Town of Queen Creek will need east-west corridors for access to the Santan. When the Ocotillo Road is complete to Power Road, it will provide direct access to the center of Queen Creek and the Town Hall located 4 miles to the east near Ocotillo Road and Ellsworth Road.

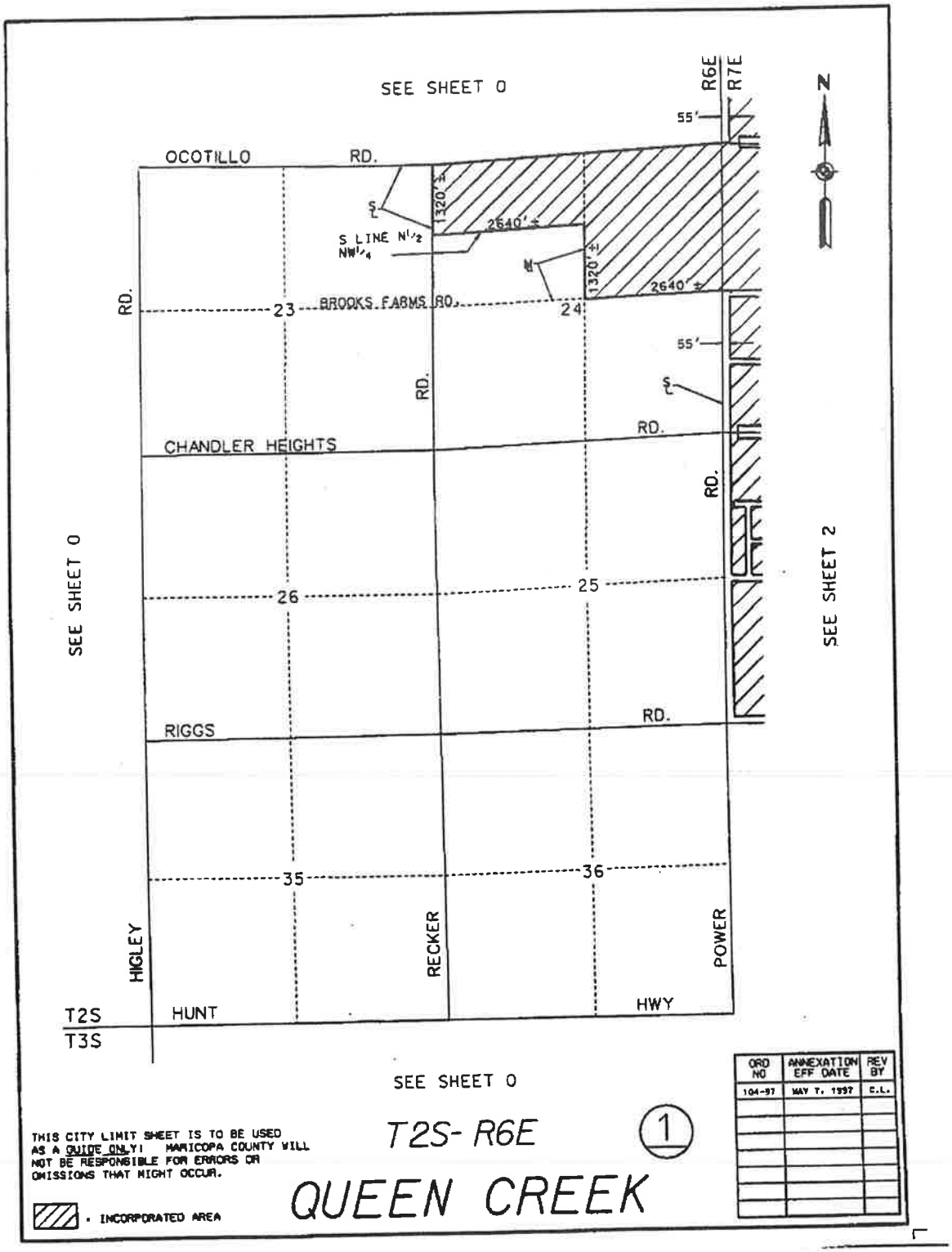

OCOTILLO ROAD
GREENFIELD RD TO RECKER RD
C00-1697-10-00
N
MCDOT
SEP/09/99
Project Limits
QUEEN CREEK ROAD
OCOTILLO ROAD
CHANDLER HEIGHTS ROAD
VAL VISTA DRIVE
GREENFIELD ROAD
HIGLEY ROAD
RECKER ROAD
POWER ROAD
SOSSAMAN ROAD
QUEEN CREEK
RWCDC
LEGEND
COUNTY
GILBERT
QUEEN CREEK
Project Location
M:2:\CLIENTS\SAEED AL-SAFFAR\OCOTILLO.cdr

GILBERT TOWN BOUNDARIES



ORD NO	ANNEXATION EFF DATE	REV BY
1072	1/9/98	DG
REV	1/7/99	DG
1150	3/16/99	DG
1151	3/16/99	DG

QUEEN CREEK TOWN BOUNDARIES



TRAFFIC INFORMATION

Traffic Counts and Projections:

The Maricopa Association of Governments (MAG) identified Ocotillo Road as providing access from Greenfield Road to Power Road in their 2010 and 2020 regional traffic modeling of this area. This Candidate Assessment Report (CAR) will identify the improvements necessary based on current Maricopa County Standards to meet the traffic volumes identified in the regional traffic modeling of Ocotillo Road.

Because of a discrepancy with the MAG AADT projections for the design year 2020, Sverdrup was directed to use only the 2010 MAG AADT projections for this report. The MAG 2020 projections were significantly less than the MAG 2010 projections. The 2010 projection does not consider the Santan Freeway (Loop 202), which is scheduled for completion in 2007. For this report, the MAG 2010 projections were assumed to be constant from 2010 to 2020.

Existing MCDOT traffic counts and modeled future traffic counts with Ocotillo Road connected between Greenfield Road and Power Road are listed below:

LOCATION	1998	MAG 2020
Ocotillo Road, west of Greenfield Road	583	6,800
Ocotillo Road, Greenfield Road to Higley Road	N/A	6,700
Ocotillo Road, Higley Road to Recker Road	N/A	10,650
Ocotillo Road, east of Recker Road	N/A	9,870

The significant cross roads are Greenfield Road, Higley Road and Recker Road. The cross street traffic volumes are based on counts conducted by MCDOT and on modeled future traffic volumes and are shown below:

LOCATION	1998	MAG 2020
Greenfield Road, North of Ocotillo Road	816	2,600
Greenfield Road, South of Ocotillo Road	638	2,700
Higley Road, North of Ocotillo Road	2,218	2,970
Higley Road, South of Ocotillo Road	2,218	4,570
Recker Road, North of Ocotillo Road	N/A	120
Recker Road, South of Ocotillo Road	N/A	880

See Appendix B for the MAG 2010 traffic distribution. The MAG road segment codes for Ocotillo Road from Greenfield Road to Higley Road was 2-lanes and from Higley Road to Power Road was 4-lanes. The increase in traffic volumes listed above for 2020 are mainly due to development growth in the area.

There are no posted speed limit signs on Ocotillo Road east and west of Greenfield Road. There are no posted speed limit signs on Greenfield Road north and south of Ocotillo Road. The existing speed limit on Higley Road between Queen Creek Road and Chandler Heights Road is 50 mph. It is anticipated that Ocotillo Road would be

posted at 75 km/hour (45 Mph) following completion of the roadway improvements due to the likelihood of several adjacent parcels being developed within the next 5 years including Power Ranch, Sossaman Estates, and JM Estates.

Peak hour traffic volumes were determined by multiplying the 2020 AADTs by the appropriate Peak Hour percentage in Table 2.1 of the MCDOT Roadway Design Manual.

Since Ocotillo Road does not exist between Greenfield Road and Recker Road, turning movement counts could not be taken in the field. Turning movements were estimated based on the two-way traffic projections. Calculations for the turning movements for each of the intersections can be found in Appendix B.

The level of service (LOS) was calculated in accordance with the Highway Capacity Manual, Special Report 209, Transportation Research Board, 1998.

Three typical sections were evaluated for the future 2020 traffic projection. The sections included a two-lane two-way rural section, a five-lane rural section, and a five-lane urban section. Since no roadway exists today, no evaluations were prepared for existing conditions. The results of the LOS analysis for Alternative 1 are shown in the table below. The worksheets can be found in Appendix B.

Ocotillo Road Segment	Future (2020) LOS	Desired LOS
Greenfield Road to Higley Road		
Two-lane Rural Section	C	B
Five-lane Rural Section	A	C
Five-lane Urban Section	A	C
Higley Road to Recker Road		
Two-lane Rural Section	D	B
Five-lane Rural Section	A	C
Five-lane Urban Section	A	C

Since the LOS for a two-lane roadway is not acceptable for the 2020 traffic projection (see Table 2.1, MCDOT Roadway Design Manual), a minimum of a five-lane roadway section should be used for Ocotillo Road. However, this project should not be considered until the area west of the RWCD Canal (JM Estates) is developed and the two developments east of Recker Road (Power Ranches and Sossaman Estates) are underway. These developments will provide sufficient traffic to justify the 5-lane roadway and bridge construction. For the recommended alternative (Alternative 1), a rural minor arterial (Figure 5.2, MCDOT Roadway Design Manual) was selected. For Alternative 2, an urban minor arterial (Figure 5.8, MCDOT Roadway Design Manual) was selected. The LOS results for each intersection is shown in the table below.

Intersection	Future (2020) Peak Hour LOS	Inter. Delay
Ocotillo Road/Greenfield Road		
With Prop. Geometrics (Unsignalized)	A	3.2
With Prop. Geometrics (Signalized)	B	6.6
Ocotillo Road/Higley Road		
With Prop. Geometrics (Unsignalized)	B*	9.0
With Prop. Geometrics (Signalized)	B	6.1
Ocotillo Road/Recker Road		
With Prop. Geometrics (Unsignalized)	A	0.7

Delay = seconds/vehicle
* Unsignalized Intersection not acceptable because SB Lt. Turn shows LOS F.

See Appendix B for level of service work sheets.

For the Ocotillo Road/Greenfield Road intersection, it has been assumed that the developer (JM Estates) will improve the north, south, and east legs. Because Ocotillo Road will be the dominant roadway, it is recommended that the intersection stop control be removed from Ocotillo Road and added to Greenfield Road. In addition, a left-turn lane should be added to the west leg of Ocotillo Road to match the geometrics of the east leg. See Appendix B for a sketch of the intersection.

For the Ocotillo Road/Higley Road intersection, it is recommended that the intersection be signalized. See Appendix B for a sketch of the intersection.

For the Ocotillo Road/Recker Road intersection, it is recommended that the intersection have stop control for Recker Road. See Appendix B for a sketch of the intersection.

Accident Data:
Because Ocotillo Road is not currently connected between Greenfield Road and Power Road, accident history was requested for the major cross street of Greenfield Road, Higley Road, and for Ocotillo Road from Val Vista Drive east to Greenfield Road. The accident records data was supplied by MCDOT for the 3-year period between January 1, 1996 to June 30, 1999. Only one non-intersection accident was reported. The accident was located on Ocotillo Road between Val Vista Drive and Greenfield Road outside the limits of this project. The accident occurred in the evening, resulting in the vehicle running off the road and into the ditch.

DRAINAGE

The area surrounding the Ocotillo Roadway alignment is gently sloping down to the west at a rate of approximately 0.3%. West of the RWCD Canal to Greenfield Road, the runoff flows in a southwesterly direction and discharges into a concrete lined irrigation supply ditch.

Approximately 800 meters (2,600 ft) east of Greenfield Road the East Maricopa Floodway crosses the roadway alignment at a 40-degree skew to the right. The East Maricopa Floodway is a major flood control channel constructed parallel with the RWCD Canal to drain floodwater away to the Gila River. Runoff between Queen Creek Wash and the East Maricopa Floodway flows in a southwesterly direction discharging into the East Maricopa Floodway. Approximately 400 meters (1,300 ft) west of Higley Road, Queen Creek crosses the Ocotillo Road alignment at a 40-degree skew to the right. The 100-year flow for Queen Creek has been estimated at 85 cms (3,000 cfs).

The Ocotillo Roadway alignment segment between Higley and Recker Roads is located within the Sanoqui Wash floodplain. Runoff in this area concentrates along the roadway alignment and flows to the west. Some attempt has been made by local farmers to contain portions of the Sanoqui Wash flow between two parallel levees that end abruptly at Higley Road. Tailwater flows from farm fields to the north are also discharged between the levees, which flows to the west and under Higley Road through a 1.2 m (4-ft) diameter pipe. The 100-year flow for Sanoqui Wash has been estimated at 107.6 cms (3,800 cfs) with the wash flowing over 800 meters (2,600 ft) wide. Sanoqui Wash flows over Higley Road and turns to the south flowing into Queen Creek near Chandler Heights Road.

Several drainage studies have been prepared that cover this area. They include the Queen Creek Area Drainage Master Study, which was completed for the Flood Control District of Maricopa County (FCDMC) by Wood and Associates Consulting Engineers. Entellus prepared the "Sanoqui Wash Floodplain Delineation Study", which was recently completed in March of 1999. Huitt-Zollars is currently preparing the "Queen Creek/Sanoqui Wash Hydraulic Master Plan & East Maricopa Floodway Study". As of this writing, the Floodplain Delineation Study has not been submitted to FEMA. The FCDMC was planning to develop an approved hydraulic concept prior to submitting the information to FEMA. The FDCMC contact for the Sanoqui Wash study is Tim Phillips (602-506-4718).

The Flood Control District of Maricopa County is currently developing concepts for Sanoqui Wash in the study being prepared by Huitt-Zollars. The FCDMC is currently favoring a concept that places the improved Sanoqui Wash channel to the south of and adjacent to the Ocotillo Road right-of-way between Higley and Recker Roads. The preliminary channel section is 76 m (250 ft) wide as shown on the Concept Plans.

The (Recommended) Alternative 1 is a Rural Five-Lane Improvement. The drainage improvements will consist of roadside drainage ditches to collect and retain stormwater from the roadway right-of-way between the East Maricopa Floodway and Recker Road. Offsite flows from areas to the north of the roadway will be directed into the Sanoqui Wash or the East Maricopa Floodway. Between Greenfield Road and the East Maricopa Floodway, this area is proposed for development by JM Land Development. The JM Estates Plat identified retention basins to be constructed by the development north and south of Ocotillo Road to contain the runoff from the development and the roadway. Bridges proposed to cross over the East Maricopa Floodway and Queen Creek will need to have a minimum clearance of 3.1 meters (10 ft) for equestrian purposes. Bridges located just south of Ocotillo Road for Higley Road and Recker Road over the

Sanoqui Wash will also need a minimum clearance of 3.1 meters (10 ft) for equestrian purposes, but are not included as part of this roadway project. The close proximity of the bridges to Ocotillo Road will affect the vertical profile of the roadway during final design. See Appendix C for drainage calculations and ditch typical section.

For Alternative 2, an Urban Five-Lane Improvement, drainage improvements will consist of a series of catch basins to collect runoff from the roadway surface. Stormwater will be retained in roadside drainage ditches between the East Maricopa Floodway and Recker Road. Offsite flows from areas to the north of the roadway will be directed into the Sanoqui Wash or the East Maricopa Floodway. Between Greenfield Road and the East Maricopa Floodway, this area is proposed for development by JM Land Development. The JM Estates Plat identified retention basins to be constructed by the development north and south of Ocotillo Road to contain the runoff from the development and the roadway. Bridges proposed to cross over the East Maricopa Floodway and Queen Creek will need to have a minimum clearance of 3.1 meters (10 ft) for equestrian purposes. See Appendix C for drainage calculations and ditch typical section.

The retention basin volumes for the roadway have been based on 25-year, 2-hour storm event.

IRRIGATION

For both Alternatives, the RWCD Canal will be enclosed within a new single barrel 4,270 mm (14') x 2,440 mm (8') Reinforced Concrete Box Culvert skewed at 40 degrees right to the roadway. In addition, the existing canal weir will be relocated to the south to clear the box culvert headwall by a minimum of 6.1 m (20 ft). Construction of the box culvert and the canal weir must take place during the annual dry-up period in November-December to avoid a temporary by-pass of the canal.

LAND USE

Zoning and Land Use Plans:

The land uses adjacent to the site are a mixture of undeveloped agricultural land, single-family residential, with property owned by the City of Mesa, Flood Control District of Maricopa County, and the Roosevelt Water Conservation District.

Current Maricopa County Generalized Zoning for the area shows that the adjacent land is zoned for residential estates according to the Maricopa County Queen Creek Land Use Plan. The property north of Ocotillo Road from ½ mile west of Recker Road to Recker Road lies within the Town of Gilbert and is zoned R1-10 and R1-8 (see Appendix D).

The project limits are located within the San Tan Area Plan (see Appendix D), which was a study prepared by CSC/Counts for the Town of Gilbert. The San Tan Planning Area boundaries are approximately between Hunt Highway north to Germann Road and east of Lindsay Road to Recker Road. The business activity in this area is primarily

dairy, citrus and grain farming. The residents rely on retail services in the surrounding communities for shopping opportunities. The majority of the existing residents commute to other parts of the Valley for employment. The following major employers currently exist within a 16-kilometer (10-mile) diameter of the Planning Area: Intel (Chandler Blvd & Rural Rd), Williams Gateway Airport (Power Rd & Williams Field Roads), General Motors Proving Grounds (Ellsworth Rd & Ray Rd), Motorola (Alma School Rd & Ray Rd and Ocotillo Rd & Price Rd), Chandler-Gilbert Community College (Pecos Rd & Gilbert Rd), Chandler Airport (Gilbert Rd & Queen Creek Rd), Shamrock Dairy (Chandler Heights Blvd & Higley Rd), Allied Signal and Zinke Dairy. This study also indicated that a proposed school site might be located in the southwest quadrant of Ocotillo Road and Higley Road (NE ¼ of Section 22, Township 2S, and Range 6E).

Pending Development:
There are several current development proposals pending along Ocotillo Road between Greenfield Road and Recker Road. The current proposals are all found in Township 2 South, Range 6 East and are found in Sections 15, 22, 14, and 23 (see Appendix D). The development proposals are listed below and arranged according to their respective Section. The Town of Gilbert will probably annex this development.

Section 15 – North of Ocotillo Road to Queen Creek Road, between Greenfield Road and Higley Road.

- JM Estates is a development proposed by JM Land Development II [2200 South 75th Avenue, Phoenix, Arizona 85043, Phone: (602) 432-0696]. The proposed site in Section 15 is north of Ocotillo Road to Appleby Road and between Greenfield Road east to the RWCD Canal. The plans propose residential development for this section. The Town of Gilbert will probably annex this development.

Section 22 – South of Ocotillo Road to Chandler Heights Road, between Greenfield Road and Higley Road.

- JM Estates is a development proposed by JM Land Development II [2200 South 75th Avenue, Phoenix, Arizona 85043, Phone: (602) 432-0696]. The proposed site in Section 22 is south of Ocotillo Road to Chandler Heights Road and between Greenfield Road east to the RWCD Canal. The plans propose a combination of residential and commercial development for this section. The plans for the southeast corner of Ocotillo Road and Greenfield Road propose a grocery store, retail/office space, bank and a fast food restaurant.

Section 14 – North of Sanoqui Wash to Queen Creek Road, between Higley Road and Recker Road.

- The City of Mesa in conjunction with the Town of Gilbert has proposed the entire Section 14 as the "Future Recharge Site for Reclaimed Wastewater" (620 acres).

Section 23 – South of Sanoqui Wash to Queen Creek Road, between Higley Road and Recker Road.

- This section is mixture of agriculture and residential uses. The eastern half of this section is being broken down into 1-13 acre single family dwellings.

Adjacent Development:

- The Power Ranch development is being constructed between Ocotillo Road north to Pecos Road and east of Recker Road to Power Road (Township 2S, Range 6E, Sections 1, 12 & 13). This development is in the Town of Gilbert.

- The Sossaman Land Company (1,262 acres) is proposing a residential development east of Power Road, from approximately a quarter mile south of Ocotillo Road north to Queen Creek Road. The development also crosses over into the southwest corner of Power Road and Ocotillo Road. This development is in the Town of Queen Creek.

- The Seville development (1,381 acres) is being proposed between Riggs Road north to Chandler Heights Road and between Higley Road east to Power Road (Township 2S, Range 6E, Sections 25 & 26). The developer is working with the Town of Gilbert to annex the facility.

Potential Partners (Intergovernmental & Private):

The Town of Gilbert, the Town of Queen Creek, the FCDMC, and adjacent property owners will benefit from the roadway improvements. The FCDMC will need to develop the Sanoqui Wash in concert with the roadway project to plan for right-of-way and material needs and to ensure the future integrity of the roadway, since the roadway would otherwise be located within the floodplain of the wash. In addition, the FCDMC is reviewing alternatives for improvements to the EMF that may involve a large detention facility between the EMF and Queen Creek on both sides of Ocotillo Road. The Ocotillo Road project could benefit from the use of borrow material from the channelization of Sanoqui Wash. The FCDMC is a very strong potential partner for this project since the roadway work and the Sanoqui Wash channelization are so closely linked geographically. Also since the adjacent properties east of the EMF cannot be developed until Sanoqui Wash is channelized, adjacent large property owners may be willing to dedicate R/W and participate in the funding. Power Ranches and Sossaman Estates may participate in the construction of Ocotillo Road east of Recker Road. The Towns of Gilbert and Queen Creek are not likely to annex adjacent property unless it is being developed which does not seem likely in the near future. Since the Town of Gilbert's boundary is located 16.764 m (55 ft) north of the south section line for the east half of Section 14, and other development in the area are being annexed by the town. Thus, there may be a partnering opportunity with the Town of Gilbert.

RIGHT-OF-WAY

The boundary limit maps for the Town of Gilbert and Queen Creek are shown on pages 7 and 8 respectively. Right-of-way requirements and calculations are shown on the plan sheets in Appendix A. Copies of the Assessor's Maps are included in Appendix D.

Existing:
Along Ocotillo Road between Greenfield Road and Higley Road, the existing right-of-way width is 10.058 meters (33 feet) north (T-2S, R-6E and Section 15) and south (T-2S, R-6E and Section 22) of the section line. Between Higley Road and Recker Road the existing right-of-way width north of the section line (T-2S, R-6E and Section 14) is 16.764 meters (55 feet) for the first 0.805 kilometers (0.5-mile) and there is no existing right-of-way for the remaining 0.805 kilometers (0.5-mile) to Recker Road. South of the section line (T-2S, R-6E and Section 23) between Higley and Recker Road, there is only right-of-way for 88.392 meters (290 feet) just east of Higley Road and that is 12.192 m (40 feet) wide.

Proposed:
Improvement of Ocotillo Road using the **(Recommended) Alternative 1**, will require obtaining a uniform strip 16.76 meters (55 feet) of right-of-way north and south of the Ocotillo Road Centerline. At the intersections, an additional triangular corner piece of right-of-way measuring 13.72 meter by 13.72 meter (45' x 45') will also be required. A drainage easement will be needed north and south of the above right-of-way 6.096 meters (20 feet) wide.

Improvement of Ocotillo Road using **Alternative 2,** will also require obtaining a uniform 16.76 meters (55 feet) of right-of-way north and south of the Ocotillo Road Centerline. At the intersections, an additional triangular corner piece of right-of-way measuring 13.72 meter by 13.72 meter (45' x 45') will also be required. A drainage easement will be needed north of the above right-of-way 7.62 meters (25 feet) wide.

ENVIRONMENTAL

At present, Ocotillo Road does not connect Greenfield and Recker Roads. Approximately ¼ mile of the two-mile stretch between Greenfield and Recker Roads is undeveloped where the Roosevelt Water Conservation District (RWCD) Canal and Queen Creek traverse the project area. The land use in this unincorporated part of Maricopa County is primarily agricultural.

The majority of the project area along Ocotillo Road is sparsely vegetated; however, evidence of a riparian habitat is visible along Queen Creek. The riparian habitat may support threatened or endangered species. No landfill or hazardous waste sites were observed or known to be in the area. Hazardous materials were not observed in the project area.

Because a large portion of the project area is undeveloped, a cultural resources survey would need to be included in the environmental clearance process. Encroachment on Queen Creek may require a biological evaluation and a Section 404 Water Quality Permit. In addition, a *Notice of Intent to Clear* is required by the Arizona Department of Agriculture at least 60 days prior to removing any native plant species from the project area.

MAJOR DESIGN CRITERIA

Standard Typical Sections	Rural Minor Arterial, flush median (Fig. 5.2) Urban Minor Arterial, flush median (Fig 5.8)
Level of Service (LOS)	C
Design Year	2020
Design Vehicle	WB-50
Design Speed	Rural - 105 km/h (65 mph) Urban – 90 km/h (55 mph)
Maximum Super-Elevation	Rural - 0.08 m/m Urban – 0.04 m/m
Lane Widths	3.6 m (12 ft)
Shoulder Width	1.5 m (5 ft)
Median	4.2 m (14 ft)
Roadway Cross-Slope	2 %
Shoulder Cross-Slope	20:1
Embankment Cut/Fill Slopes	6:1
Clear Zone	Urban - 0.45 m (1.5 ft) behind curbs Rural - 10.06 m (33 ft) without curbs
Minimum Stopping Sight Distance	Rural - 168 m (550 ft) Urban – 137 m (450 ft)
Minimum Passing Sight Distance	N/A
Sidewalks	N/A
Maximum Longitudinal Grade	Rural - 3.0% Urban – 5.0 %
Minimum Longitudinal Grade	0.25%
Curb & Gutter Types	Std. Dtl. 220, Type A
Curb Return Radii	10.7 m (35 ft) radius
Traffic Signals	Intersection of Ocotillo Rd/Higley Rd.
Guardrail (Rural Section)	60 m (200 ft) + ADOT GET
Vertical Clearance	N/A
Pavement Design Life	20 years
Drainage Criteria	
Retention Design (roadway)	25-yr, 2-hr storm event
Culvert Design	50-yr storm
Catch Basins and Laterals	10-yr storm
Standard Right-of-Way Requirements	16.764 m (55 ft) each side of centerline

ROADWAY DESIGN ALTERNATIVES

Typical Sections:

The typical sections for the **(Recommended) Alternative 1, Rural Five-Lane Improvement** includes a 21.94 meter (72 foot) five-lane rural minor arterial road with median from the EMF bridge to Recker Road and a 20.72 meter (68 foot) five-lane urban minor arterial road with median from the JM Estate improvements to the EMF bridge. The typical sections are shown in Appendix A.

The typical section for the **Alternative 2, Urban Five-Lane Improvement** is a 20.72-meter (68 foot) five-lane urban minor arterial road with median as shown in Appendix A.

Alternative Development:

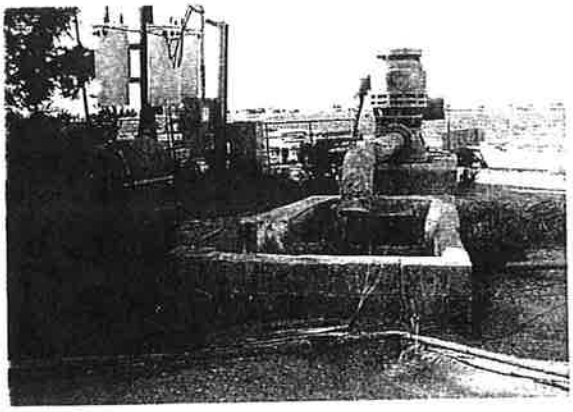
No Build Alternative:

The no build alternative would not address the need to connect Ocotillo Road between Greenfield Road and Recker Road.

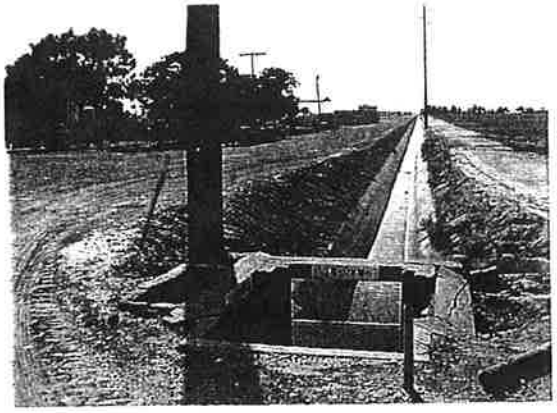
(Recommended) Alternative 1, Rural Five-Lane Improvement:

Alternative 1, Rural Five-Lane Improvement consists of constructing a five-lane road in accordance with MCDOT Standards for a rural minor arterial road from the EMF bridge east to Recker Road and an urban minor arterial road from the JM Estate improvements to the EMF bridge. The roadway construction centerline for the proposed sections will follow the section line except for two horizontal curves located at small angle deflections in the section line.

Between Greenfield Road and the RWCD Canal a new development (JM Estates) is in the preliminary plat stage. The development plans to improve Ocotillo Road from the two-lane gravel road to a five-lane urban minor arterial. The 69kV overhead power transmission line and a concrete irrigation supply ditch along the north side of Ocotillo



Looking north at private well, located south of Ocotillo Road and west of RWCD Canal.

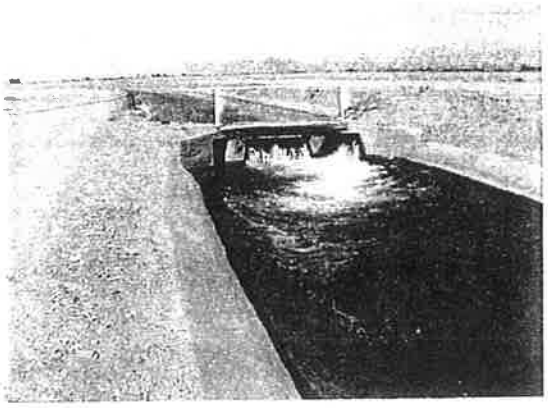


West of RWCD Canal looking west along concrete irrigation ditch and overhead 69 kV line.

Road will be removed and relocated to the north by the developer. Most of the 12-kV overhead power line along the south side of Ocotillo Road will also be removed and relocated to the south by the developer. However, a well site and farm residence located near the canal is not part of the development but will be affected by this project. The 12 kV lines will need to be relocated, but there may be enough clearance between the proposed curb and gutter and the well by constructing small retaining wall and guardrail. Detailed options will be explored in the DCR stage of this project.

The RWCD Canal will be conveyed under the proposed five-lane urban minor arterial within a new 4,270-mm (14') x 2,440-mm (8') reinforced concrete box culvert (RCBC). An existing irrigation gate and diversion structure will need to be moved to the north of the RCBC and an existing irrigation weir structure will need to be moved to the south of the RCBC.

Adjacent to the RWCD Canal is the EMF, requiring an 88.4-meter (290-foot) long by 25.7-m (84.8-ft) wide bridge structure (see typical section in Appendix A). East of the EMF, a five-lane rural minor arterial section will be used. Ocotillo Road will cross Queen Creek Wash, requiring a 61.6-meter (202-foot) long by 25.7-m (84.8-ft) wide bridge structure. The roadway profile across both bridges will need to be elevated to allow a minimum 10-foot vertical clearance under the bridges for future equestrian use.



Existing irrigation gate at the RWCD Canal.

Between the RWCD Canal and Higley Road, the 69-kV overhead power line along the section line will need to be relocated.

Looking east across the EMF along the Ocotillo Road alignment.

Looking north along Queen Creek Wash streambed at the Ocotillo Road alignment.

Between Higley Road and Recker Road, the Sanoqui Wash is located along the section line. The Flood Control District of Maricopa County is currently developing concepts for the wash in the study being prepared by Huitt-Zollars. Although this report has not been finalized, a representative from the Flood Control District of Maricopa County advised that a 250-foot channel width could be used for planning purposes and the Sanoqui Wash could be located south of the Ocotillo Road right-of-way.

The Ocotillo Road/Greenfield Road intersection (see sketch in Appendix B) will be improved by the JM Estates development. Ocotillo Road west of the intersection should be improved to provide an eastbound left-turn lane to better match up with the five lanes for the east leg of the intersection. The outside westbound lane would become a right-turn only lane onto northbound Greenfield Road.

The Ocotillo Road/Higley Road intersection (see sketch in Appendix B) should include NB and SB left-turn lane improvements on Higley Road. Ocotillo Road west and east of the intersection will have five lanes to provide a westbound and eastbound left-turn lane.

The Ocotillo Road/Recker Road intersection (see sketch in Appendix B) will include radius return improvements on Recker Road. The construction of Recker Road will be by others. The five-lane roadway section will end at the east radius returns on Recker Road. Others will complete improvements to Ocotillo Road east of Recker Road to Power Road.

A MCDOT standard pavement section of 100 mm (4 inches) of asphaltic concrete pavement over 250 mm (10 inches) of aggregate base course was used to develop project costs. A detailed pavement design will be performed and included in the Geotechnical Report, which is prepared during the project final design.

Alternative 2, Urban Five-Lane Improvement:
Alternative 2, Urban Five-Lane Improvement consists of constructing a five-lane road in accordance with MCDOT Standards for an urban minor arterial road from the JM Estate improvements to Recker Road. The roadway construction centerline for the proposed sections will follow the section line except for two horizontal curves located at small angle deflections in the section line.

The major differences between Alternative 1 and 2 include:

- Alternative 2 will use curb and gutter and catch basins throughout the project limits to control pavement runoff.
- No guardrail is required for Alternative 2 at the two bridge locations.
- The private well is relocated for Alternative 2.

RECOMMENDED ALTERNATIVE

Alternative 1, Rural Five-Lane Improvement is recommended over Alternative 2, Urban Five-Lane Improvement and the No Build Alternative for the following reasons:

- Alternative 1 provides a typical section that fits the character of the land use for this area (urban – west of the EMF and rural – east of the EMF). There is very little developable land between the RWCD Canal and Recker Road. With the future recharge site for reclaimed wastewater by the City of Mesa/Gilbert, the FCDMC land east of the RWCD Canal and the future location of the Sanoqui Wash on the south side of Ocotillo Road, the future need for curbing will be minimal. Alternative 1 provides adequate capacity to handle the projected 2010 traffic volumes. The No-Build Alternative provides no crossing of the EMF and Queen Creek.
- Alternative 1 has an overall lower cost than Alternative 2.

UTILITIES

The following utilities, either noted during the field review and/or from the Blue Stake Inquiry (#1999 102600282), were determined to be within or adjacent to the proposed right-of-way of Ocotillo Road between Greenfield Road and Recker Road.

- Queen Creek Water & Irrigation
  Contact: Paul T. Gardner
  Phone: (480) 987-3240
- Roosevelt Water Conservation District
  Contact: Joe Nyikes
  Phone: (480) 988-9586
- SRP Electric & Irrigation
  Contact: Jane
  Phone: (602) 236-5527
  Fax: (602) 236-3196
- Southwest Gas
  Contact: Teresa or Janice
  Phone: (602) 484-5431
  Fax: (602) 484-5353
- US West
  Contact: John Aker
  Phone: (602) 630-0496
  Fax: (480) 831-4928
- Tankersley Water
  Contact: Robert Summers
  Phone: (480) 503-6415
- Town of Gilbert
  Contact: Dan Glanders
  Phone: (480) 503-6433
- Queen Creek Irrigation
  Contact: Dean Griffith
  Phone: (480) 987-3002

SRP 69 kV and 12 kV power lines will require relocation in conjunction with the improvements to Ocotillo Road.

DESIGN EFFORT

Design Exceptions:
No design exceptions are required for this project.

Survey:
This project will require control and topographic survey.

Design:
This project will require the following:

- Roadway Design
- Drainage Design
- Utility Coordination
- Bridge Design
- IGA Coordination
- R/W Acquisition

Construction Cost Estimate:

The construction cost estimate for the Recommended Alternative 1, Rural Five-Lane Improvement is $5,546,968. This cost includes bridges over the EMF and Queen Creek plus a concrete box culvert crossing of the Roosevelt Water Conservation District Canal ($2,158,792). Assuming construction takes place in five years, the construction cost would be $6,399,301using an annual inflation rate of 2.90% (the average yearly % change in the U.S Consumer Price Index over the past 10 years).

The total project costs $8,759,103 (current) and $10,105,004 (inflated) are shown in the Cost Estimate Summary on the following page.

COST ESTIMATE SUMMARY

Project Name & Termini: Ocotillo Road, Greenfield Road to Recker Road
Report or Work Order No. C00-1679-10-00

1999 CAR PRELIMINARY SUMMARY COST ESTIMATES (Current Dollars)

COST CATAGORIES	*Factors*	*No Build*	*Rural Five Lane Alternative*	*Urban Five Lane Alternative*
Construction		$0	$5,546,968	$6,366,675
Design (10% TO 15%)	13%	$0	$721,106	$827,668
Construction Management	15%	$0	$832,045	$955,001
Right-of-Way (@ $40,000/ac)		$0	$812,000	$691,600
Utility Relocation		$0	$292,288	$292,288
Administration (8% TO 13%)	10%	$0	$554,697	$636,667
Total		**$0**	**$8,759,103**	**$9,769,899**

PRELIMINARY SUMMARY COST ESTIMATES (Adjusted for Inflation)

Assumed Annual Inflation Rate = 2.90%
Assumed Number of Years = 5

Adjusted Construction Cost	$0	$6,399,301	$7,344,962
Design	$0	$831,909	$954,845
Construction Management	$0	$959,895	$1,101,744
Right-of-Way	$0	$936,770	$797,869
Utility Relocation	$0	$337,200	$337,200
Administration	$0	$639,930	$734,496
Adjusted Total	$0	$10,105,004	$11,271,116

Construction Costs – Recommended Alternative 1

PROJECT: Ocotillo Road, Greenfield Road to Recker Road
1999 CONSTRUCTION COST WORK SHEET

Five Lane Alternative: Rural Minor Arterial					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
107.01100	N.P.D.E.S.	L.S.	1	$4,000.00	$4,000
107.09200	Community Relations	Allowance	1	$20,000.00	$20,000
210.03000	Borrow Excavation (If anticipated)	CM	59,200	$9.00	$532,800
215.00000	Channel & Retention Basin Excavation	CM	13,800	$7.00	$96,600
220.01400	Plain Riprap	CM	16	$45.00	$720
301.00000	Subgrade Preparation	SQ M	59,234	$2.75	$162,894
	New Asphalt Pavement (See Pavement Sheet)	SQ M	59,234	$17.90	$1,060,289
336.08100	Pavement Sawcut	M	50	$6.50	$325
340.01120	Conc. C & G	M	550	$34.50	$18,975
340.09750	Concrete Driveway w/5' Wings, Std. Det. 250	SQ M	45	$40.00	$1,800
350.01110	Removal of Existing Improvements	L.S.	1	$10,000.00	$10,000
402.00000	Traffic Signing & Striping - 4 lanes	M	2,730	$6.40	$17,472
402.00000	Traffic Signal, Full Intersection	EA	1	$110,000.00	$110,000
402.00000	Traffic Signal, Future "Box-in"	EA	1	$4,800.00	$4,800
505.06125	Catch Basin - Curb Inlet	EA	2	$3,600.00	$7,200
618.02318	460 mm (18") RGRCP, Class III	M	74	$138.00	$10,212
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M	74	$215.00	$15,910
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA	4	$1,800.00	$7,200
	RWCD Box Culvert (See Structure Sheet)	EA	1	$68,992.00	$68,992
	Queen Creek Bridge (See Structure Sheet)	EA	1	$863,784.00	$863,784
	East Maricopa Floodway Bridge (See Structure Sheet)	EA	1	$1,226,016.00	$1,226,016
415.00000	Guardrail without approach end section	M	360	$78.00	$28,080
	Guardrail Approach End Section - New ADOT Type	EA	6	$2,000.00	$12,000
		Subtotal			$4,280,068
110.01000	Mobilization @ 5%	L.S.	1	$214,003.00	$214,003
401.00000	Traffic Control @ 3%	L.S.	1	$128,402.00	$128,402

Subtotal Construction		$4,622,473
Contingency	20%	$924,495
Total		**$5,546,968**

Construction Costs – Alternative 2

PROJECT: Ocotillo Road, Greenfield Road to Recker Road
1999 CONSTRUCTION COST WORK SHEET

Five Lane Alternative: Urban Minor Arterial					
Item #	Description	Unit	Quantity	Unit Cost	Total
107.01100	N.P.D.E.S.	L.S.	1	$4,000.00	$4,000
107.09200	Community Relations	Allowance	1	$20,000.00	$20,000
210.03000	Borrow Excavation (If anticipated)	CM	62,400	$9.00	$561,600
215.00000	Channel & Retention Basin Excavation	CM	12,240	$7.00	$85,680
220.01400	Plain Riprap	CM	39	$45.00	$1,755
301.00000	Subgrade Preparation	SQ M	54,725	$2.75	$150,494
	New Asphalt Pavement (See Pavement Sheet)		54,725	$17.90	$979,578
340.01120	Conc. C & G	M	5,130	$34.50	$176,985
340.00000	Conc S/W Ramp Std Det 231 Type "A"	EA	8	$700.00	$5,600
340.06950	Concrete Sidewalk Std Det 230	SQ M	300	$32.00	$9,600
340.09750	Concrete Driveway w/5' Wings, Std. Det. 250	SQ M	74	$40.00	$2,960
350.01110	Removal of Existing Improvements	L.S.	1	$10,000.00	$10,000
402.00000	Traffic Signing & Striping - 4 lanes	M	8,410	$6.40	$53,824
402.00000	Traffic Signal, Full Intersection	EA	1	$110,000.00	$110,000
402.00000	Traffic Signal, Future "Box-in"	EA	1	$4,800.00	$4,800
505.06125	Catch Basin - Curb Inlet	EA	44	$3,600.00	$158,400
618.02318	460 mm (18") RGRCP, Class III	M	510	$138.00	$70,380
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M	74	$215.00	$15,910
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA	4	$1,800.00	$7,200
	Private Irrigation Relocation (See Irrigation Sheet)	L.S.	1	$325,000.00	$325,000
	RWCD Box Culvert (See Structure Sheet)	EA	1	$68,992.00	$68,992
	Queen Creek Bridge (See Structure Sheet)	EA	1	$863,784.00	$863,784
	East Maricopa Floodway Bridge (See Structure Sheet)	EA	1	$1,226,016.00	$1,226,016
		Subtotal			$4,912,557
110.01000	Mobilization @ 5%	L.S.	1	$245,628.00	$245,628
401.00000	Traffic Control @ 3%	L.S.	1	$147,377.00	$147,377
		Subtotal Construction			$5,305,562
		Contingency		20%	$1,061,112
		Total			**$6,366,675**

Pavement Costs

APPROXIMATE UNIT COSTS FOR PAVEMENT AND OVERLAY SECTIONS

Unit Cost Derivation for Arterial Section Shown:		Metric	Actual	Used	See
2	Aggregate Base Thickness 250 mm	250 mm	9.843"	10"	Computations
	Asphalt Concrete Thickness 100 mm	100 mm	3.937"	4"	Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
310.07100	Aggregate Base (10")	Ton	0.5250	$11.80	$6.20
315.07000	Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	$310.00	$0.50
	Tack Coat	SY	1	$0.18	$0.18
321.03100	Asphalt Concrete, C 3/4 (4")	Ton	0.2189	$36.50	$7.99
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$310.00	$0.12
	Pavement Cost Per SY				$14.98
	Pavement Cost Per SQ M				$17.92
Rounded	Unit Cost Per SQ M for 100 mm over 250 mm			Total	$17.90

Utility Relocation Costs

Alternative:					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
1	Relocate 69 kV Power Pole	EA	13	$10,500.00	$136,500.00
2	Other Poles associated w/ 69kv Power Line	EA	1	$7,000.00	$7,000.00
3	RWCD Facilities by RWCD Forces (See Calc Shee	EA	1	$100,073.00	$100,073.00
	Subtotal Construction				$243,573.00
	Contingency			20%	$48,714.60
	Total				$292,287.60

Structure Costs

BOX CULVERT COST CALCULATIONS

TYPE OF ROAD	BOX LENGTH	BOX DESCRIPTION	BOX WIDTH	TOP SFC AREA'	UNIT	COST**	TOTAL COST
URBAN MINOR ARTERIAL***	35.2	New 1 - 4270mm x 2440 mm (14' x 8'), Skewed 40 deg. rt. RCBC for the RWCD Canal	4.9	172.48	SQ M	$400.00	$68,992.00

* Top Surface Area of box.

** Includes cost of standard wing walls and bridge barrier. For special construction review unit cost with MCDOT bridge section.

*** Perpendicular Width is 25.8 m or 84.6' for 5 Lanes & 2 Sidewalks

BRIDGE COST CALCULATIONS

TYPE OF ROAD	BRIDGE LENGTH	BRIDGE DESCRIPTION	BRIDGE WIDTH	TOP SFC AREA'	UNIT	COST**	TOTAL COST
URBAN MINOR ARTERIAL***	88	New East Maricopa Floodway Bridge	25.8	2270.4	SQ M	$540.00	$1,226,016.00
URBAN MINOR ARTERIAL***	62	New Queen Creek Bridge	25.8	1599.6	SQ M	$540.00	$863,784.00

* Top Surface Area of bridge.

** Cost Includes bridge railings, barriers, approach slabs, piers, and other items of bridge construction. Note: Show cost of channel excavation, rip rap , and other bridge site work on roadway spread sheet.

*** Perpendicular Width is 25.8 m or 84.6' for 5 Lanes & 2 Sidewalks

RWCD Irrigation Costs

CONSTRUCTION OF RWCD IRRIGATION FACILITIES BY RWCD FORCES

THE FOLLOWING WORKSHEET FOR DETERMINING AN APPROXIMATE COST OF RELOCATING RWCD FACILITIES

(Note: English Units)

Alternatives: 1 and 2					
Item #	Description	Unit	Quantity	Unit Cost	Total
	Mobilization	L.S	1	$6,000.00	$6,000
	Clearing, Grubbing and Site Clean Up	EA	1	$6,000.00	$6,000
	Canal Weir Structure	EA	1	$40,000.00	$40,000
	Irrigation Delivery Structure w/ Gates	EA	1	$15,000.00	$15,000
	24" RGRCP	LF	50	$65.00	$3,250
	30" & 36" RGRCP	LF	85	$85.00	$7,225
	Headwall w/ Gate	EA	1	$3,500.00	$3,500
	Remove Existing Structures	LS	1	$10,000.00	$10,000
	Subtotal Construction				$90,975
	Irrigation System Design	LS	1	10%	$9,098
	Total RWCD Relocation Estimate				$100,073

Alternative: 2 Only					
Item #	Description	Unit	Quantity	Unit Cost	Total
	Irrigation Well Relocation	EA	1	$300,000.00	$300,000
	Irrigation Delivery Structure w/ Gates	EA	1	$15,000.00	$15,000
	Remove Existing Structures	LS	1	$10,000.00	$10,000
	Total Private Irrigation Relocation Estimate				$325,000

MCDOT Rating System Data

DOT Rating System Data Input

Project: Ocotillo Road, Greenfield Road to Recker Road

Criteria	Category	Type of Data Input	Data
Safety	Accident Rate & Type of Accident 1. Fatal 2. Incapacitating 3. Non-Incapacitating 4. Possible 5. No Injury	Annual Accidents per Million Miles of Travel and number of accidents by type Rate = (Total Accidents/Yr) (1,000,000) / (ADT * Project Length) (365/Days/Yr)	Current ADT 0 Proj Length 2.0 # Years Collect 3 # Fatal 0 # Incapacitating 0 # NonIncp 0 # Possible # No Injury 0
	Sufficiency Rating	0 - 100 100 = New Road	N/A**
	Pavement Condition Rating (PCR)	0 - 100 100 = Excellent Road	N/A**
	International Roughness Index (IRI)	0 - 500 0 = Smooth Road	N/A**
Land Use, Regional Travel, and Environmental Factors	Environmental Factors	Project is in a Non Attainment Area and one of the following two criteria	Yes or No
		Project paves a Dirt Road	Yes or No
		Project provides Paved Shoulders or Curbs	Yes or No
	Regional Travel	Percent Regional Travel Usage	* %
	TSP Land Use Points	From TSP Investment Potential Matrix	*
	Project Location Percent of the project area in the County		%
Current and Future V/C Ratios	Current (2005) V/C Ratio	Volume and Capacity from the MAG Transportation Model or Consultant	Vol _____ Cap _____*
	Future (2020) V/C Ratio	Volume and Capacity from the MAG Transportation Model or Consultant	Vol _____ Cap _____*
Project Benefits and Costs	Benefits and Costs for a 20 Year Period	Project Cost	$8,759,103
		Benefit/ Cost Ratio	*
oint Sponsorship	Local Partnership Contribution	Percent a local city or town is willing to Cost Share	%
	Included in a Local Jurisdiction's CIP	Yes or No	Yes or No
Bonus	**Intelligent Transportation System (ITS)**		
	ITS Corridor	Yes or No	
	Signal System Interconnect	Yes or No	
	Regional Traveler Info. System Data Collection	Yes or No	
	Surveillance & Monitoring of the Corridor	Yes or No	
	Roadway/Transit/Pedestrian/Bicycle		
	Bike Lanes	Yes or No	
	Sidewalks	Yes or No	
	Landscaping	Yes or No	
	Bus Pull Outs	Yes or No	
	Environmental Components		
	Environmental Enhancements	Yes or No	
	Avoidance of Significant Archaeological Sites	Yes or No	
	Environmental Restoration of Old Roadways	Yes or No	
	HAZMAT Site Cleanup Partnering	Yes or No	

* MCDOT Responsibility

** One-way dirt road

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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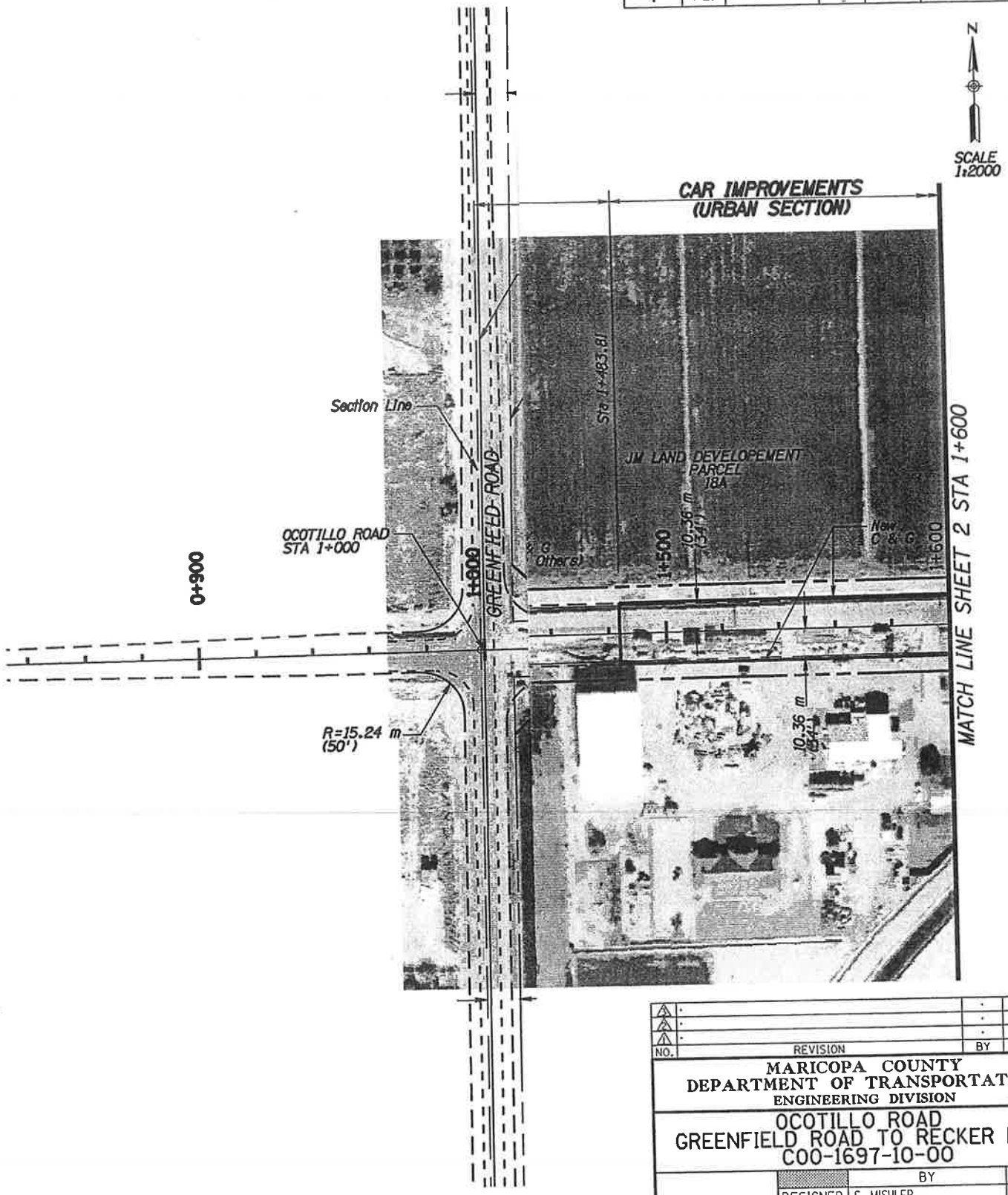

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
C00-1697-10-00

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	S. MISHLER	11/21/99
	DRAWN	B. EDGAR	11/21/99
	CHECKED	R. MILES	11/21/99

Sverdrup CORPORATION

ALTERNATIVE I, RURAL FIVE-LANE IMPROVEMENT

SHEET 1 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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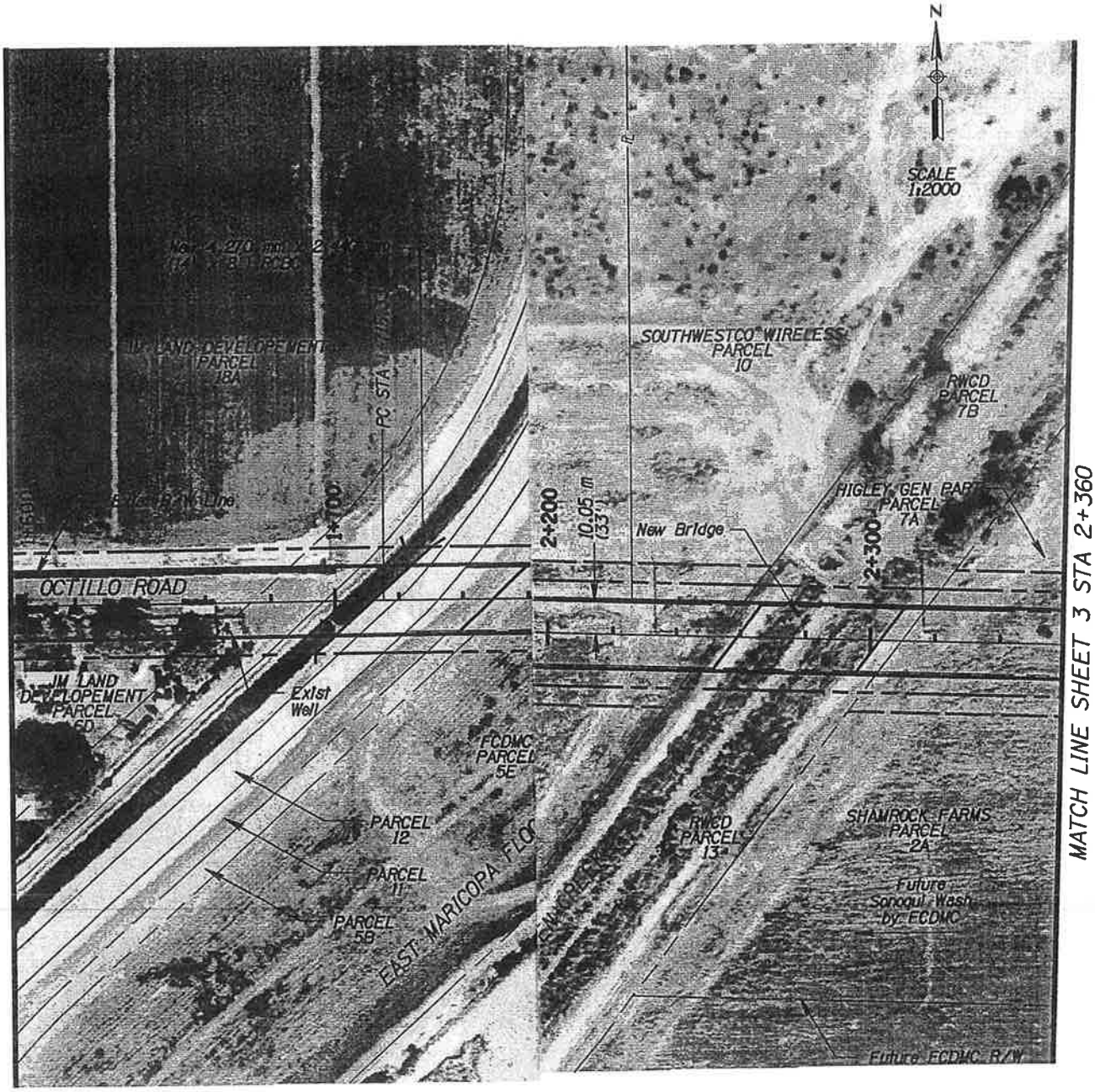

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MARICOPA COUNTY
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Sverdrup CORPORATION

ALTERNATIVE I, RURAL
FIVE-LANE IMPROVEMENTS

SHEET 2 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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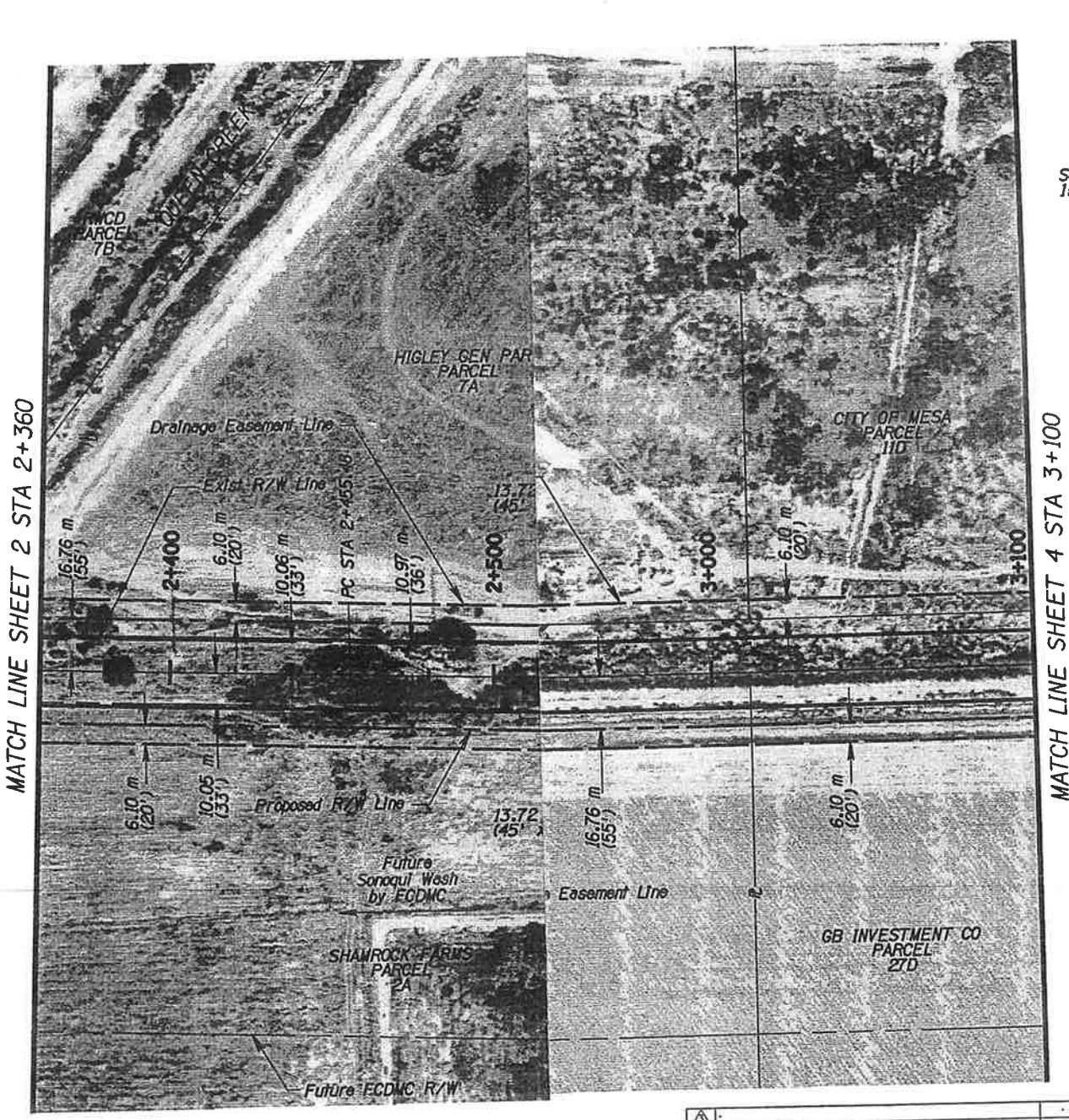

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MARICOPA COUNTY
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ENGINEERING DIVISION

OCOTILLO ROAD
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Sverdrup
CORPORATION

ALTERNATIVE I, RURAL
FIVE-LANE IMPROVEMENTS

SHEET 3 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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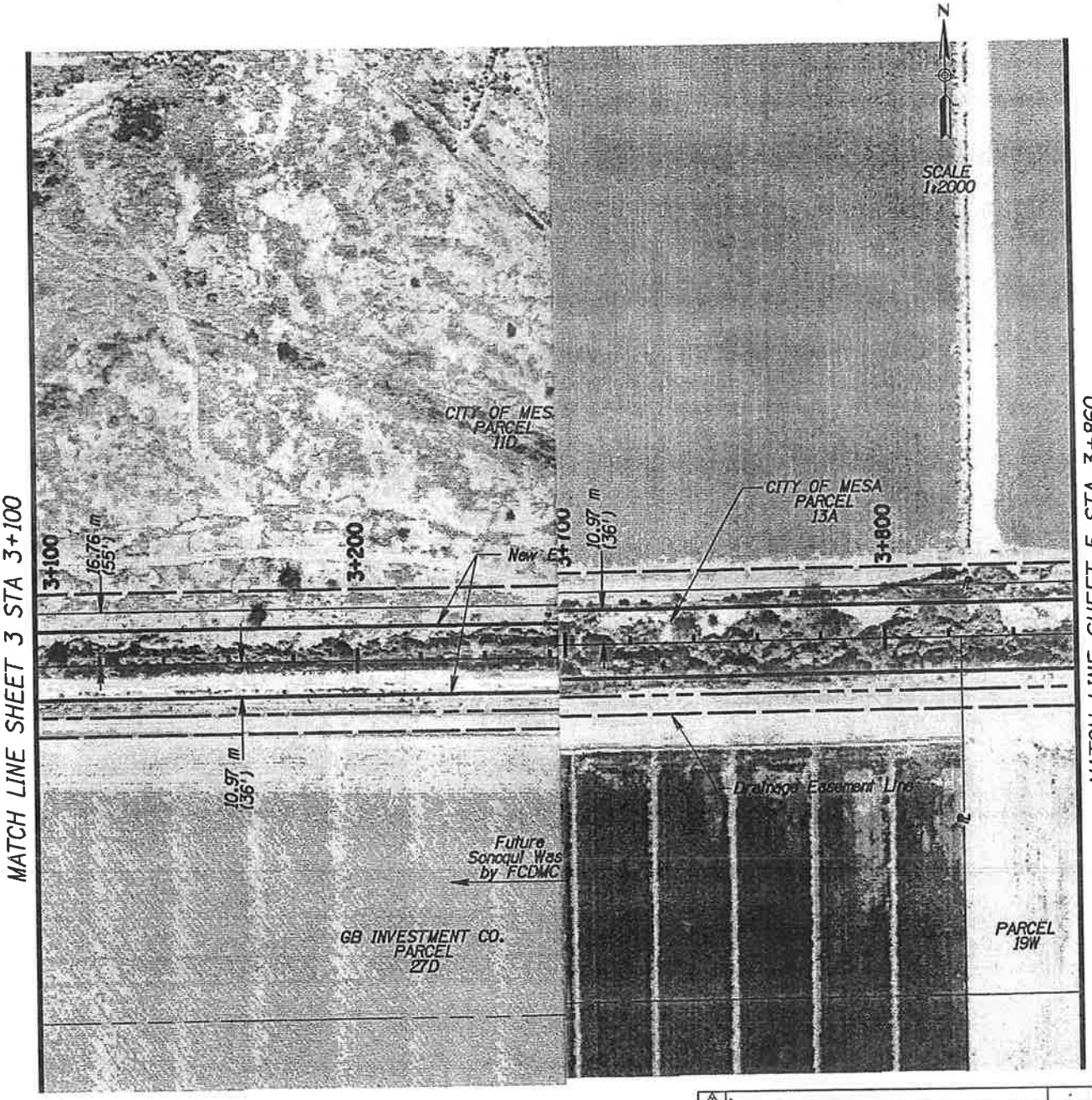

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

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Sverdrup
CORPORATION

ALTERNATIVE 1, RURAL
FIVE-LANE IMPROVEMENTS

SHEET 4 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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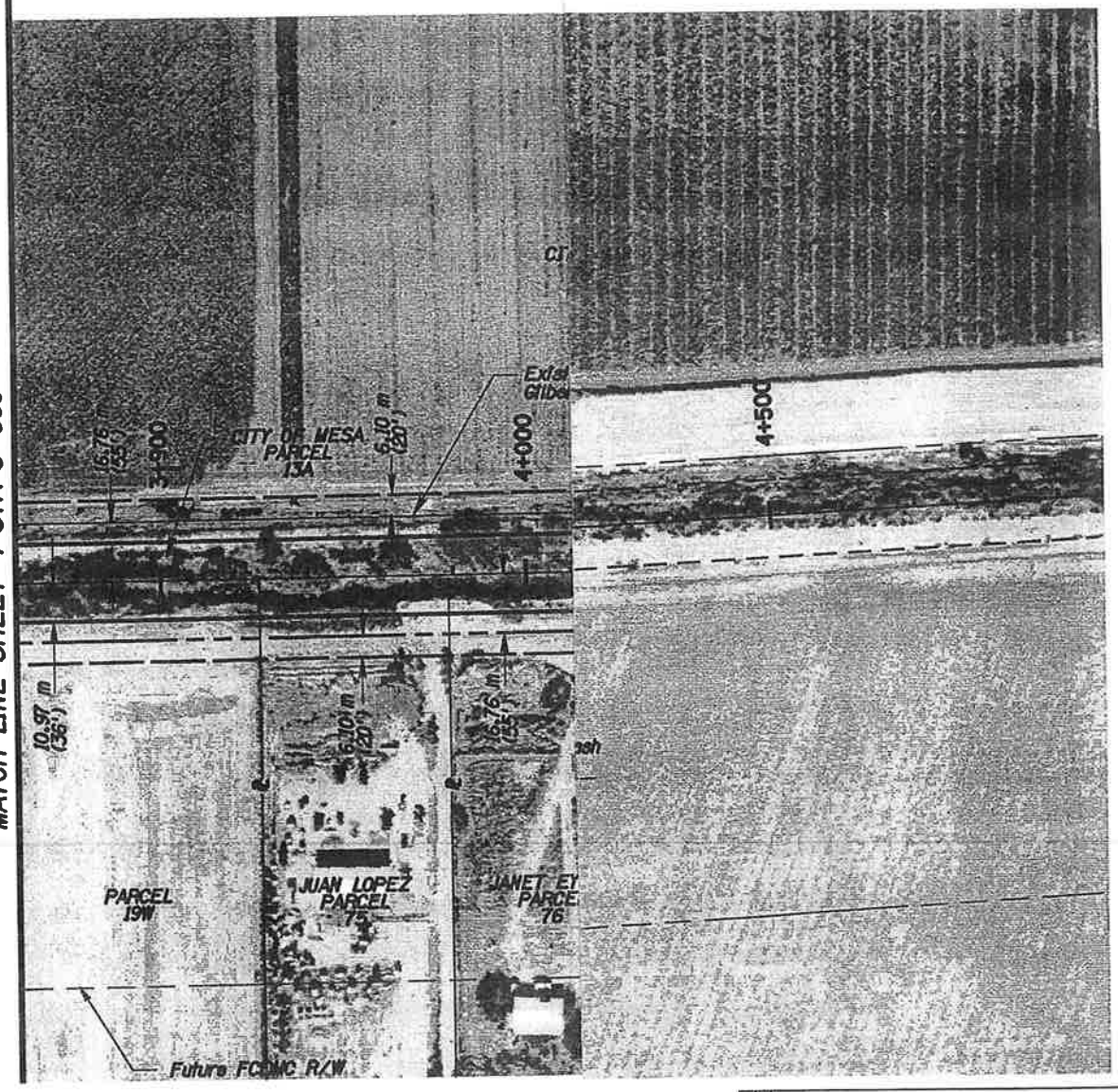
MATCH LINE SHEET 4 STA 3+860



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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
C00-1697-10-00

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	S. MISHLER	11/21/99
DRAWN	B. EDGAR	11/21/99
CHECKED	R. MILES	11/21/99

Sverdrup
CORPORATION

ALTERNATIVE 1, RURAL
FIVE-LANE IMPROVEMENTS

SHEET 5 OF 5

TRACS NO.

Filename
Plotted Date
Date of Plot

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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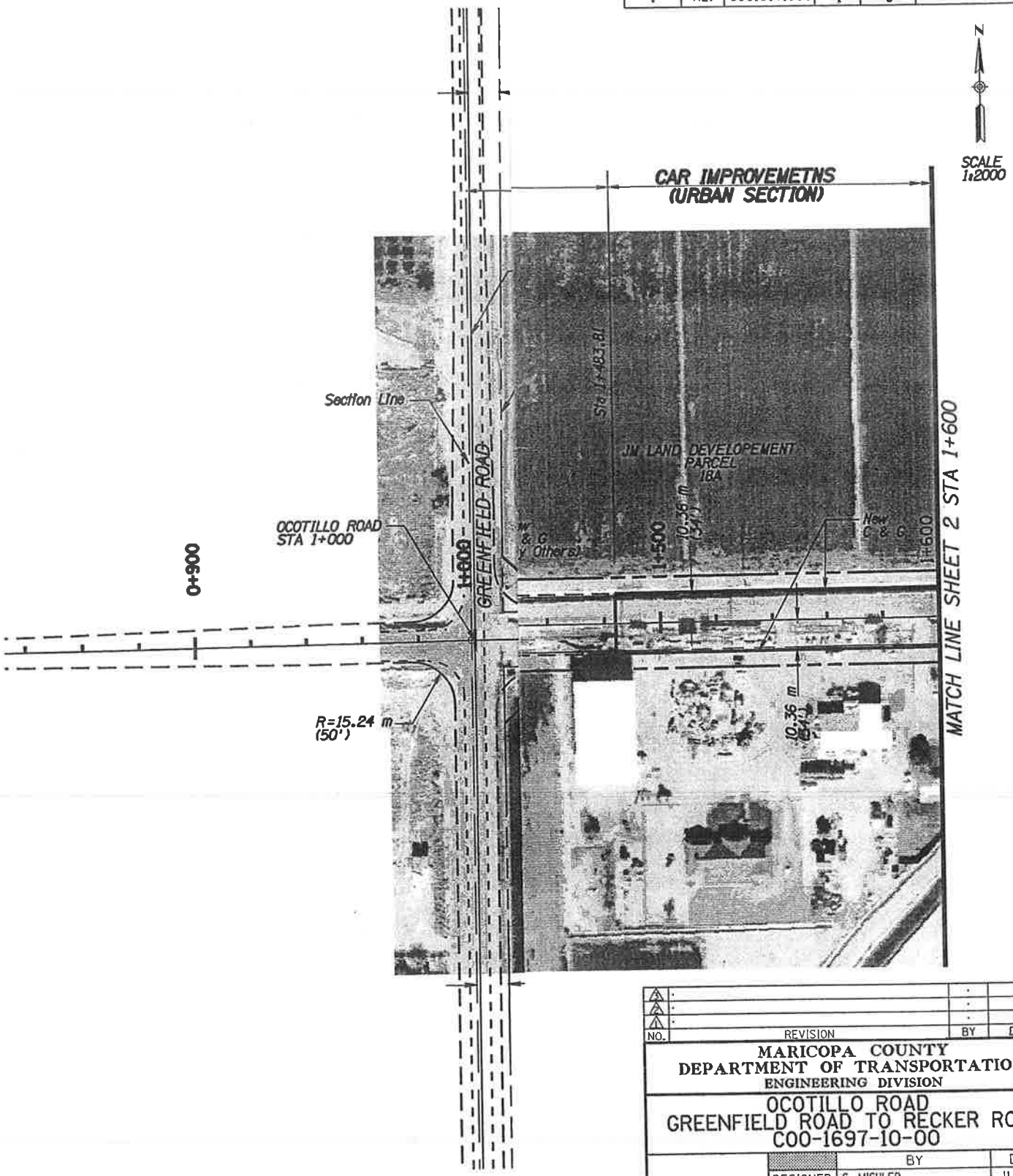

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
C00-1697-10-00

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	S. MISHLER	11/21/99
DRAWN	B. EDGAR	11/21/99
CHECKED	R. MILES	11/21/99

Sverdrup
CORPORATION

ALTERNATIVE 2, URBAN FIVE-LANE IMPROVEMENTS

SHEET 1 OF 5

TRACS NO.

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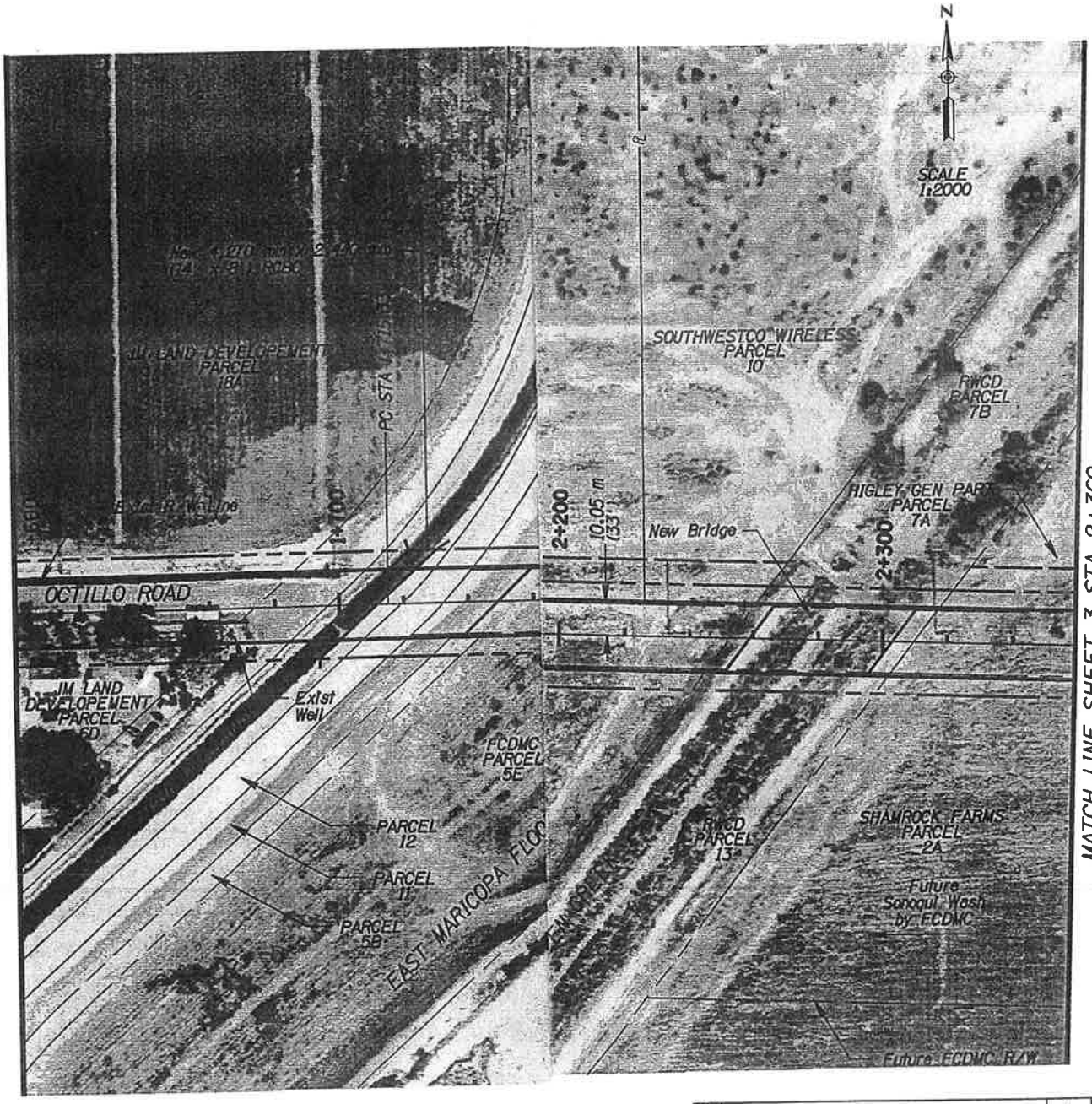

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
C00-1697-10-00

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PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	S. MISHLER	11/21/99
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Sverdrup CORPORATION

ALTERNATIVE 2, URBAN FIVE-LANE IMPROVEMENTS

SHEET 2 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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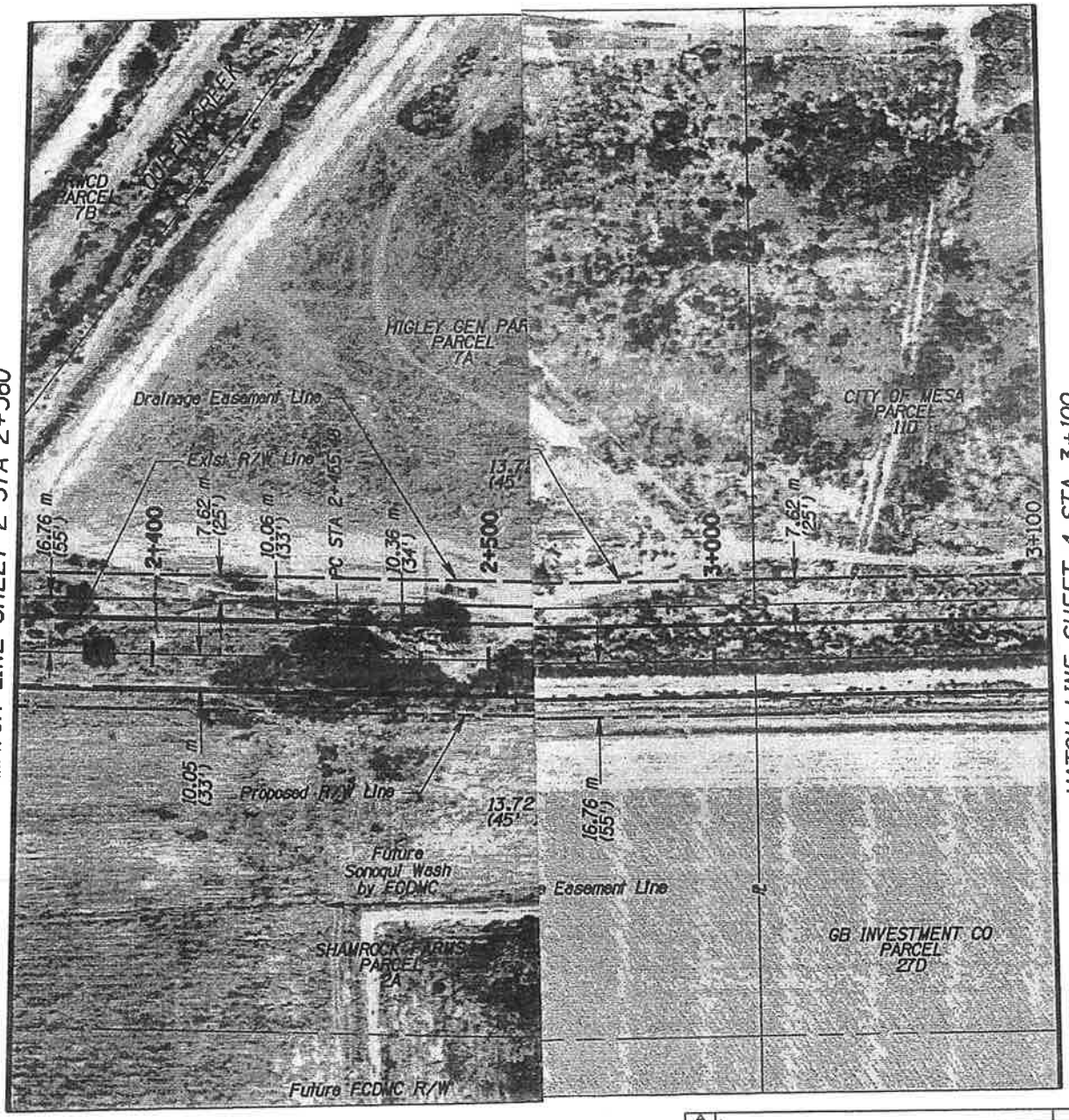
SCALE 1:2000

MATCH LINE SHEET 2 STA 2+360



MATCH LINE SHEET 4 STA 3+100

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
C00-1697-10-00

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	S. MISHLER	11/21/99
	DRAWN	B. EDGAR	11/21/99
	CHECKED	R. MILES	11/21/99

Sverdrup CORPORATION

ALTERNATIVE 2, URBAN FIVE-LANE IMPROVEMENTS

SHEET 3 OF 5

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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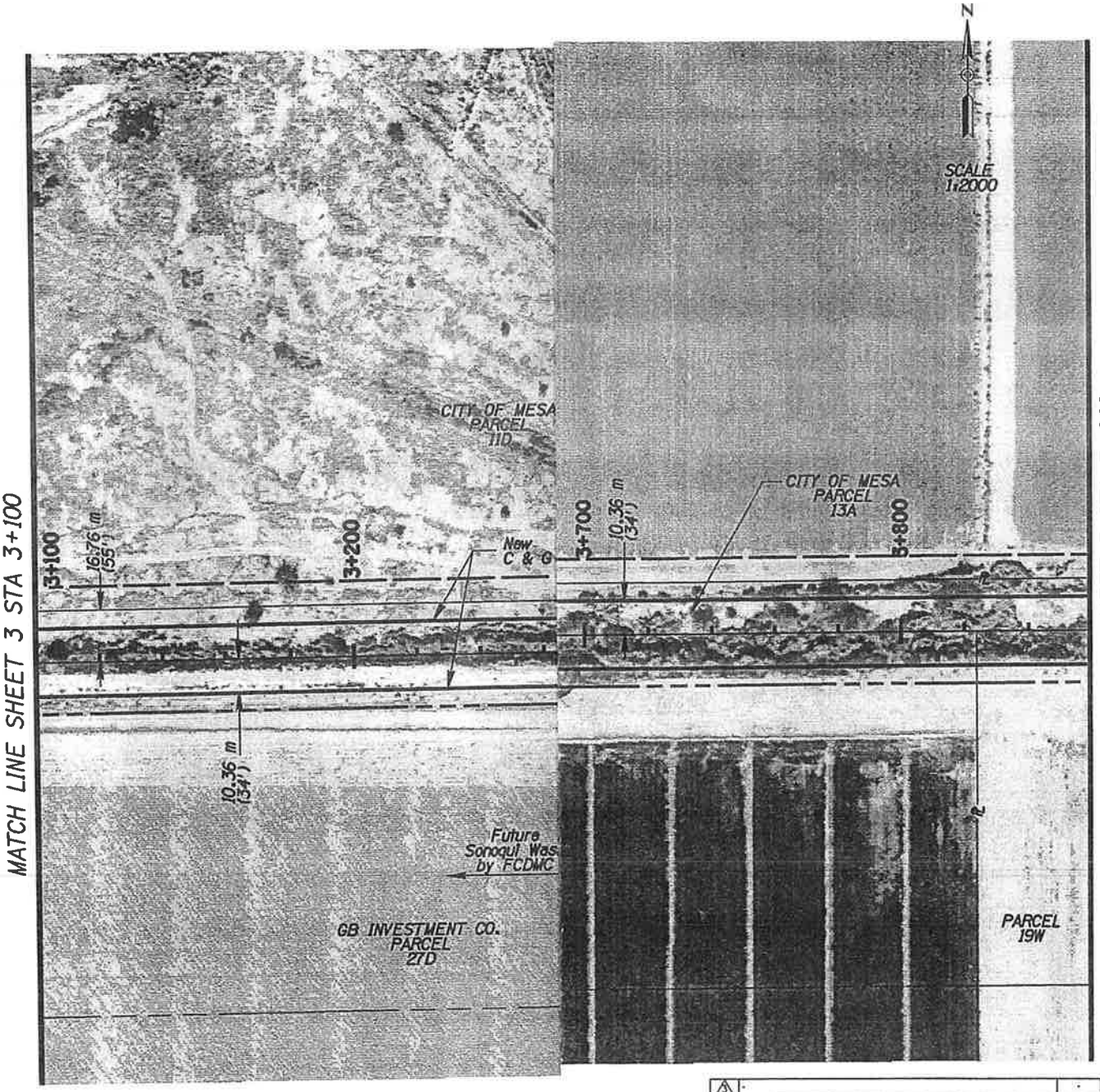

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MARICOPA COUNTY
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OCOTILLO ROAD
GREENFIELD ROAD TO RECKER ROAD
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Sverdrup
CORPORATION

ALTERNATIVE 2, URBAN FIVE-LANE IMPROVEMENTS

SHEET 4 OF 5

TRACS NO.

Filename 134.dgn
Plotted by
Date: 01-FEB-2000 14:29

APPENDIX A

PLAN SHEETS AND TYPICAL SECTIONS

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	334	323
Potential Capacity: (pcph)	938	950
Movement Capacity: (pcph)	938	950
Prob. of Queue-Free State:	0.98	0.98

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	342	334
Potential Capacity: (pcph)	1178	1188
Movement Capacity: (pcph)	1178	1188
Prob. of Queue-Free State:	0.98	0.99

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	702	698
Potential Capacity: (pcph)	467	469
Capacity Adjustment Factor due to Impeding Movements	0.97	0.97
Movement Capacity: (pcph)	453	455
Prob. of Queue-Free State:	0.70	0.73

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	750	761
Potential Capacity: (pcph)	390	384
Major LT, Minor TH Impedance Factor:	0.71	0.68
Adjusted Impedance Factor:	0.78	0.75
Capacity Adjustment Factor due to Impeding Movements	0.76	0.74
Movement Capacity: (pcph)	297	284

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	21	297		13.0	0.1	C	11.2
NB T	135	453 >					
NB R	16	938 >	479	10.9	1.4	C	
SB L	14	284		13.3	0.0	C	10.6
SB T	122	455 >					
SB R	17	950 >	486	10.3	1.3	C	
EB L	16	1188		3.1	0.0	A	0.1
WB L	19	1178		3.1	0.0	A	0.2

Intersection Delay = 3.2 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4e 11-22-1999
Center For Microcomputers In Transportation

Streets: (E-W) Ocotillo Road (N-S) Greenfield Road
Analyst: BDO File Name: 10GRNFLD.HC9
Area Type: Other 11-11-99 Peak Hr
Comment: 2010 Volume, Peak Hour, 5-Lane Improvement

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	1	1	1	< 0	1	1	< 0
Volumes	14	311	14	17	307	10	17	110	13	11	100	14
Lane W (ft)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	*							
	Thru	*							
	Right	*							
	Peds								
WB	Left	*							
	Thru	*							
	Right	*							
	Peds								
NB	Right								
SB	Right								
Green		25.0A							
Yellow/AR		5.0							

		5
NB	Left	*
	Thru	*
	Right	*
	Peds	
SB	Left	*
	Thru	*
	Right	*
	Peds	
EB	Right	
WB	Right	
Green		23.0A
Yellow/AR		5.0

Cycle Length: 58 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	296	635	0.051	0.466	5.5	B	6.7	B
	TR	837	1798	0.417	0.466	6.8	B		
WB	L	278	597	0.065	0.466	5.5	B	6.6	B
	T	842	1810	0.392	0.466	6.7	B		
	R	716	1538	0.015	0.466	5.4	B		
NB	L	535	1242	0.034	0.431	6.2	B	6.5	B
	TR	764	1772	0.173	0.431	6.6	B		
SB	L	521	1209	0.023	0.431	6.1	B	6.5	B
	TR	762	1768	0.161	0.431	6.5	B		

Intersection Delay = 6.6 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.300

SVERDRUP

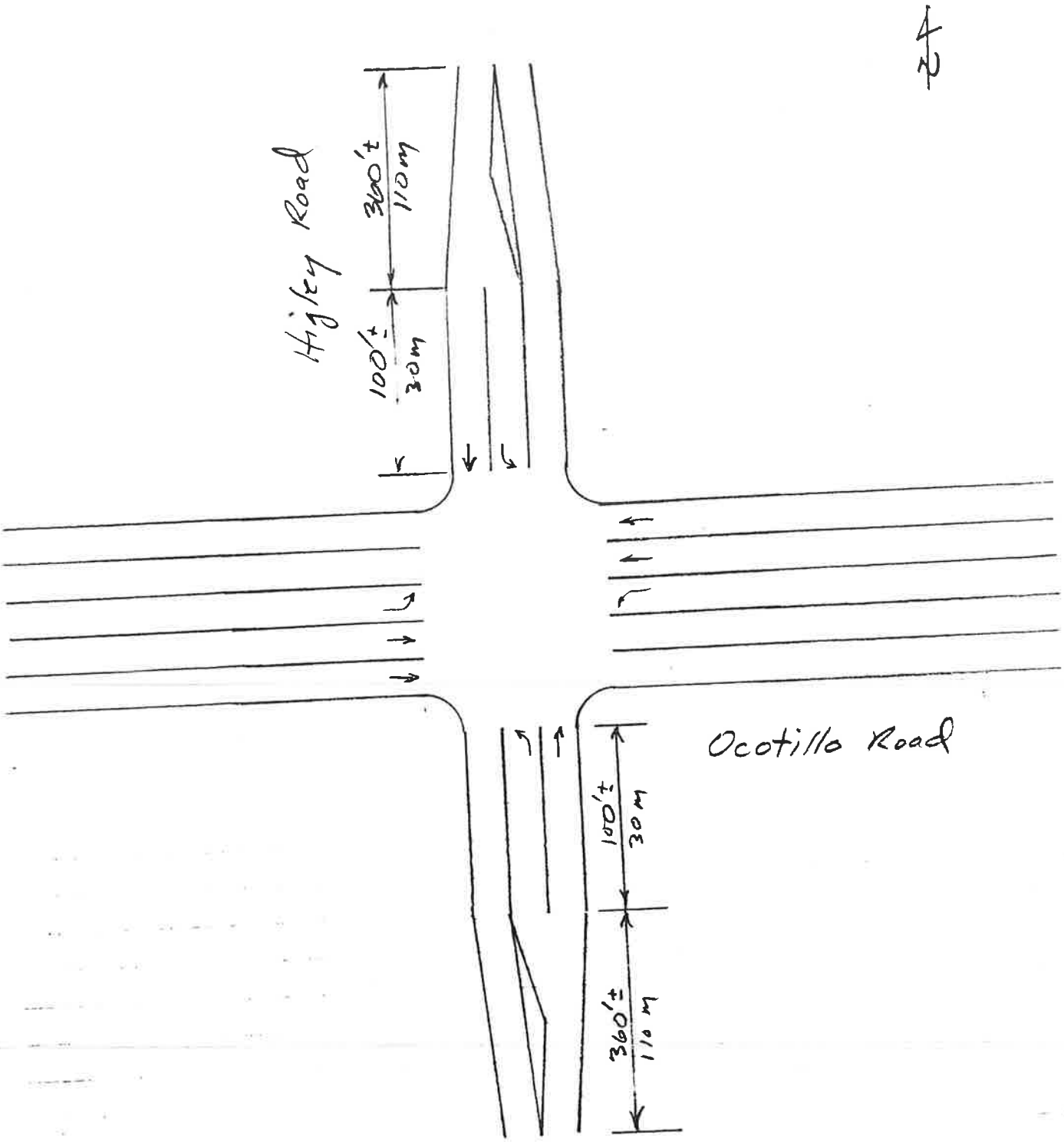
JOB W74284 MCDOT On-Call

COMPUTATIONS FOR Intersection Sketch
Ocotillo / Higley

SHEET NO. 2 OF 3

DATE 11/12/99

BY BDO CHKD



2010 Volume Calculations
Ocotillo Road / Higley Road
Peak Hour

Projected ADT Volumes

Leg	EB	WB	NB	SB
E	5353	5281		
W	3350	3334		
N			1458	1512
S			2286	2284

Projected Peak Hr. Volumes (K=10%)

Leg	EB	WB	NB	SB
E	535	528		
W	335	333		
N			146	151
S			229	228

Assumed Peak Hour Turning Percents

Inbound	L	T	R	Check
E Leg WB	30%	60%	10%	100%
W Leg EB	5%	90%	5%	100%
N Leg SB	61%	35%	4%	100%
S Leg NB	4%	33%	63%	100%

Peak Hour Turning Volumes

Inbound	L	T	R	Check	
E Leg WB	158	317	53	528	528
W Leg EB	17	300	17	334	335
N Leg SB	92	53	6	151	151
S Leg NB	9	75	144	228	229

Check Turning Volumes based on Outbound Volumes

Outbound	L	T	R	Check	
E Leg EB	92	300	144	536	535
W Leg WB	9	317	6	332	333
N Leg NB	17	75	53	145	146
S Leg SB	158	53	17	228	228

Center For Microcomputers In Transportation
University of Florida
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Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Higley Road (E-W) Ocotillo Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... BDO
Date of Analysis..... 11/12/99
Other Information..... 2010 Volumes, Peak Hour, 5-Lane Improvement

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	17	300	17	158	317	53	9	75	144	92	53	6
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			1			1	
MC's (%)	1			1			1	1	1	1	1	1
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	5			5			5	5	5	5	5	5
PCE's	1.05			1.05			1.16	1.16	1.16	1.16	1.16	1.16

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	167	195
Potential Capacity: (pcph)	1139	1103
Movement Capacity: (pcph)	1139	1103
Prob. of Queue-Free State:	0.84	0.99

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	334	390
Potential Capacity: (pcph)	1134	1059
Movement Capacity: (pcph)	1134	1059
Prob. of Queue-Free State:	0.85	0.98

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	899	880
Potential Capacity: (pcph)	325	333
Capacity Adjustment Factor due to Impeding Movements	0.83	0.83
Movement Capacity: (pcph)	270	277
Prob. of Queue-Free State:	0.66	0.77

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	871	901
Potential Capacity: (pcph)	294	281
Major LT, Minor TH Impedance Factor:	0.64	0.55
Adjusted Impedance Factor:	0.72	0.65
Capacity Adjustment Factor due to Impeding Movements	0.71	0.55
Movement Capacity: (pcph)	210	153

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	10	210		18.0	0.0	C	13.2
NB T	92	270 >					
NB R	177	1139 >	542	13.0	2.8	C	
SB L	113	153		70.9	3.8	F	49.4
SB T	65	277 >					
SB R	7	1103 >	299	15.8	1.0	C	
EB L	19	1059		3.5	0.0	A	0.2
WB L	173	1134		3.7	0.6	A	1.1

Intersection Delay = 9.0 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4e 11-15-1999
Center For Microcomputers In Transportation

Streets: (E-W) Ocotillo Road (N-S) Higley Road
Analyst: BDO File Name: 10HIGL5.HC9
Area Type: Other 11-11-99 Peak Hr
Comment: 2010 Volume, Peak Hour, 5-Lane Ocotillo & 3-Lanes for Higley Rd

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Volumes	14	311	14	17	307	10	17	110	13	11	100	14
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	*				*			
	Thru	*				*			
	Right	*				*			
	Peds								
WB	Left	*				*			
	Thru	*				*			
	Right	*				*			
	Peds								
NB	Right								
SB	Right								
Green		25.0A				23.0A			
Yellow/AR		5.0				5.0			

Cycle Length: 58 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	385	828	0.039	0.466	5.5	B	5.9	B
	TR	1665	3578	0.220	0.466	6.0	B		
WB	L	379	815	0.047	0.466	5.5	B	5.9	B
	TR	1668	3584	0.215	0.466	6.0	B		
NB	L	538	1248	0.033	0.431	6.2	B	6.5	B
	TR	768	1781	0.172	0.431	6.6	B		
SB	L	524	1215	0.023	0.431	6.1	B	6.5	B
	TR	766	1776	0.161	0.431	6.5	B		

Intersection Delay = 6.1 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.197

SVERDRUP

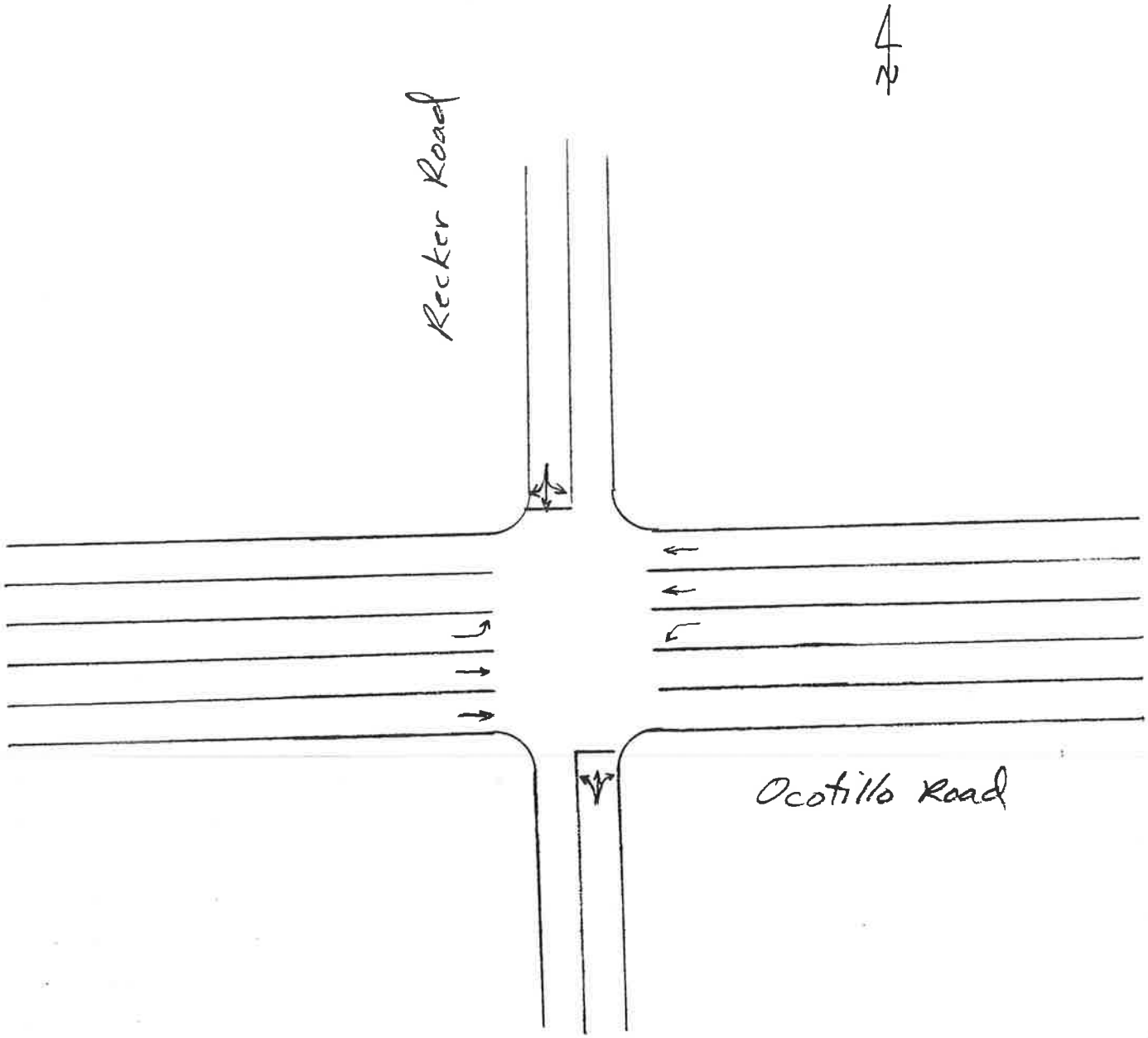
JOB W74284 MCDOT On Call

COMPUTATIONS FOR Intersection Sketch
Ocotillo / Recker

SHEET NO. 3 OF 3

DATE 11/12/99

BY BDO CHKD



2010 Volume Calculations
Ocotillo Road / Recker Road
Peak Hour

Projected ADT Volumes

Leg	EB	WB	NB	SB
E	4976	4890		
W	5353	5281		
N			58	59
S			445	432

Turning Ratios based on Outbound Volumes

Inbound	L	T	R	Check
E Leg WB	0.075	0.915	0.010	1.000
W Leg EB	0.011	0.910	0.079	1.000
N Leg SB	0.466	0.040	0.494	1.000
S Leg NB	0.512	0.006	0.482	1.000

Peak Hour Turning Volumes (K = 10%)

Inbound	L	T	R	Check
E Leg WB	37	447	5	489
W Leg EB	6	487	42	535
N Leg SB	3	0	3	6
S Leg NB	23	0	21	44

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Streets: (N-S) Recker Road (E-W) Ocotillo Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... BDO
Date of Analysis..... 11/11/99
Other Information..... 2010 Volumes, Peak Hour, 5-Lane Improvement

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	6	487	42	37	447	5	23	0	21	3	0	3
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			1			1	
MC's (%)	1			1			1	1	1	1	1	1
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	5			5			5	5	5	5	5	5
PCE's	1.05			1.05			1.16	1.16	1.16	1.16	1.16	1.16

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	278	238
Potential Capacity: (pcph)	1001	1049
Movement Capacity: (pcph)	1001	1049
Prob. of Queue-Free State:	0.97	1.00

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	557	476
Potential Capacity: (pcph)	861	952
Movement Capacity: (pcph)	861	952
Prob. of Queue-Free State:	0.95	0.99

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	1056	1076
Potential Capacity: (pcph)	263	256
Capacity Adjustment Factor due to Impeding Movements	0.95	0.95
Movement Capacity: (pcph)	249	242
Prob. of Queue-Free State:	1.00	1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	1050	1031
Potential Capacity: (pcph)	226	232
Major LT, Minor TH Impedance Factor:	0.95	0.95
Adjusted Impedance Factor:	0.96	0.96
Capacity Adjustment Factor due to Impeding Movements	0.96	0.93
Movement Capacity: (pcph)	216	217

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	28	216 >					
NB	T	0	249 >	347	12.3	0.5	C	12.3
NB	R	26	1001 >					
SB	L	3	217 >					
SB	T	0	242 >	360	10.2	0.0	C	10.2
SB	R	3	1049 >					
EB	L	6	952		3.8	0.0	A	0.0
WB	L	41	861		4.4	0.0	A	0.3

Intersection Delay = 0.7 sec/veh

APPENDIX C

DRAINAGE CALCULATIONS

1. ONSITE DRAINAGE CALCULATION

Weighted Runoff Coefficient

Five Lanes (w/curb)

C	Land Use	C (10-yr)	C (50-yr)	C (100-yr)	length (m)	length (ft)	Weighted C (10-yr)	Weighted C (50-yr)	Weighted C (100-yr)
C1	Paved Roads	0.85	0.93	0.95	23.8	78			
C2	Bare Ground	0.3	0.36	0.38	9.8	32			
Cw					33.5	110	0.69	0.76	0.78

Five Lanes (w/o curb)

C	Land Use	C (10-yr)	C (50-yr)	C (100-yr)	length (m)	length (ft)	Weighted C (10-yr)	Weighted C (50-yr)	Weighted C (100-yr)
C1	Paved Roads	0.85	0.93	0.95	18.9	62			
C2	Shoulder	0.7	0.84	0.88	4.3	14			
C3	Bare Ground	0.3	0.36	0.38	10.4	34			
Cw					33.5	110	0.66	0.74	0.76

10- and 100-YEAR STORM

5-LANES ROADWAY (w/ Curb)

(ONE SIDE)

UNIT: cfs

Catch Basin ID	Sta. From (ft)	Sta. To (ft)	L (ft)	width (ft)	area (ac)	Average slope (%)	Velosity (fps)	Tc (min)	I (10-yr)	I (100-yr)	C (10-yr)	C (100-yr)	Q (10)	Q (10) (cms)	Q (100)	Q (100) (cms)
1	0	1000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
2	1000	2000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
3	2000	3000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
4	3000	4000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
5	4000	5000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
6	5000	6000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
7	6000	7000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
8	7000	8000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
9	8000	9000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
10	9000	10000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145
11	10000	11000	1000	34	0.781	0.006	1.5	11.5	4.9	6.9	0.85	0.95	3.3	0.092	5.1	0.145

100-YEAR STORM

5-LANES ROADWAY (w/o Curb)

(ONE SIDE)

Sta. From (ft)	Sta. From (meter)	Sta. To (ft)	Sta. To (meter)	L (ft)	width (ft)	area (ac)	velosity (fps)	time (min)	Average slope (%)	Tc (min)	I (100-yr)	C (100-yr)	Q100 (cfs)	Q100 (cms)
0	*0*	1000	*305*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
1000	*305*	2000	*610*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
2000	*610*	3000	*915*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
3000	*915*	4000	*1220*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
4000	*1220*	5000	*1524*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
5000	*1524*	6000	*1829*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
6000	*1829*	7000	*2134*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
7000	*2134*	8000	*2439*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
8000	*2439*	9000	*2744*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
9000	*2744*	10000	*3049*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185
10000	*3049*	11000	*3354*	1000	55	1.263	2.3	7.2	0.006	11.5	6.9	0.75	6.5	0.185

Table
Rating Table for Gutter Section

Project Description	
Worksheet	Gutter Section - 1
Type	Gutter Section
Solve For	Discharge

Input Data	
Gutter Width	2.00 ft
Gutter Cross Slope	0.030000 ft/ft
Road Cross Slope	0.020000 ft/ft
Spread	15.00 ft
Mannings Coefficient	0.013

Attribute	Minimum	Maximum	Increment
Slope (ft/ft)	0.002000	0.020000	0.001000

Slope (ft/ft)	Discharge (cfs)	Velocity (ft/s)
0.002000	3.94	1.74
0.003000	4.83	2.13
0.004000	5.58	2.46
0.005000	6.24	2.75
0.006000	6.83	3.01
0.007000	7.38	3.25
0.008000	7.89	3.48
0.009000	8.37	3.69
0.010000	8.82	3.89
0.011000	9.25	4.08
0.012000	9.66	4.26
0.013000	10.06	4.43
0.014000	10.44	4.60
0.015000	10.80	4.76
0.016000	11.16	4.92
0.017000	11.50	5.07
0.018000	11.83	5.21
0.019000	12.16	5.36
0.020000	12.47	5.50

Avg slope of ground
~0.3%

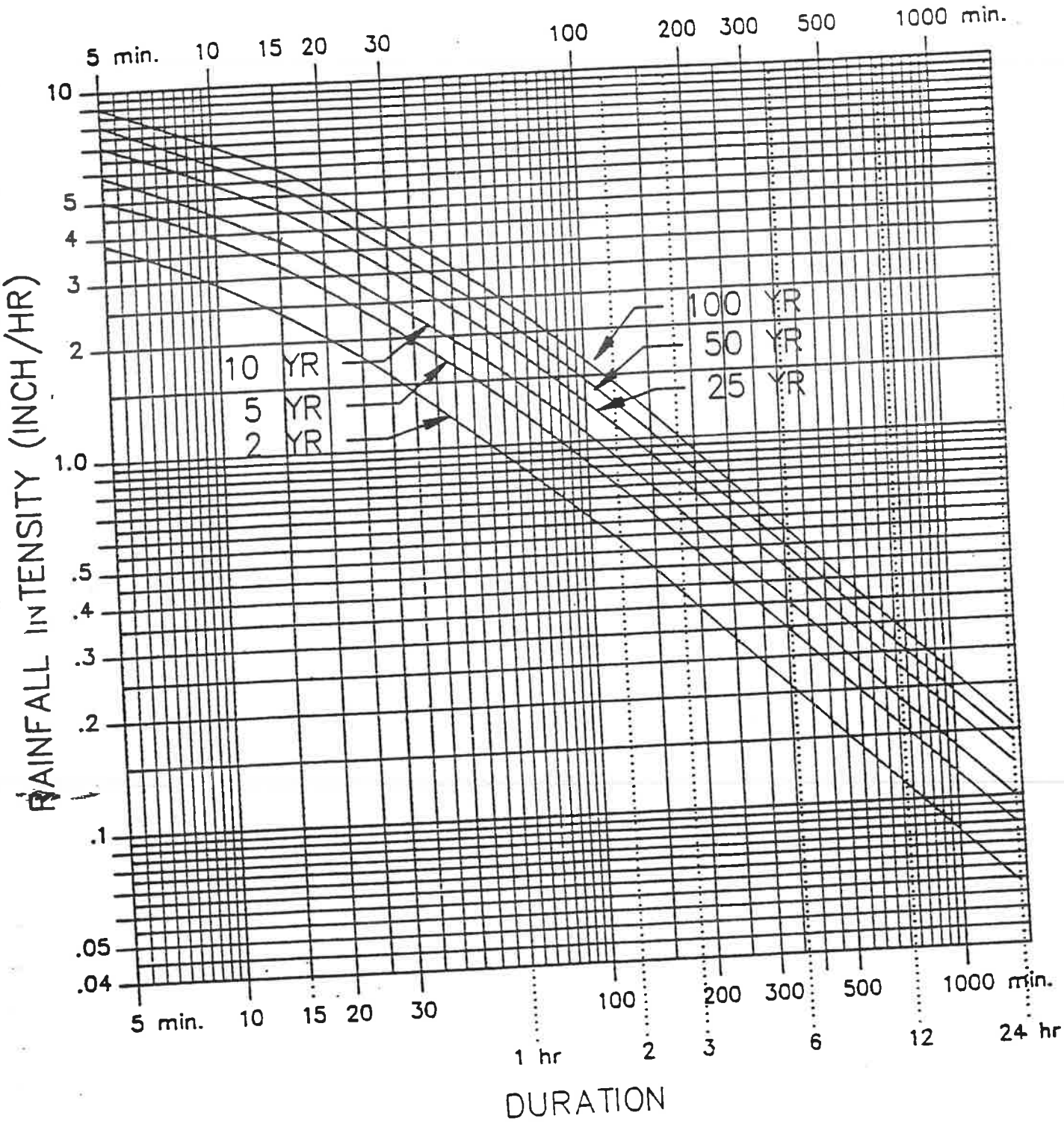
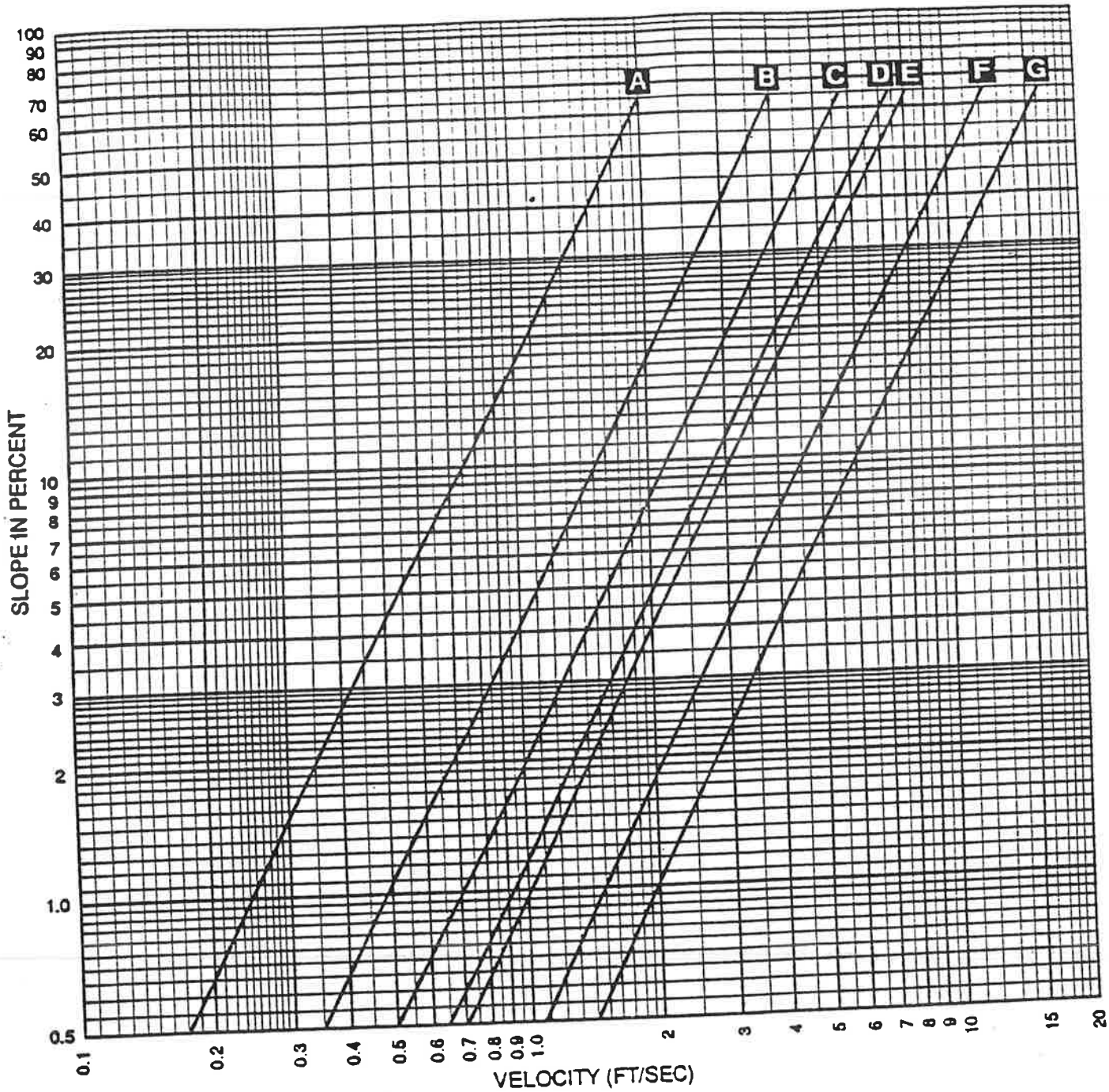


Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

Table 3.2
C Coefficients for Use with the Rational Method

Land Use	Return Period			
	2-10 Year	25 Year	50 Year	100 Year
Streets and Roads				
Paved Roads	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Gravel Roadways & Shoulders	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Industrial Areas				
Heavy	0.70 – 0.80	0.77 – 0.88	0.84 – 0.95	0.88 – 0.95
Light	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Business Areas				
Downtown	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Neighborhood	0.55 – 0.65	0.61 – 0.72	0.66 – 0.78	0.69 – 0.81
Residential Areas				
Lawns – Flat	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
– Steep	0.25 – 0.40	0.28 – 0.44	0.30 – 0.48	0.31 – 0.50
Suburban	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Single Family	0.45 – 0.55	0.50 – 0.61	0.54 – 0.66	0.56 – 0.69
Multi-Unit	0.50 – 0.60	0.55 – 0.66	0.60 – 0.72	0.63 – 0.75
Apartments	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Parks/Cemetaries	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
Playgrounds	0.40 – 0.50	0.44 – 0.55	0.48 – 0.60	0.50 – 0.63
Agricultural Areas	0.10 – 0.20	0.11 – 0.22	0.12 – 0.24	0.13 – 0.25
Bare Ground	0.20 – 0.30	0.22 – 0.33	0.24 – 0.36	0.25 – 0.38
Undeveloped Desert	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Mountain Terrain (Slopes > 10%)	0.60 – 0.80	0.66 – 0.88	0.72 – 0.95	0.75 – 0.95

Note: Values of C for 25, 50 and 100 Year were derived using frequency adjustment factors of 1.10, 1.20, and 1.25, respectively, with an upper limit of 0.95 for C for the 2-10 Year values.



A Forest with heavy ground litter & hay meadow (overland flow)

B Trash fallow or minimum tillage cultivation; contour or strip cropped & woodland (overland flow)

C Short grass pasture (overland flow)

D Cultivated, straight row (overland flow)

E Nearly bare and untilled (overland flow); alluvial fans western mountain regions

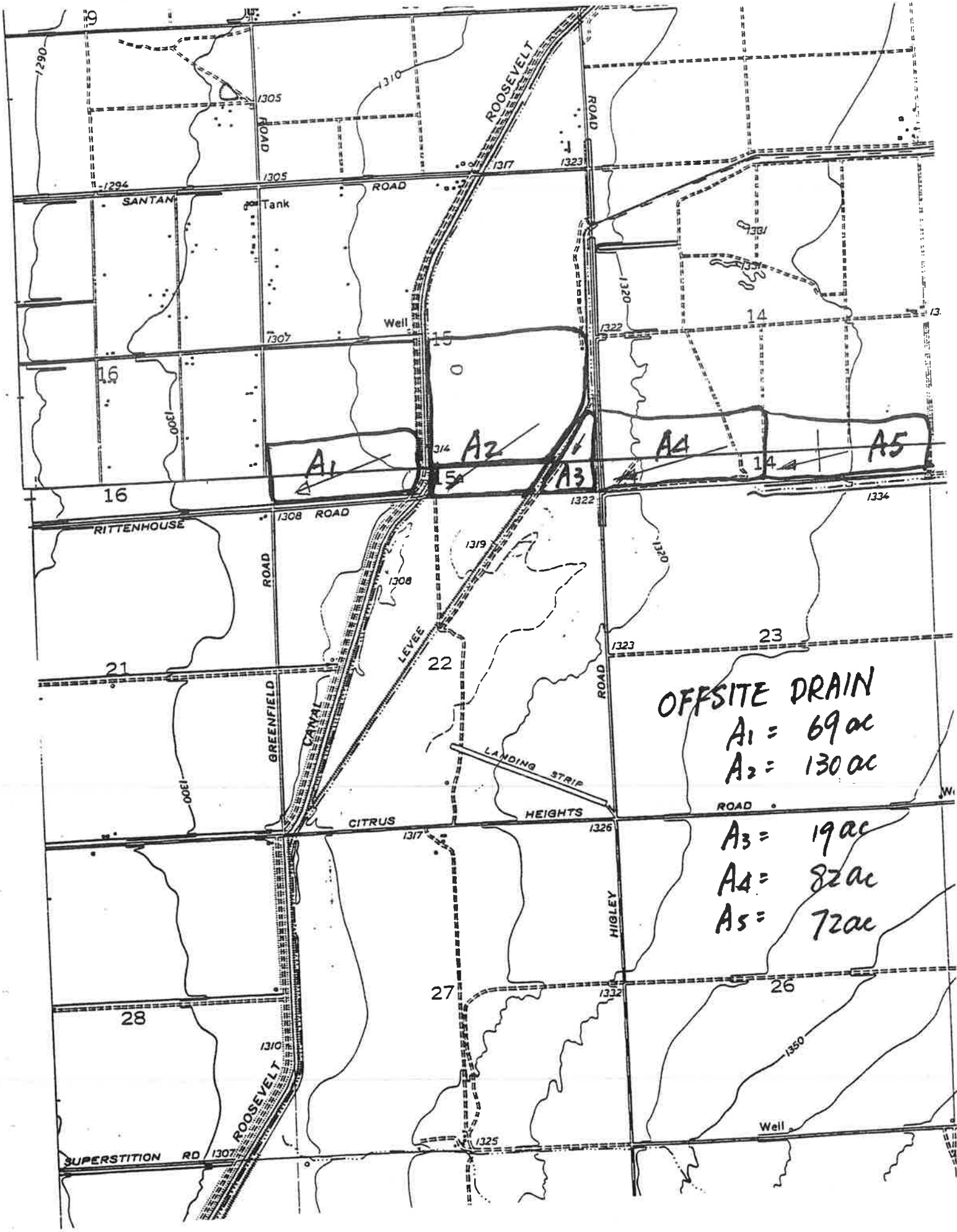
F Grassed waterway

G Paved area (sheet flow); small upland gullies

FIGURE 2.2-14

Overland Flow Velocities for Upland Method of Estimating T_c

2. OFFSITE DRAINAGE CALCULATION


ROOSEVELT
ROAD
SANTAN
ROAD
Tank
Well
RITTENHOUSE
ROAD
GREENFIELD
ROAD
CANAL
LEVEE
LANDING STRIP
CITRUS
HEIGHTS
ROAD
HIGLEY
ROAD
ROOSEVELT
SUPERSTITION RD
A1
A2
A3
A4
A5
OFFSITE DRAIN
A1 = 69 ac
A2 = 130 ac
A3 = 19 ac
A4 = 82 ac
A5 = 72 ac

Offside Drain (100-year)

area id	L (ft)	area (ac)	velosity (fps)	Tc (sec)	Tc (min)	Average slope (%)	I	C	Q (cfs)	Q(cms)
A1	2500	69	0.75	3333	56	0.006	2.5	0.4	69.0	1.953
A2	2800	130	0.7	4000	67	0.005	2.3	0.4	119.6	3.386
A3	1300	19	0.7	1857	31	0.005	3.5	0.4	26.6	0.753
A4	2650	82	0.7	3786	63	0.005	2.4	0.4	78.7	2.229
A5	2650	72	0.75	3533	59	0.006	2.5	0.4	72.0	2.038

Table
Rating Table for Triangular Channel

Project Description	
Worksheet	Triangular Channel - 1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Mannings Coefficient	0.032
Depth	2.50 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V

Attribute	Minimum	Maximum	Increment
Slope (ft/ft)	0.002000	0.020000	0.001000

Slope (ft/ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.002000	43.62	2.33	18.8	15.81	15.00
0.003000	53.43	2.85	18.8	15.81	15.00
0.004000	61.69	3.29	18.8	15.81	15.00
0.005000	68.97	3.68	18.8	15.81	15.00
0.006000	75.56	4.03	18.8	15.81	15.00
0.007000	81.61	4.35	18.8	15.81	15.00
0.008000	87.25	4.65	18.8	15.81	15.00
0.009000	92.54	4.94	18.8	15.81	15.00
0.010000	97.54	5.20	18.8	15.81	15.00
0.011000	102.31	5.46	18.8	15.81	15.00
0.012000	106.85	5.70	18.8	15.81	15.00
0.013000	111.22	5.93	18.8	15.81	15.00
0.014000	115.42	6.16	18.8	15.81	15.00
0.015000	119.47	6.37	18.8	15.81	15.00
0.016000	123.38	6.58	18.8	15.81	15.00
0.017000	127.18	6.78	18.8	15.81	15.00
0.018000	130.87	6.98	18.8	15.81	15.00
0.019000	134.46	7.17	18.8	15.81	15.00
0.020000	137.95	7.36	18.8	15.81	15.00

Average slope for area is 0.30%

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Table
Rating Table for Irregular Channel

Project Description	
Worksheet	Irregular Channel - 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge
Input Data	
Water Surface Elevation	0.50 ft
Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Attribute	Minimum	Maximum	Increment
Slope (ft/ft)	0.002000	0.020000	0.001000

Slope (ft/ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.002000	10.84	1.73	6.2	25.50	25.00
0.003000	13.28	2.12	6.2	25.50	25.00
0.004000	15.33	2.45	6.2	25.50	25.00
0.005000	17.14	2.74	6.2	25.50	25.00
0.006000	18.78	3.00	6.2	25.50	25.00
0.007000	20.28	3.25	6.2	25.50	25.00
0.008000	21.69	3.47	6.2	25.50	25.00
0.009000	23.00	3.68	6.2	25.50	25.00
0.010000	24.24	3.88	6.2	25.50	25.00
0.011000	25.43	4.07	6.2	25.50	25.00
0.012000	26.56	4.25	6.2	25.50	25.00
0.013000	27.64	4.42	6.2	25.50	25.00
0.014000	28.69	4.59	6.2	25.50	25.00
0.015000	29.69	4.75	6.2	25.50	25.00
0.016000	30.67	4.91	6.2	25.50	25.00
0.017000	31.61	5.06	6.2	25.50	25.00
0.018000	32.53	5.20	6.2	25.50	25.00
0.019000	33.42	5.35	6.2	25.50	25.00
0.020000	34.29	5.49	6.2	25.50	25.00

Avg slope of area S = 0.003%

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3. RETENTION BASIN CAPACITY CALCULATION

Retention Basin Calculation

	c	area (sf)	area (ac)	p (in)	v (cf)	v (cy)
100-yr	0.78	957000	22.0	2.6	161733	5990
50-yr	0.76	957000	22.0	2.3	139403	5163
25-yr	0.69	957000	22.0	2	110055	4076

Project No. W7428400 TRACS NO. _____ Date: 11/22/99

Project Name: Ocotillo Road

Location/Station Maricopa County Checker _____

Designer: NW

DATA TO ENTER:

2 year, 6 hour (P2y6h) =	1.05	100 year, 6 hour (P100y6h) =	2.95
2 year, 24 hour (P2y24h) =	1.30	100 year, 24 hour (P100y24h) =	3.40

Zone = 8

	2 year factors - Eq 3 Through Eq 6				100 year factors - Eq 3 Through Eq 6			
Zone	5	10	15	30	5	10	15	30
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	0.34	0.51	0.62	0.82	0.30	0.46	0.59	0.80

CALCULATED VALUES:

Eq 1	P(2y1h) = -0.011 + [0.942 x (P2y6h^2) / P2y24h]	P(2y1h) =	0.79
Eq 2	P(100,1') = 0.494 + [0.755 x (P100y6h^2) / P100y24h]	P(100y1h) =	2.43

		Factor		Calculated Rainfall Depth	
Eq 3	P(2y5m) = A x P(2y1h)	A =	0.34	P(2y5m) =	0.27
Eq 4	P(2y10m) = B x P(2y1h)	B =	0.51	P(2y10m) =	0.40
Eq 5	P(2y15m) = C x P(2y1h)	C =	0.62	P(2y15m) =	0.49
Eq 6	P(2y30m) = D x P(2y1h)	D =	0.82	P(2y30m) =	0.65
Eq 7	P(100y5m) = E x P(100y1h)	E =	0.30	P(100y5m) =	0.73
Eq 8	P(100y10m) = F x P(100y1h	F =	0.46	P(100y10m) =	1.12
Eq 9	P(100y15m) = G x P(100y1h	G =	0.59	P(100y15m) =	1.43
Eq 10	P(100y30m) = H x P(100y1h	H =	0.80	P(100y30m) =	1.94

Eq 11	P(2y2h) = 0.341 x P2y6h + 0.659 x P2y1h	P(2y2h) =	0.88
Eq 12	P(2y3h) = 0.569 x P2y6h + 0.431 x P2y1h	P(2y3h) =	0.94
Eq 13	P(2y12h) = 0.5 x P2y6h + 0.5 x P2y24h	P(2y12h) =	1.18
Eq 14	P(100y2h) = 0.341 x P100y6h + 0.659 x P100y1h	P(100y2h) =	2.60
Eq 15	P(100y3h) = 0.569 x P100y6h + 0.431 x P100y1h	P(100y3h) =	2.72
Eq 16	P(100y12h) = 0.5 x P100y6h + 0.5 x P100y24h	P(100y12h) =	3.18

	5 year	10 year	25 year	50 year	500 year
X Factor	0.674	0.496	0.293	0.146	-0.337
Y Factor	0.278	0.449	0.669	0.835	1.381

5-Year Equations (see note below)

	Calculated Precipitation Depths				
P (5y5m) =x5y x P2y5m + y5y x P100y5m	0.38	0.46	0.57	0.65	0.92
P (5y10m) = x5y x P2y10m + y5y x P100y10m	0.58	0.70	0.86	0.99	1.41
P (5y15m) = x5y x P2y15m + y5y x P100y15m	0.73	0.89	1.10	1.27	1.81
P (5y30m) = x5y x P2y30m + y5y x P100y30m	0.98	1.19	1.49	1.72	2.46
P (5y1h) = x5y x P2y1h + y5y x P100y1h	1.21	1.48	1.85	2.14	3.09
P (5y2h) =x5y x P2y2h + y5y x P100y2h	1.32	1.60	2.00	2.30	3.30
P (5y3h) =x5y x P2y3h + y5y x P100y3h	1.39	1.69	2.10	2.41	3.45
P (5y6h) =x5y x P2y6h + y5y x P100y6h	1.53	1.85	2.28	2.62	3.72
P (5y12h) =x5y x P2y12h + y5y x P100y12h	1.67	2.01	2.47	2.82	3.99
P (5y24h) =x5y x P2y24h + y5y x P100y24h	1.82	2.17	2.66	3.03	4.26

Note: 10-year, 25-year, 50-year, 500-year equations use the corresponding x_y or y_y factor.

TABLE A1.1

PRECIPITATION DEPTHS (in)

FREQUENCY (years) >>>>>>>>	2	5	10	25	50	100	500
DURATION	DEPTH (INCHES)						
5 min	0.27	0.38	0.46	0.57	0.65	0.73	0.92
10 min	0.40	0.58	0.70	0.86	0.99	1.12	1.41
15 min	0.49	0.73	0.89	1.10	1.27	1.43	1.81
30 min	0.65	0.98	1.19	1.49	1.72	1.94	2.46
1 hr	0.79	1.21	1.48	1.85	2.14	2.43	3.09
2 hr	0.88	1.32	1.60	2.00	2.30	2.60	3.30
3 hr	0.94	1.39	1.69	2.10	2.41	2.72	3.45
6 hr	1.05	1.53	1.85	2.28	2.62	2.95	3.72
12 hr	1.18	1.67	2.01	2.47	2.82	3.18	3.99
24 hr	1.30	1.82	2.17	2.66	3.03	3.40	4.26

TABLE A1.2

PRECIPITATION INTENSITIES (in/hr)

FREQUENCY (years) >>>>>>>>	2	5	10	25	50	100	500
DURATION	INTENSITY (INCHES / HOUR)						
5 min	3.21	4.60	5.52	6.79	7.76	8.74	10.98
10 min	2.41	3.49	4.20	5.19	5.94	6.70	8.44
15 min	1.95	2.91	3.54	4.40	5.07	5.73	7.25
30 min	1.29	1.95	2.38	2.98	3.43	3.88	4.93
1 hr	0.79	1.21	1.48	1.85	2.14	2.43	3.09
2 hr	0.44	0.66	0.80	1.00	1.15	1.30	1.65
3 hr	0.31	0.46	0.56	0.70	0.80	0.91	1.15
6 hr	0.18	0.25	0.31	0.38	0.44	0.49	0.62
12 hr	0.10	0.14	0.17	0.21	0.24	0.26	0.33
24 hr	0.05	0.08	0.09	0.11	0.13	0.14	0.18

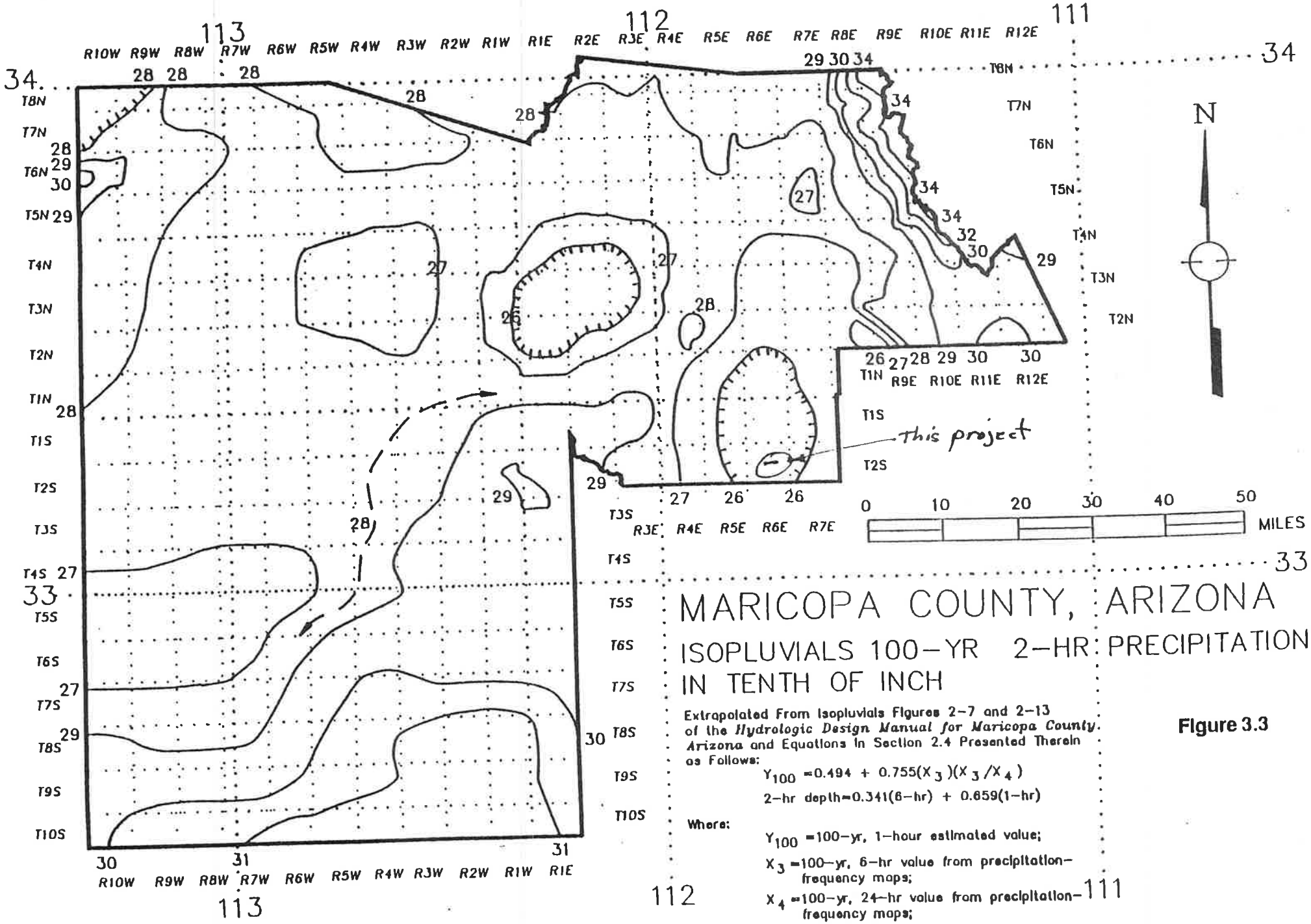

R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113
112
111
34
33
30
31
N
0 10 20 30 40 50
MILES
this project
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 2-HR PRECIPITATION
IN TENTH OF INCH
Extrapolated From Isopluvials Figures 2-7 and 2-13 of the Hydrologic Design Manual for Maricopa County, Arizona and Equations in Section 2.4 Presented Therein as Follows:
$Y_{100} = 0.494 + 0.755(X_3)(X_3/X_4)$
2-hr depth = 0.341(6-hr) + 0.659(1-hr)
Where:
Y_{100} = 100-yr, 1-hour estimated value;
X_3 = 100-yr, 6-hr value from precipitation-frequency maps;
X_4 = 100-yr, 24-hr value from precipitation-frequency maps;
6-hr = Isopluvial values from figure 2.7;
1-hr = Y_{100} value as computed above.

Figure 3.3

SVERDRUP

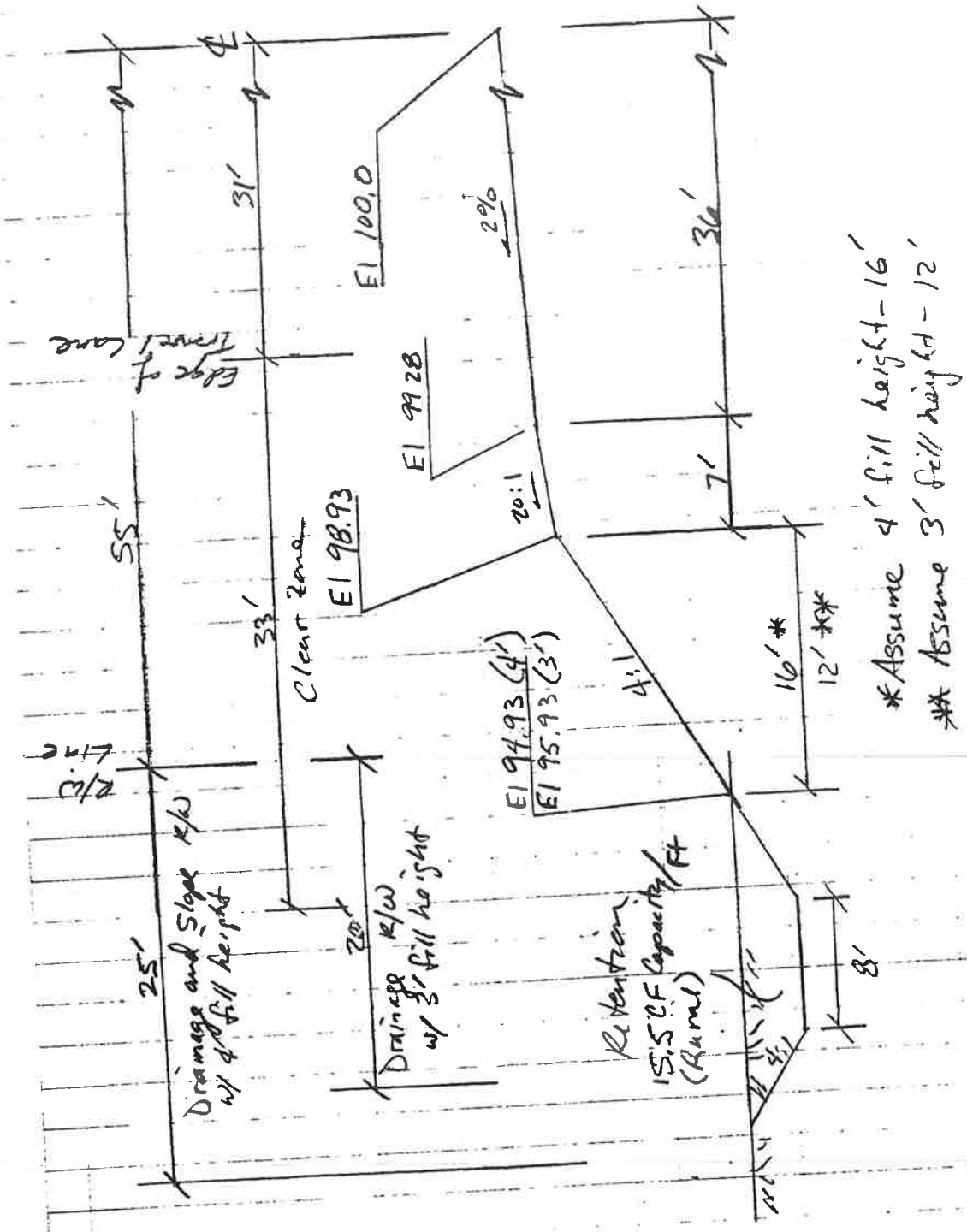
JOB W74284 MoDOT On Call

COMPUTATIONS FOR Drainage R/W

SHEET NO. 1 OF 3

DATE 11/28/99

BY BDG CHKD MSM



Recommend Additional 20' R/W width each side for Rural Minor Arterial

SVERDRUP

JOB W74284 MCDOT On-Call

COMPUTATIONS FOR Drainage R/W

SHEET NO. 2 OF 3

DATE 11/28/99

BY BDD CHKD MSM

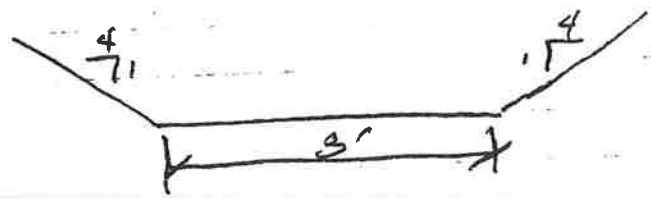
100-yr retention requirement

$0.78 \times 55' \times 2.6\,\text{in}/12 \times 1' = 9.3$ CF

Assume 40% of project length cannot have retention basin adjacent to roadway R/W because of fill height. High fill areas will have ditch directing runoff to retention basin.

$9.3\text{ cf}/0.60 = 15.5$ CF

Capacity of 8' bottom ditch w/ 4:1 side slopes



First 1' = $(8 \times 1) + \frac{1}{2}(4 \times 1) \times 2 = 12$ CF
Next ½' = $(16 \times \frac{1}{2}) + \frac{1}{2}(2 \times .5) \times 2 = 9$ CF } 21 CF
Next ½' = $(20 \times \frac{1}{2}) + \frac{1}{2}(2 \times .5) \times 2 = 11$ CF } 32 CF

Use 2' depth for retention capacity and to convey local offsite flows.

SVERDRUP

JOB W74284 MCDOT On Call

COMPUTATIONS FOR Drainage R/W

SHEET NO. 3 OF 3

DATE 11/28/99

BY BDO CHKD MSM

For Rural Section recommend obtaining 20' strip on both sides of roadway.

For Urban Section

Need approx. 31 CF of storage on one side of roadway. Side slopes of retention basin can be steeper. The hinge point at edge of urban section will be approximately the same location as a rural section at 3' fill height (55' urban vs 55' rural).

Need 25' for urban section on one side to contain 8' bottom w/ 4:1 side slopes with little additional capacity for offsite flows.
Recommend 25' width as basin can be deepened with a narrower bottom width to handle offsite flows.

4. QUEEN CREEK BRIDGE

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Queen Creek
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.032
Slope	0.006000 ft/ft
Left Side Slope	5.00 H : V
Right Side Slope	5.00 H : V
Bottom Width	150.00 ft
Discharge	3,000.00 cfs

Results	
Depth	2.75 ft
Flow Area	449.7 ft²
Wetted Perimeter	178.01 ft
Top Width	177.46 ft
Critical Depth	2.26 ft
Critical Slope	0.011674 ft/ft
Velocity	6.67 ft/s
Velocity Head	0.69 ft
Specific Energy	3.44 ft
Froude Number	0.74
Flow Type	Subcritical

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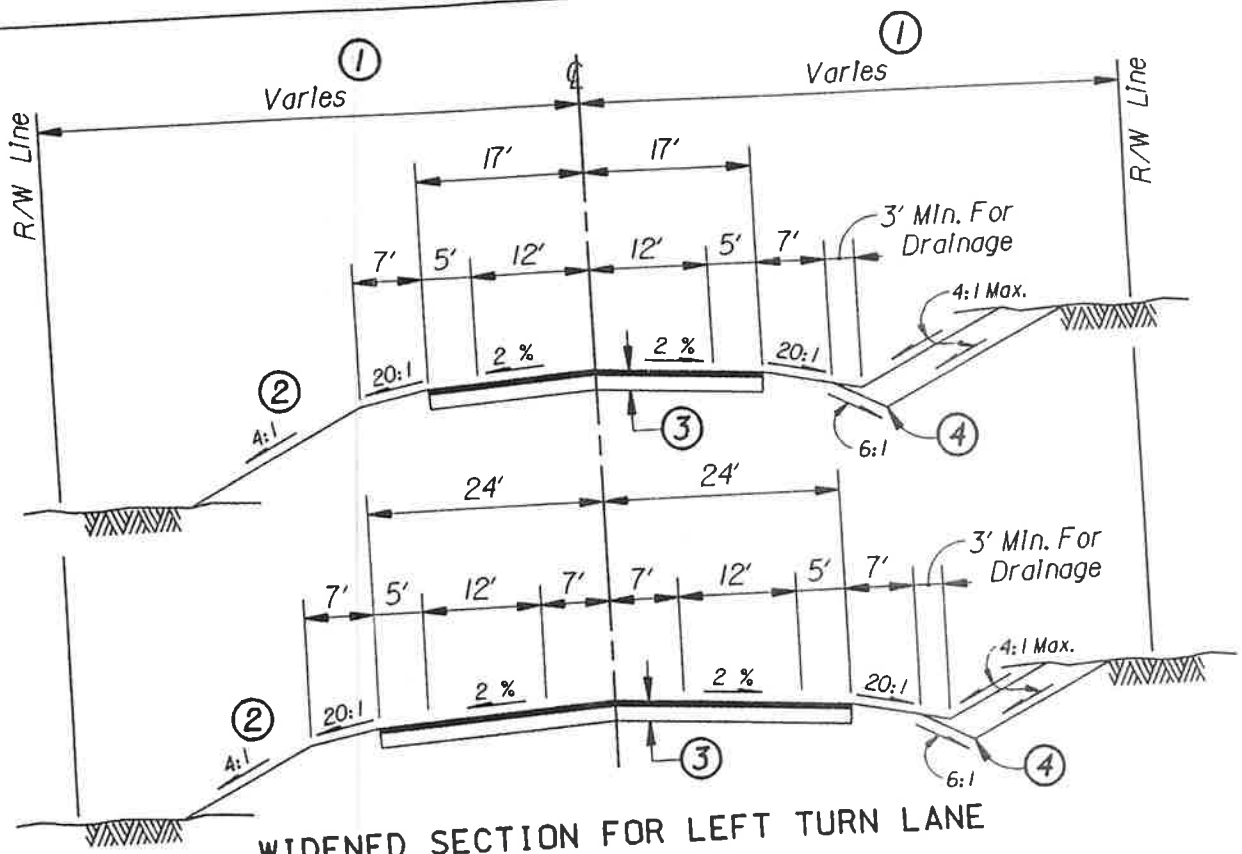
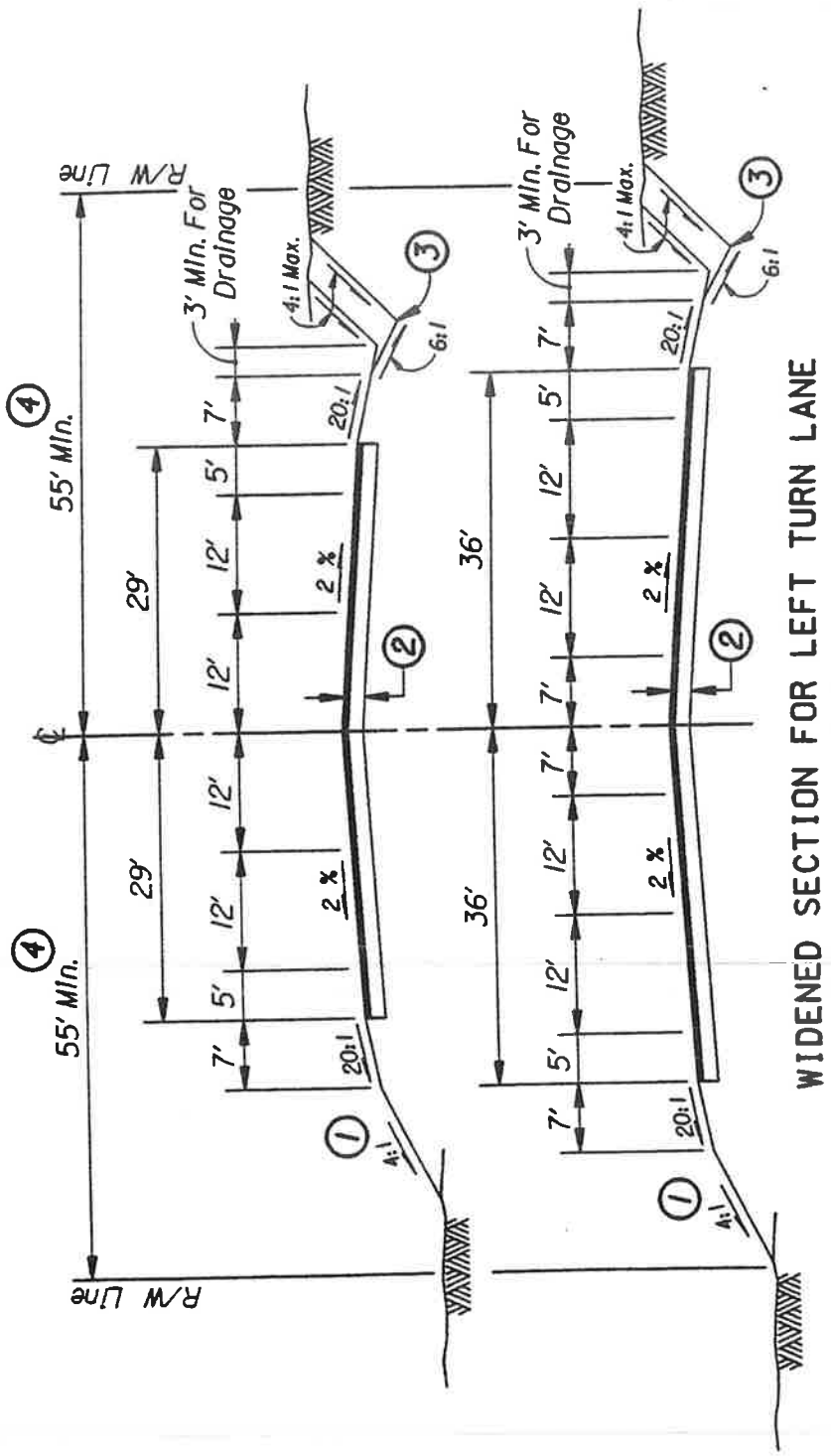


WIDENED SECTION FOR LEFT TURN LANE

N.T.S.

1. Min. Std. R/W Requirements:
   Section Line or Section Line Alternate Location - 55' Typical Half-Width Min.
   Mid-Section Line or Mid-Section Line Alternate Location - 40' Typical Half-Width Min.
   Road of Regional Significance Alignment - 70' Typical Half-Width Min.
2. For Guardrail Installation See MCDOT Std. Detail 2036 or 2037.
3. 3" Min. A.C. Over 10" Min. A.B. or Approved Equivalent.
4. Special Drainage Ditch as Required.

Maricopa Co. Dept. of Transportation Standard Typical Section	RURAL COLLECTOR ROADS	FIG. 5.3



① For Guardrail Installation See MCDOT Std. Detail 2036 or 2037.

② 4" Min. A.C. Over 10" Min. A.B. or Approved Equivalent.

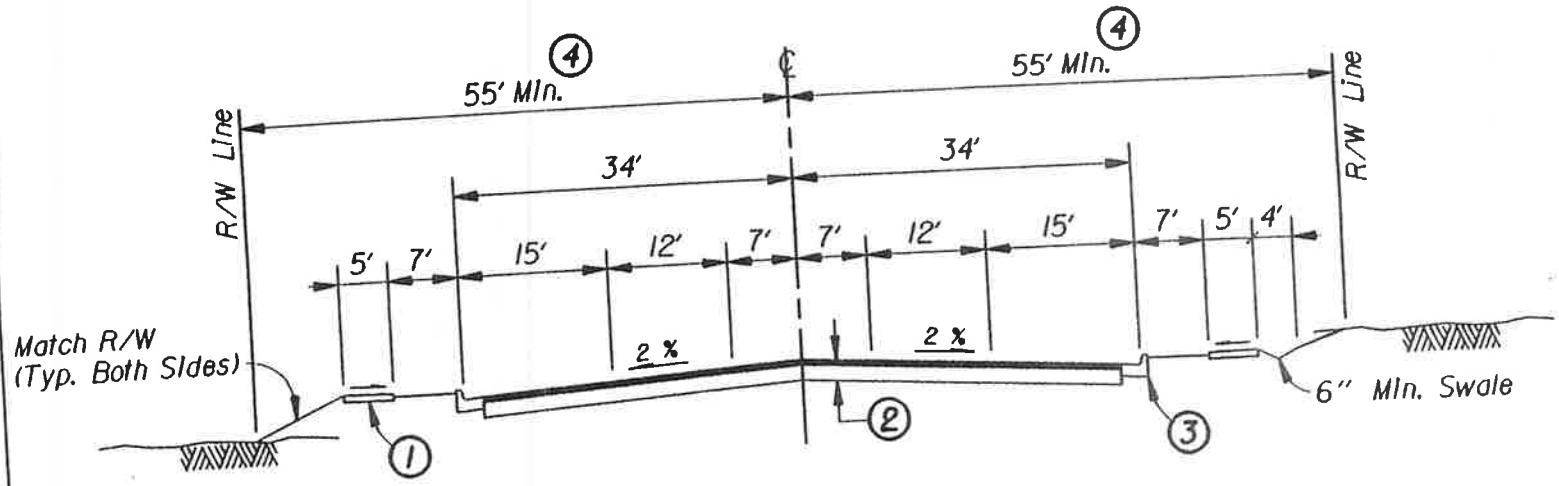
③ Special Drainage Ditch as Required.

④ Road of Regional Significance Alignment - 70' Typical Half-Width Min.

Maricopa Co. Dept. of Transportation
Standard Typical Section

RURAL MINOR ARTERIAL ROADS

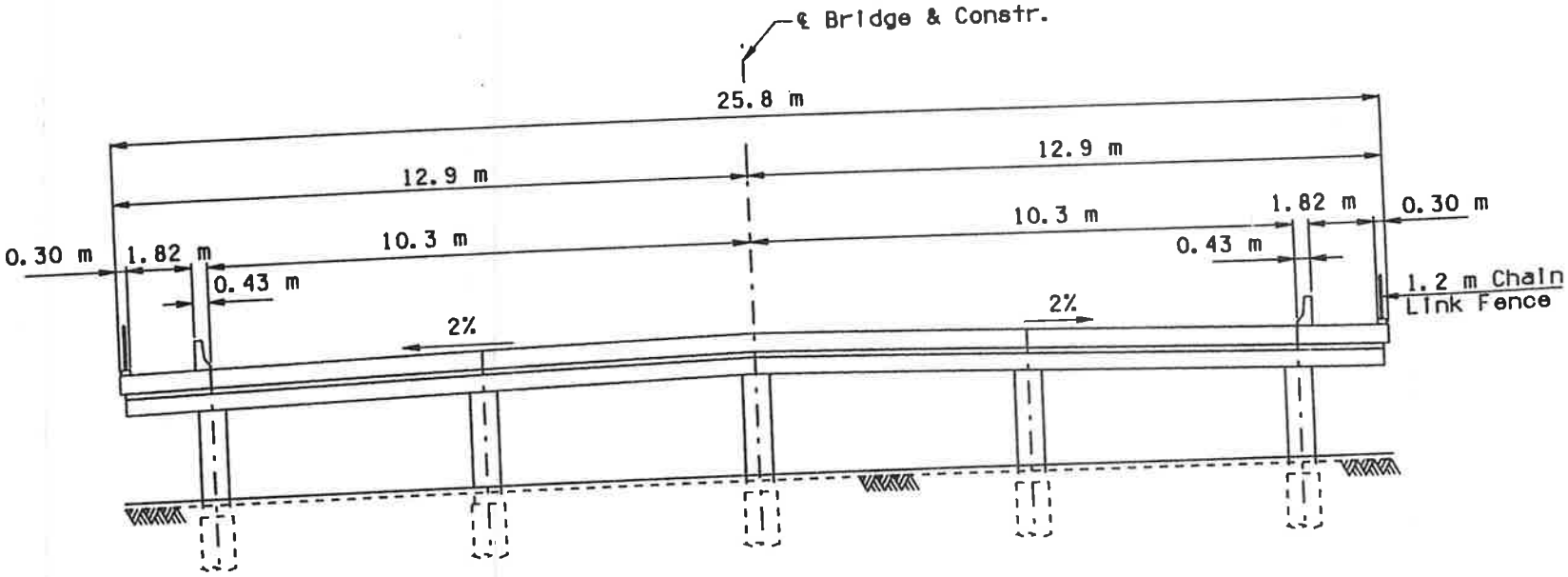
FIG. 5.2



N.T.S.

1. Designer Shall Offset S/W Except at Street Intersections (Typ. Both Sides).
2. 4" Min. A.C. Over 10" Min. A.B. or Approved Equivalent.
3. MAG Std. Detail 220, Type A or MCDOT Std. Detail 2030. Curb & Gutter (Typ. Both Sides).
4. Road of Regional Significance Alignment • 70' Typical Half-Width Min.

Maricopa Co. Dept. of Transportation Standard Typical Section	URBAN MINOR ARTERIAL ROAD	FIG. 5.8

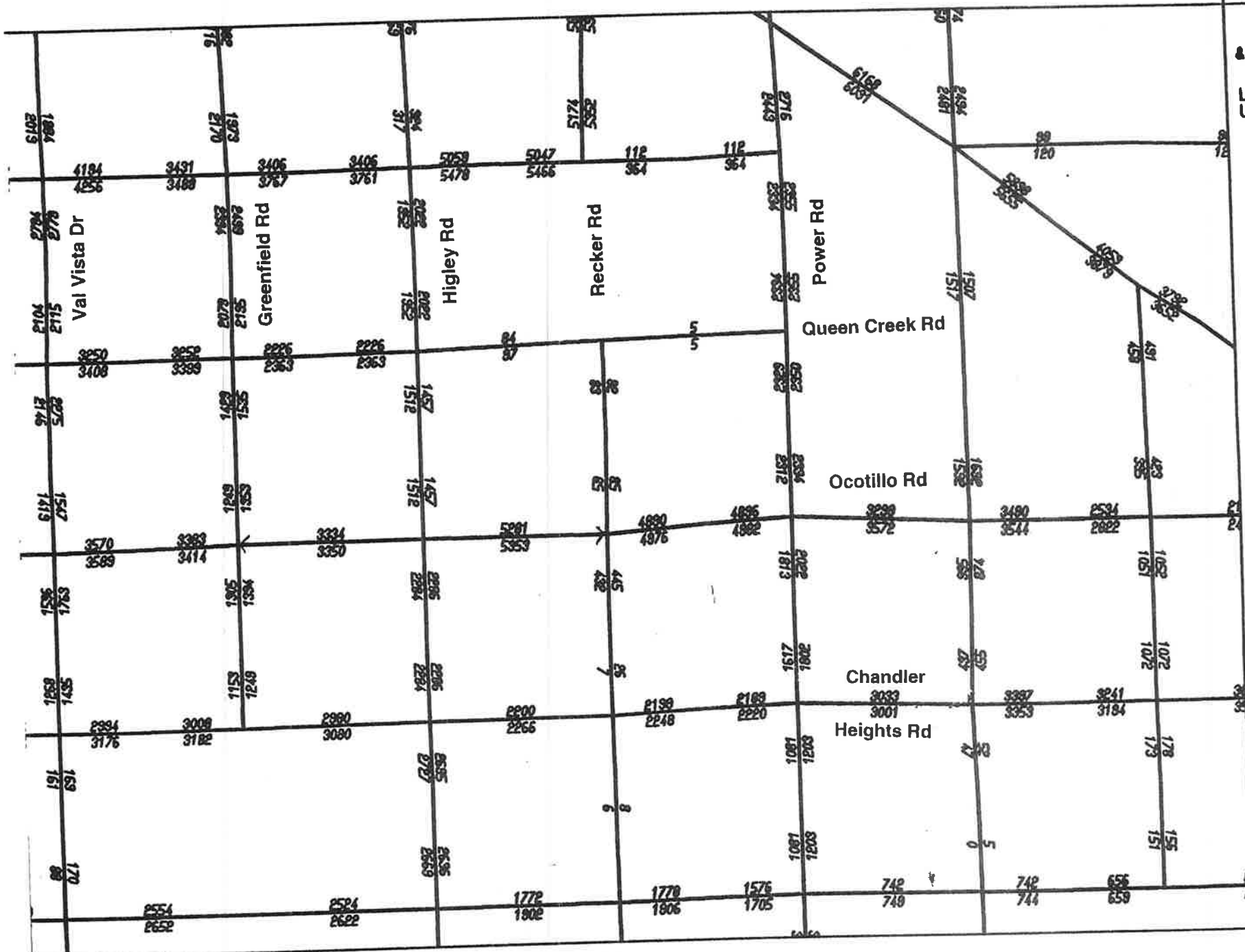


TYPICAL SECTION
No Scale

APPENDIX B

TRAFFIC INFORMATION AND ANALYSIS

emme/2



LINKS:
mod=a
&lmod=wep

THRESHOLD:
LOWER: -*****
UPPER: *****

WINDOW:
548501/ 806218
583770/ 832670

EMME/2 PROJECT: 2010|2 BUILD FOR CONFORMITY (MCDOT run)
SCENARIO 13: Ocotillo/Greenfield-Higley addition

99-08-13 10:11
MODULE: 2.13
MAGTPO.....djw

FileCountID	TargetStreet	Dir	StreetRef	Trav	DateofCount	TotalCount	AMTime	AMTotal	PMTime	PMTotal
3727	NEW RIVER RD	North	DESERT HILL RD	Both	11-Mar-98	3868	8:00 AM	278	5:30 PM	373
2998	NORHTERN AVE	East	EL MIRAGE RD	Both	24-Nov-98	7692	6:45 AM	645	4:30 PM	785
W1922222	NORTHER AVE	East	103RD AVE	West	19-May-98	6699	7:00 AM	748	5:00 PM	519
W1922444	NORTHERN AVE	West	103RD AVE	East	19-May-98	5033	7:15 AM	468	4:30 PM	456
3399	NORTHERN AVE	East	99TH AVE	West	24-Nov-98	4771	6:45 AM	383	5:15 PM	408
3399A	NORTHERN AVE	East	99TH AVE	East	24-Nov-98	7182	6:45 AM	636	4:15 PM	704
D5422	NORTHERN AVE		BEARDSLEY CANAL TO PERRYVILLE RD	Both	22-Sep-98	52	9:15 AM	6	5:45 PM	6
2883	NORTHERN AVE	East	CITRUS RD	Both	24-Nov-98	978	8:00 AM	75	5:00 PM	89
3397	NORTHERN AVE	East	LITCHFIELD RD	Both	24-Nov-98	6947	6:45 AM	602	4:30 PM	701
2846	NORTHERN AVE	East	REEMS RD	Both	14-Jul-98	3292	6:15 AM	218	5:15 PM	244
D5441	NORWICH DR		193RD AVE - END OF MAINT.	Both	02-Sep-98	163	5:30 AM	7	12:00 PM	11
D5443	NUNNELLEY RD		130TH ST TO 131ST ST	Both	08-Sep-98	441	8:45 AM	26	3:45 PM	27
D5444	NUNNELLEY RD		131ST ST TO 132ND ST	Both	08-Sep-98	132	10:00 AM	11	3:45 PM	13
1768444	OAK ST	West	GILBERT RD	East	05-Jan-98	76	8:00 AM	8	12:15 PM	12
W1764222	OCOTILLO RD	East	BASHA RD	West	09-Sep-98	1127	8:00 AM	150	2:45 PM	194
W1764444	OCOTILLO RD	West	BASHA RD	East	09-Sep-98	506	8:00 AM	54	1:00 PM	46
3483	OCOTILLO RD	East	CRISMON RD	Both	24-Mar-98	4508	8:00 AM	352	3:30 PM	348
3506	OCOTILLO RD	East	ELLSWORTH RD	West	01-Jun-98	905	10:30 AM	91	7:45 PM	111
3506B	OCOTILLO RD	East	ELLSWORTH RD	East	01-Jun-98	904	12:00 AM	65	8:45 PM	132
3541	OCOTILLO RD	East	GIBERT RD	Both	04-Mar-98	860	7:30 AM	67	6:00 PM	87
W2025444	OCOTILLO RD	West	GILBERT RD	East	22-Jul-98	503	10:45 AM	39	6:15 PM	77
W2025222	OCOTILLO RD	East	GILBERT RD	West	22-Jul-98	456	7:00 AM	49	1:00 PM	30
3492	OCOTILLO RD	East	HAWES RD	Both	12-May-98	2377	8:00 AM	210	2:45 PM	255
W2099222	OCOTILLO RD	East	HAWES RD	Both	14-Sep-98	1105	8:15 AM	98	3:30 PM	120
W2099444	OCOTILLO RD	West	HAWES RD	Both	14-Sep-98	602	8:00 AM	68	2:45 PM	85
3542	OCOTILLO RD	East	LINDSAY RD	Both	04-Mar-98	528	8:30 AM	41	4:30 PM	54
3486B	OCOTILLO RD	East	SIGNAL BUTTE RD	West	01-Jun-98	1028	10:45 AM	122	12:00 PM	108
3486	OCOTILLO RD	East	SIGNAL BUTTE RD	East	01-Jun-98	995	12:00 AM	92	9:30 PM	149
3504	OCOTILLO RD	East	SOSSAMAN RD	Both	12-May-98	1638	8:00 AM	148	2:45 PM	161
3557	OCOTILLO RD	East	SR 87	Both	09-Sep-98	1221	8:00 AM	113	5:45 PM	101
3538	OCOTILLO RD	East	VAL VISTA DR	Both	04-Mar-98	583	8:30 AM	61	4:30 PM	53
D6124	OLD MINE RD		DEER TRAIL RD TO SOMBRERO RD	Both	22-Sep-98	197	9:15 AM	10	1:45 PM	10
D6123	OLD MINE RD		LAPLATA RD TO DEER TRAIL RD	Both	22-Sep-98	426	8:45 AM	21	4:15 PM	22
D6125	OLD MINE RD		SOMBRERO RD TO HOHOKAM RD	Both	22-Sep-98	127	6:30 AM	6	1:45 PM	9
3298	OLD U.S. 80	North	AGUA CALIENTE RD	Both	17-Nov-98	325	10:45 AM	56	1:30 PM	46
3293	OLD U.S. 80	East	ARLINGTON RD	Both	17-Nov-98	747	10:45 AM	117	1:00 PM	74
3299	OLD U.S. 80	North	DESERT ROSE RD	Both	17-Nov-98	367	10:45 AM	46	1:15 PM	51
3218	OLD U.S. 80	East	JOHNSON RD	Both	17-Nov-98	947	8:00 AM	78	12:00 PM	89
3217	OLD U.S. 80	East	PALO VERDE RD	Both	17-Nov-98	1157	8:00 AM	114	12:00 PM	120
3291	OLD U.S. 80	West	SALOME HWY	Both	17-Nov-98	946	8:00 AM	77	1:45 PM	82
3303	OLD U.S. 80	North	WATERMELON RD	Both	17-Nov-98	448	8:00 AM	34	4:00 PM	39
3215	OLD U.S. 80	East	WILSON AVE	Both	17-Nov-98	935	7:45 AM	95	2:45 PM	87

FileCountID	TargetStreet	Dir	StreetRef	Trav	DateofCount	TotalCount	AMTime	AMTotal	PMTime	PMTotal
3617	GUADALUPE RD	East	GREENFIELD RD	Both	07-Apr-98	9050	7:15 AM	816	5:45 PM	801
3615A	GUADALUPE RD	East	RECKER RD	West	07-Apr-98	5272	7:00 AM	493	2:30 PM	625
3615	GUADALUPE RD	East	RECKER RD	East	07-Apr-98	5138	7:00 AM	868	4:00 PM	415
3630A	GUADALUPE RD	East	VAL VISTA DR	West	08-Apr-98	7243	7:45 AM	769	3:30 PM	572
W1931222	HALLEY DR	East	ALMA SCHOOL RD	West	11-May-98	1287	10:45 AM	116	1:30 PM	116
0730982	HALLEY DR		NEAR ALMA SCHOOL RD	Both	03-Aug-98	6396	9:15 AM	194	12:00 PM	219
SP02	HAPPY VALLEY RD	West	GRAND AVE	Both	12-May-98	996	6:45 AM	82	3:00 PM	100
3133	HAPPY VALLEY RD	East	LAKE PLEASANT RD	Both	17-Nov-98	280	9:00 AM	28	5:30 PM	27
3334	HARQUAHALA VALLEY RD	North	BASELINE RD	Both	10-Dec-98	270	10:15 AM	24	12:00 PM	29
3403	HARRISON ST	East	83RD AVE	Both	01-Dec-98	1219	5:00 AM	110	3:15 PM	169
3652	HAWES RD	North	BROADWAY RD	Both	03-Jun-98	582	10:30 AM	36	4:15 PM	58
W2100111	HAWES RD	North	CHANDLER HGTS RD	Both	14-Sep-98	607	8:30 AM	59	3:30 PM	78
W2100333	HAWES RD	South	CHANDLER HGTS RD	Both	14-Sep-98	292	8:15 AM	33	7:00 PM	35
3510	HAWES RD	North	CHANDLER HIEGHTS RD	Both	13-May-98	1316	8:30 AM	137	3:00 PM	141
D4442	HAWES RD	North	ELLIOT RD TO END OF MAINT	Both	08-Sep-98	647	7:45 AM	35	1:15 PM	27
D4441	HAWES RD		MESQUITE ST ALIG TO ELLIOT RD	Both	08-Sep-98	647	7:45 AM	35	1:15 PM	27
D4441A	HAWES RD		MESQUITE ST ALIG TO ELLIOT RD	Both	08-Sep-98	272	6:45 AM	33	5:30 PM	21
W2099111	HAWES RD	North	OCOTILLO RD	Both	14-Sep-98	334	8:00 AM	36	2:45 PM	35
3693	HAWES RD	North	OCOTILLO RD	Both	12-May-98	741	8:00 AM	72	3:00 PM	59
W2099333	HAWES RD	South	OCOTILLO RD	Both	14-Sep-98	673	8:15 AM	88	4:15 PM	61
3497	HAWES RD	North	RIGGS RD	Both	13-May-98	635	8:15 AM	56	6:15 PM	61
3281	HAZEN RD	East	S.R. 85	Both	08-Dec-98	777	9:45 AM	77	3:15 PM	85
3280	HAZEN RD	East	WILSON AVE	Both	08-Dec-98	266	7:45 AM	26	1:30 PM	34
1880222	HERITAGE DR	East	151ST AVE	West	02-Apr-98	609	10:45 AM	66	3:45 PM	79
1880444	HERITAGE DR	West	151ST AVE	East	02-Apr-98	575	9:45 AM	67	12:45 PM	53
3-333	HIGLEY RD	South	BASELINE RD	North	14-Apr-98	11310	8:00 AM	478	4:15 PM	420
3648	HIGLEY RD	South	BASELINE RD	Both	15-Jun-98	10013	7:15 AM	728	5:15 PM	777
3534	HIGLEY RD	North	CHANDLER HEIGHTS RD	Both	04-Mar-98	2218	9:00 AM	160	5:15 PM	197
3629	HIGLEY RD	South	ELLIOT RD	Both	13-Apr-98	3003	10:30 AM	279	12:00 PM	236
3523	HIGLEY RD	South	GERMANN RD	Both	11-Feb-98	2997	7:30 AM	247	4:15 PM	239
3522	HIGLEY RD	North	GERMANN RD	Both	11-Feb-98	3520	7:45 AM	304	5:30 PM	281
3535	HIGLEY RD	North	RIGGS RD	Both	03-Feb-98	1507	10:15 AM	106	5:30 PM	141
3569	HIGLEY RD	North	WARNER RD	Both	13-Apr-98	5171	7:30 AM	422	4:30 PM	476
3568B	HIGLEY RD	North	WILLIAMS FIELD RD	South	22-Apr-98	1624	10:45 AM	193	12:00 PM	168
3568	HIGLEY RD	North	WILLIAMS FIELD RD	North	22-Apr-98	1471	10:45 AM	106	8:45 PM	198
3728	HONDA BOW RD	West	NEW RIVER RD	Both	28-Jul-98	460	6:15 AM	38	5:00 PM	48
D5081	HONDA BOW RD		NEW RIVER RD TO END OF MAINT	Both	15-Sep-98	251	9:00 AM	19	12:00 PM	20
3604	HUNT HWY	East	ALMA SCHOOL RD	Both	27-Jan-98	1588	10:00 AM	90	4:45 PM	153
3536	HUNT HWY	East	LEMON AVE	Both	11-May-98	890	7:30 AM	65	5:30 PM	71
3511	HUNT HWY	West	SOSSAMAN RD	Both	11-May-98	1245	7:15 AM	80	4:30 PM	112
3607	HUNT HWY	East	SR 87	Both	27-Jan-98	848	10:45 AM	82	3:45 PM	87

FileCountID	TargetStreet	Dir	StreetRef	Trav	DateofCount	TotalCount	AMTime	AMTotal	PMTime	PMTotal
3690	FORT MCDOWELL RD	North	SR 87	Both	27-Apr-98	5546	10:45 AM	308	5:15 PM	491
S5216	FRONTIER RD	East	REEMS RD	Both	04-Aug-98	12	5:45 AM	4	7:00 PM	1
S5216A	FRONTIER RD	West	REEMS RD	Both	04-Aug-98	39	8:15 AM	4	3:15 PM	5
D4644	GALVIN ST		11TH AVE TO 7TH AVE	Both	14-Sep-98	555	7:15 AM	31	6:30 PM	31
D4643	GALVIN ST		17TH AVE TO 11TH AVE	Both	14-Sep-98	510	7:30 AM	30	6:45 PM	37
D4187	GARNET RD		RAY RD TO ARLINGTON RD	Both	30-Sep-98	70	8:30 AM	7	2:30 PM	9
3592	GERMANN RD	East	COOPER RD	Both	13-Apr-98	3152	7:30 AM	381	5:30 PM	289
3561	GERMANN RD	East	GILBERT RD	Both	02-Mar-98	2530	7:45 AM	280	5:30 PM	265
3507	GERMANN RD	East	HAWES RD	Both	22-Jun-98	1814	6:45 AM	229	2:45 PM	159
689E	GERMANN RD	East	MCQUEEN RD	Both	01-Jul-98	4607	7:15 AM	539	5:15 PM	417
3524	GERMANN RD	East	VAL VISTA RD	Both	11-Feb-98	1523	6:30 AM	154	3:30 PM	134
W2025333	GIBERT RD	South	OCOTILLO RD	North	22-Jul-98	1466	8:00 AM	121	5:45 PM	129
3549	GILBERT RD	North	GERMANN RD	Both	02-Mar-98	4383	6:45 AM	400	4:30 PM	409
1768111	GILBERT RD	North	OAK ST	South	05-Jan-98	6651	7:45 AM	383	5:00 PM	763
1768333	GILBERT RD	South	OAK ST	North	05-Jan-98	7316	7:15 AM	1040	4:15 PM	466
W2025111	GILBERT RD	North	OCOTILLO RD	South	22-Jul-98	1684	8:00 AM	143	4:30 PM	134
3544	GILBERT RD	North	OCOTILLO RD	Both	04-Mar-98	3476	7:30 AM	306	4:00 PM	325
3529	GILBERT RD	South	RIGGS RD	South	20-Apr-98	451	10:30 AM	140	12:00 PM	70
3528B	GILBERT RD	North	RIGGS RD	South	20-Apr-98	761	10:30 AM	158	7:30 PM	97
3528	GILBERT RD	North	RIGGS RD	North	20-Apr-98	712	10:45 AM	89	8:30 PM	133
3529B	GILBERT RD	South	RIGGS RD	North	20-Apr-98	422	10:45 AM	59	8:15 PM	122
1767333	GILBERT RD	South	THOMAS RD	North	05-Jan-98	7023	8:00 AM	1048	5:00 PM	417
1767111	GILBERT RD	North	THOMAS RD	South	05-Jan-98	7014	8:30 AM	370	6:00 PM	941
3548	GILBERT RD	South	WILLIAMS FIELD RD	South	22-Apr-98	3057	10:45 AM	295	9:15 PM	281
3546	GILBERT RD	North	WILLIAMS FIELD RD	North	21-Apr-98	3740	10:45 AM	226	9:30 PM	402
3546B	GILBERT RD	North	WILLIAMS FIELD RD	South	21-Apr-98	3633	10:45 AM	305	12:00 PM	387
3548B	GILBERT RD	South	WILLIAMS RD	North	22-Apr-98	3026	10:45 AM	231	9:15 PM	310
2838	GLENDALE AVE	East	ALSUP AVE	Both	14-Jul-98	168	10:00 AM	23	12:30 PM	19
2847	GLENDALE AVE	West	ALSUP AVE	Both	14-Jul-98	289	8:45 AM	26	1:15 PM	35
C07122	GRAND AVE	East	99TH AVE	Both	30-Apr-98	16088	7:45 AM	1344	4:00 PM	1125
D8558	GRANITE PIT RD		1-17 FRNTG RD TO CONTINUOUS	Both	14-Sep-98	1823	10:30 AM	125	1:15 PM	142
D8559	GRANITE PIT RD		CONTINUOUS TO END OF MAINT	Both	14-Sep-98	1509	10:45 AM	114	1:15 PM	139
2-333	GREENFIELD RD	South	BASELINE RD	North	14-Apr-98	14023	7:15 AM	616	3:30 PM	605
3537	GREENFIELD RD	North	CHANDLER HEIGHTS RD	Both	04-Mar-98	638	8:30 AM	53	1:30 PM	54
3618	GREENFIELD RD	North	GUADALUPE RD	Both	07-Apr-98	11409	7:30 AM	915	5:45 PM	1078
3527	GREENFIELD RD	North	OCOTILLO RD	Both	04-Mar-98	816	8:30 AM	73	4:00 PM	72
W2108333	GREENFIELD RD	South	QUEEN CREEK RD	Both	21-Sep-98	765	8:00 AM	72	5:15 PM	63
W2108111	GREENFIELD RD	North	QUEEN CREEK RD	Both	21-Sep-98	566	9:45 AM	51	5:00 PM	64
3620	GREENFIELD RD	North	RAY RD	Both	01-Apr-98	3567	6:45 AM	385	5:15 PM	283
3621	GREENFIELD RD	South	RAY RD	Both	01-Apr-98	2933	7:00 AM	306	4:45 PM	248
D7829	GUADALUPE FRT RD		HIGLEY RD TO 172ND ST	Both	08-Sep-98	88	10:45 AM	13	2:15 PM	10

Urban Roadway Level of Service and Service Volumes							
Road Classification	Desired LOS	ADT/ Lane	No. Thru Lanes	2-Way ADT Range	Pk.Hr./ ADT %	Max. Pk. Hr. Ln. Vol.	*Max. Rdwy. Length
Local	A	350	2	50 -700	15	60	1,000 ft.
Minor Collector	B	2,500	2	500 - 5,000	12	360	1/2 mi.
Major Collector	C	3,500	2	600 - 7,000	10	420	2 mi.
Minor Arterial	C	5,500	4	6,000 - 22,000	8	530	—
Principal Arterial	D	7,500	6	18,000 - 45,000	8	720	—

Rural Roadway Level of Service and Service Volumes							
Road Classification	Desired LOS	ADT/ Lane	No. Thru Lanes	2-Way ADT Range	Pk.Hr./ ADT %	Max. Pk. Hr. Ln. Vol.	Max. Rdwy. Length
Local	A	500	2	50 - 1,000	15	90	1 mi.
Minor Collector	B	3,000	2	800 - 6,000	12	430	2 mi.
Major Collector	B	4,000	2	1,000 - 8,000	10	480	—
Minor Arterial	C	9,000	4	6,000 - 36,000	10	1,100	—
Principal Arterial	C	10,000	4	10,000 - 40,000	10	1,200	—

Table 2.1: Urban and Rural Roadway Levels of Service and Service Volumes

The chart information should be used in conjunction with other factors such as the "CONTINUITY" of the road, and its section-line or mid-section alignment.

Note the overlapping range of ADT is intended to allow for consideration of these other factors.

All chart information is based on a 60% Peak Hour (Pk. Hr.) directional split.

ADT refers to Average Daily Traffic (24 hour weekday, two-way volume) .

LOS refers to Level of Service. A summary description of Level of Service is given below:

- A - free flow, with low volumes and high speeds.
- B - reasonably free flow, but speeds beginning to be restricted by traffic conditions.
- C - in stable flow zone, but most drivers restricted in freedom to select their own speed.
- D - approaching unstable flow, drivers have little freedom to maneuver.
- E - unstable flow, may be short stoppages.

Sources: American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 1990. p.92. For additional discussion of Levels of Service, see pp. 89 - 92.

* Length may be variable as a function of degree of home frontage on the road.

- A capacity analysis will be conducted for all streets and driveways that intersect collector or arterial streets and at all critical intersections within one mile of the site or as directed by the traffic engineer. The consultant shall analyze both of the peak hours using the operations method of the Highway Capacity Software. Capacity analysis work sheets or computer printouts are to be included in the report.

Appropriate clearance intervals shall be provided for each exclusive movement. Pedestrian movements must be provided for each cycle. Maximum pedestrian walking speeds shall be four feet per second with a minimum 'WALK' time of seven seconds.

Traffic progression will be of paramount importance. Consequently, all potential signalized intersections will have a minimum spacing of one-quarter mile on arterial and collector streets. Major driveways that could require signalization will not be placed between the one-quarter mile points. Traffic signals will be installed only when they meet warrants, as determined by the Traffic Engineering Division.

Roadway level of service shall meet the design objectives established in Table 2.1, Chapter 2, Section 1. Intersection Level of Service (LOS) 'B' shall be the design objective for retirement communities. Intersection Level of Service (LOS) 'C' shall be the design objective for all other developments. No intersection through lane movement shall fall below Level of Service (LOS) 'D', and no intersection turning movement shall fall below Level of Service (LOS) 'E'. Under no circumstances will a LOS less than those established in Table 2.1, Chapter 2, Section 1 be accepted for site and non-site traffic. If a lesser LOS is the result of the study, then alternatives for providing the desired LOS shall be analyzed and included as part of the study. Generally, the design year will be 20-25 years beyond the year of study and coincide with a future traffic projection forecast year available from MAG.

If available, use most recent traffic volume counts made by MCDOT or ADOT. Any assumptions must be discussed with MCDOT before making intersection volume/capacity (V/C) calculations. Any significant impact that causes an increase in the V/C ratio of 0.05 or more at an intersection with a final V/C ratio of 0.90 or more must be mitigated.

The source for trip generation rates shall be Trip Generation published by ITE (most recent edition), unless otherwise approved by the traffic engineer. On-site trip interaction shall not exceed 15%. Pass-by 'capture' rates shall be documented and specific references shall be identified and noted for rates used. The reduction of trip rates based on transit usage requires the review and approval of the County Traffic Engineer. The review shall be based on the submitted supporting documentation. Formal written approval for the methodology and assumptions is required prior to beginning the reduction estimation process.

All final submittals for traffic studies and/or reports shall be signed and sealed by an Arizona Registered Civil Engineer experienced and qualified in the traffic engineering profession.

5.5 DESIGN SPEEDS

Originator: Traffic Engineering Division

The design of geometric features such as horizontal and vertical curves will depend upon the design speed selected for the street. The choice of the design speed is primarily determined by the street classification. The design speed is the maximum recommended speed at which reasonable safe operation of a vehicle can be maintained over a specific section of a road when conditions are so favorable that the design features of the road govern. Design speeds for the various classifications of roads may be found in Table 5.2 (Design Speeds, Rural) and Table 5.3 (Design Speeds, Urban). The use of design speeds other than those shown on these two figures must be approved by the MCDOT Director or an authorized representative. A private drive within an apartment or condominium development may be designed using a design speed of 30 miles per hour.

It is important to remember that design speeds are 5-10 mph over anticipated posted operation speeds.

Minimum Design Speeds (mph) for Rural Roadway Classifications by Type of Terrain		
Classification	**Terrain**	**Design Speed**
Rural Principal Arterial	Level Rolling Mountainous	65 55 50
Rural Minor Arterial	Level Rolling Mountainous	65 55 45
Rural Major Collector	Level Rolling Mountainous	60 50 45
Rural Minor Collector	Level Rolling Mountainous	55 45 35
Rural Local	Level Rolling Mountainous	50 40 35

Table 5.2: MINIMUM DESIGN SPEEDS (Rural)

Minimum Design Speeds (mph) for Urban Roadway Classifications by Type of Terrain		
Classification	**Terrain**	**Design Speed**
Urban Principal Arterial	Level Rolling Mountainous	60 55 45
Urban Minor Arterial	Level Rolling Mountainous	55 50 40
Urban Major Collector	Level Rolling Mountainous	40 30 25
Urban Minor Collector	Level Rolling Mountainous	40 30 25
Urban Local	Level Rolling Mountainous	35 30 25
Frontage Road	Level Rolling Mountainous	35 25 25

Table 5.3: MINIMUM DESIGN SPEEDS (Urban)

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Ocotillo Road, Higley Road to Recker Road
ANALYST..... BDO
TIME OF ANALYSIS..... 2010
DATE OF ANALYSIS..... 11-15-1999
OTHER INFORMATION.... Two-Lane Roadway

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS..... 5
PERCENTAGE OF BUSES..... 0
PERCENTAGE OF RECREATIONAL VEHICLES..... 0
DESIGN SPEED (MPH)..... 60
PEAK HOUR FACTOR..... 1
DIRECTIONAL DISTRIBUTION (UP/DOWN)..... 60 / 40
LANE WIDTH (FT)..... 12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)... 5
PERCENT NO PASSING ZONES..... 20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E T	E B	E R	f w	f d	f HV
A	2	1.8	2.2	.96	.94	.95
B	2.2	2	2.5	.96	.94	.94
C	2.2	2	2.5	.96	.94	.94
D	2	1.6	1.6	.96	.94	.95
E	2	1.6	1.6	.98	.94	.95

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 1063
ACTUAL FLOW RATE: 1063

LOS	SERVICE FLOW RATE	V/C
A	289	.12
B	572	.24
C	930	.39
D	1492	.62
E	2457	1

LOS FOR GIVEN CONDITIONS: D

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION....	Ocotillo Road, Greenfield Rd to Higley Road
ANALYST.....	BDO
TIME OF ANALYSIS.....	2010
DATE OF ANALYSIS.....	11-15-1999
OTHER INFORMATION....	Two-Lane Roadway

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	5
PERCENTAGE OF BUSES.....	0
PERCENTAGE OF RECREATIONAL VEHICLES.....	0
DESIGN SPEED (MPH).....	60
PEAK HOUR FACTOR.....	1
DIRECTIONAL DISTRIBUTION (UP/DOWN).....	60 / 40
LANE WIDTH (FT).....	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	5
PERCENT NO PASSING ZONES.....	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.96	.94	.95
B	2.2	2	2.5	.96	.94	.94
C	2.2	2	2.5	.96	.94	.94
D	2	1.6	1.6	.96	.94	.95
E	2	1.6	1.6	.98	.94	.95

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 668
ACTUAL FLOW RATE: 668

LOS	SERVICE FLOW RATE	V/C
A	289	.12
B	572	.24
C	930	.39
D	1492	.62
E	2457	1

LOS FOR GIVEN CONDITIONS: C

HCS: Multilane Highways Release 2.3e

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

File Name	GRNHIG_4.HC7
Facility Section.....	Ocotillo Road
From/To.....	Greenfield to Higley
Analyst.....	BDO
Time of Analysis.....	2010 Peak Hour
Date of Analysis.....	11/19/99
Other Information....	4-Lane Rural Roadway w/ flush median

A. Geometrics and Traffic Input	Direction 1	Direction 2
Volume	401	267
Peak-Hour Factor or Peak 15 Minutes	0.95	0.95
Number of Lanes	2	2
Percentage of Trucks and Buses	5	5
Percentage of Recreational Vehicles	0	0
Ideal Free-Flow Speed (mph)	65.0	65.0
Type of Median	D	D
Lane Width (ft)	12.0	12.0
Distance from Roadway Edge (ft)	5.0	5.0
Access Points per Mile	4.0	4.0

B. Adjustment Factors

	Terrain Type	E_T	E_R	F_{HV}	F_M	F_{LW}	F_{LC}	F_A
Dir 1	LEVEL	1.50		0.98	0.00	0.00	1.55	1.00
Dir 2		1.50		0.98	0.00	0.00	1.55	1.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	216	144
Free Flow Speed (mph)	62.5	62.5
Average Passenger Car Speed (mph)	62.5	62.5
Density (pcpmpl)	3.5	2.3
Level of Service (LOS)	A	A

HCS: Multilane Highways Release 2.3e

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

File Name	GRNHIG_5.HC7
Facility Section.....	Ocotillo Road
From/To.....	Greenfield to Higley
Analyst.....	BDO
Time of Analysis.....	2010 Peak Hour
Date of Analysis.....	11/12/99
Other Information....	5-Lane Roadway

A. Geometrics and Traffic Input	Direction 1	Direction 2
Volume	401	267
Peak-Hour Factor or Peak 15 Minutes	0.95	0.95
Number of Lanes	2	2
Percentage of Trucks and Buses	5	5
Percentage of Recreational Vehicles	0	0
Ideal Free-Flow Speed (mph)	55.0	55.0
Type of Median	D	D
Lane Width (ft)	12.0	12.0
Distance from Roadway Edge (ft)	3.0	3.0
Access Points per Mile	4.0	4.0

B. Adjustment Factors

	Terrain Type	E_T	E_R	F_{HV}	F_M	F_{LW}	F_{LC}	F_A
Dir 1	LEVEL	1.50		0.98	0.00	0.00	2.70	1.00
Dir 2		1.50		0.98	0.00	0.00	2.70	1.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	216	144
Free Flow Speed (mph)	51.3	51.3
Average Passenger Car Speed (mph)	51.3	51.3
Density (pcpmpl)	4.2	2.8
Level of Service (LOS)	A	A

HCS: Multilane Highways Release 2.3e

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

File Name ..... HIGREC_4.HC7
Facility Section..... Ocotillo Road
From/To..... Higley to Recker
Analyst..... BDO
Time of Analysis..... 2010 Peak Hour
Date of Analysis..... 11/19/99
Other Information.... 4-Lane Rural Roadway w/ Flush Median

A. Geometrics and Traffic Input	Direction 1	Direction 2
Volume	638	425
Peak-Hour Factor or Peak 15 Minutes	0.95	0.95
Number of Lanes	2	2
Percentage of Trucks and Buses	5	5
Percentage of Recreational Vehicles	0	0
Ideal Free-Flow Speed (mph)	65.0	65.0
Type of Median	D	D
Lane Width (ft)	12.0	12.0
Distance from Roadway Edge (ft)	5.0	5.0
Access Points per Mile	4.0	4.0

B. Adjustment Factors

	Terrain Type	E_T	E_R	F_{HV}	F_M	F_{LW}	F_{LC}	F_A
Dir 1	LEVEL	1.50		0.98	0.00	0.00	1.55	1.00
Dir 2		1.50		0.98	0.00	0.00	1.55	1.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	344	229
Free Flow Speed (mph)	62.5	62.5
Average Passenger Car Speed (mph)	62.5	62.5
Density (pcpmpl)	5.5	3.7
Level of Service (LOS)	A	A

HCS: Multilane Highways Release 2.3e

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

File Name	HIGREC_5.HC7
Facility Section.....	Ocotillo Road
From/To.....	Higley to Recker
Analyst.....	BDO
Time of Analysis.....	2010 Peak Hour
Date of Analysis.....	11/12/99
Other Information....	5-Lane Roadway

A. Geometrics and Traffic Input	Direction 1	Direction 2
Volume	638	425
Peak-Hour Factor or Peak 15 Minutes	0.95	0.95
Number of Lanes	2	2
Percentage of Trucks and Buses	5	5
Percentage of Recreational Vehicles	0	0
Ideal Free-Flow Speed (mph)	55.0	55.0
Type of Median	D	D
Lane Width (ft)	12.0	12.0
Distance from Roadway Edge (ft)	3.0	3.0
Access Points per Mile	4.0	4.0

B. Adjustment Factors

	Terrain Type	E_T	E_R	F_{HV}	F_M	F_{LW}	F_{LC}	F_A
Dir 1	LEVEL	1.50		0.98	0.00	0.00	2.70	1.00
Dir 2		1.50		0.98	0.00	0.00	2.70	1.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	344	229
Free Flow Speed (mph)	51.3	51.3
Average Passenger Car Speed (mph)	51.3	51.3
Density (pcpmpl)	6.7	4.5
Level of Service (LOS)	A	A

SVERDRUP

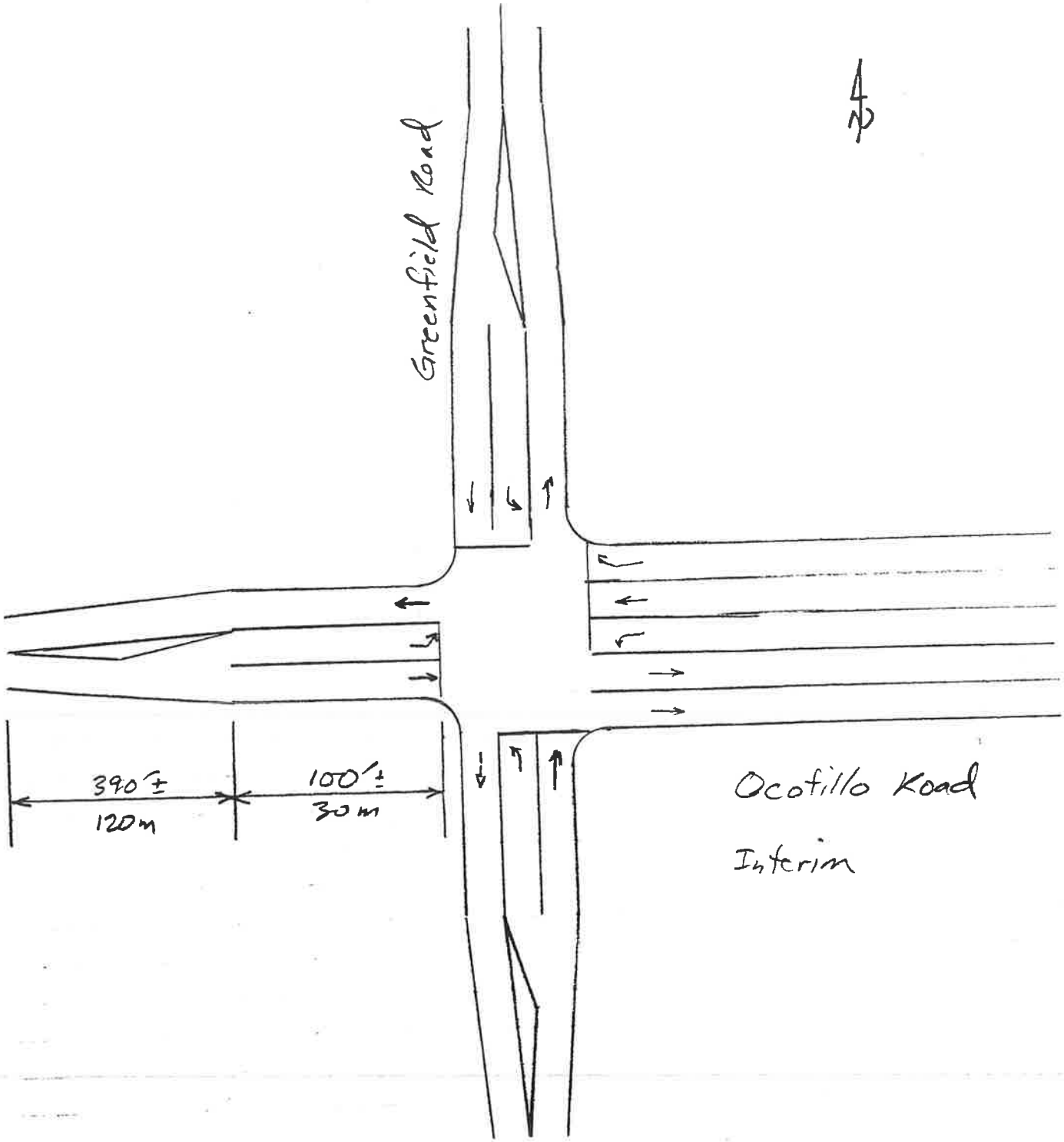
JOB W74284 MCDOT On-Call

COMPUTATIONS FOR Intersection Sketch
Ocotillo / Greenfield

SHEET NO. 1 OF 3

DATE 11/12/99

BY BDO CHKD



2010 Volume Calculations
Ocotillo Road / Greenfield Road
Peak Hour

Projected ADT Volumes

Leg	EB	WB	NB	SB
E	3350	3334		
W	3414	3383		
N			1353	1249
S			1394	1305

Projected Peak Hr. Volumes (K=10%)

Leg	EB	WB	NB	SB
E	335	333		
W	341	338		
N			135	125
S			139	131

Assumed Peak Hour Turning Percents

Inbound	L	T	R	Check
E Leg WB	5%	92%	3%	100%
W Leg EB	4%	92%	4%	100%
N Leg SB	9%	80%	11%	100%
S Leg NB	12%	79%	9%	100%

Peak Hour Turning Volumes

Inbound	L	T	R	Check	
E Leg WB	17	307	10	334	333
W Leg EB	14	311	14	339	338
N Leg SB	11	100	14	125	125
S Leg NB	17	110	13	140	139

Check Turning Volumes based on Outbound Volumes

Outbound	L	T	R	Check	
E Leg EB	11	311	13	335	335
W Leg WB	17	307	14	338	338
N Leg NB	14	110	10	134	135
S Leg SB	17	100	14	131	131

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University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Greenfield Road (E-W) Ocotillo Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... BDO
Date of Analysis..... 11/12/99
Other Information..... 2010 Volumes, Peak Hour, 5-Lane Improvement

Two-way Stop-controlled Intersection

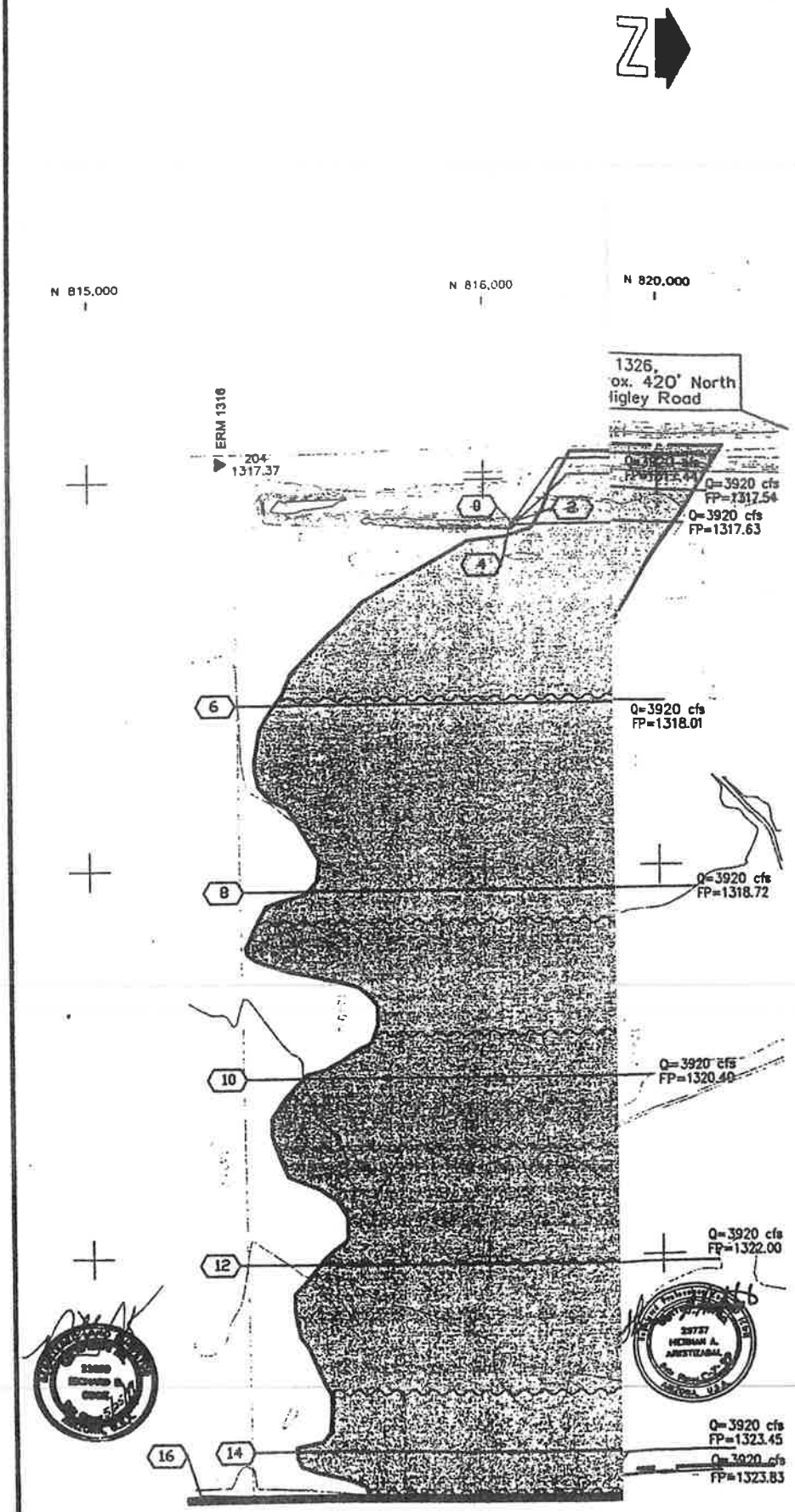
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	1	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	14	311	14	17	307	10	17	110	13	11	100	14
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			1			1	
MC's (%)	1			1			1	1	1	1	1	1
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	5			5			5	5	5	5	5	5
PCE's	1.05			1.05			1.16	1.16	1.16	1.16	1.16	1.16

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

APPENDIX D

ZONING AND COUNTY ASSESSOR MAPS



OF MARICOPA COUNTY
SANOKAI WASH
FLOOD DELINEATION STUDY OF

F.C.D. CONTRACT NO. 97-11

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	6 Q=3920 cfs FP=1318.01
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1320
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary
LIMITS OF DETAILED STUDY	

ELEVATION REFERENCE MARKS

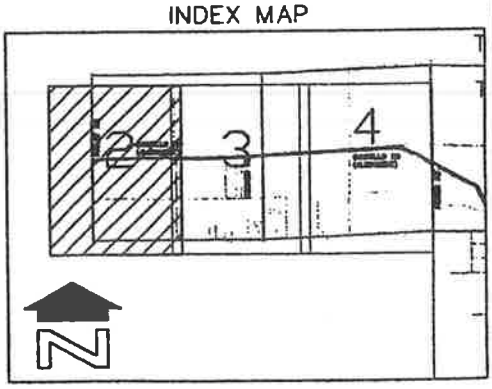
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1315	1315.78	ADOT Brass Cap in hand hole at Higley Road crossing of Sanokai Wash, being on the northwest corner of Section 23, Township 2 South, Range 6 East.
1316	1316.35	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 23, Township 2 South, Range 6 East.
1326	1326.01	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 14, Township 2 South, Range 6 East.

NOTES

NGVD 29 + 2.23 FEET = NVAD 88

INDEX MAP



200' 0' 200' 400'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

Entellus
3256 N. 44th Street Suite 125
Phoenix, AZ 85018-3279
Tel 602.244.2566
Fax 602.244.8847
E-mail www.Entellus.com

	BY	DATE
DESIGN	HAA	3/99
DESIGN CHK.	SEK	3/99
PLANS	GLT/JDS	3/99
PLANS CHK.	HAA	3/99
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

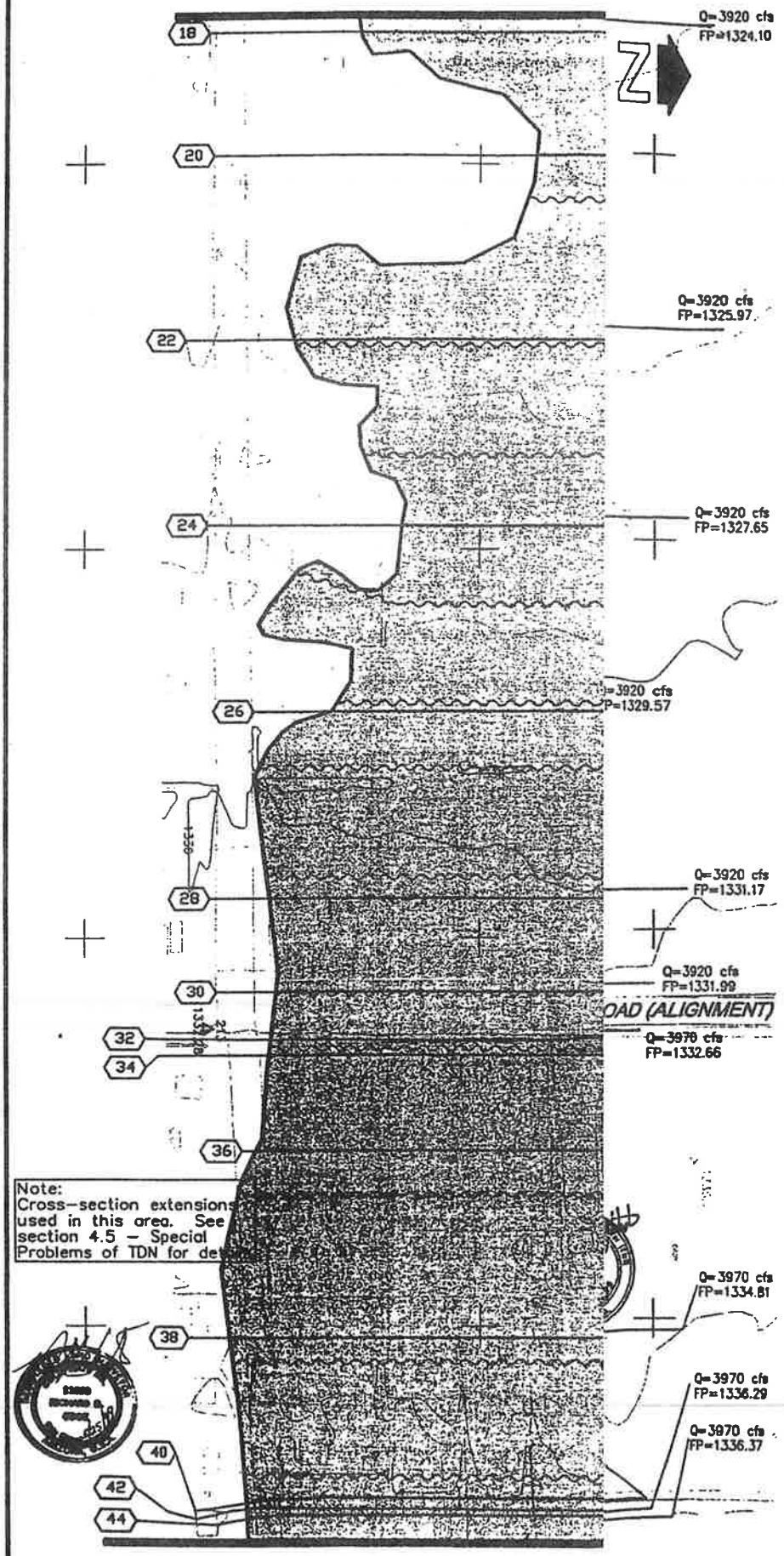
APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 2 OF 8

AERIAL MAPPING COMPANY.
CONTROL SURVEY BY COLLINS/PINA CONSULTING ENGINEERS, INC.
FLIGHT DATE 11-5-97

FILE: plan_Drafting DATE: PLOT FILE: plan.pc2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

SANOKAI WASH

FLOOD DELINEATION STUDY OF

F.C.D. CONTRACT NO. 97-11

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	6 Q=3920 cfs FP=1318.01
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1320
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary
LIMITS OF DETAILED STUDY	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

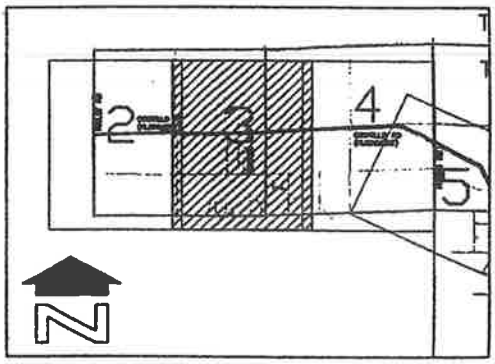
I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION

See sheet 2 and 5.

NOTES

NGVD 29 + 2.23 FEET = NVAD 88

INDEX MAP



200' 0' 200' 400'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

Entellus
2255 N. 44th Street, Suite 125
Phoenix, AZ 85008-3279
Tel 602.244.2566
Fax 602.244.0947
E-mail www.Entellus.com

	BY	DATE
DESIGN	HAA	3/99
DESIGN CHK.	SEK	3/99
PLANS	GLT/JDS	3/99
PLANS CHK.	HAA	3/99
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

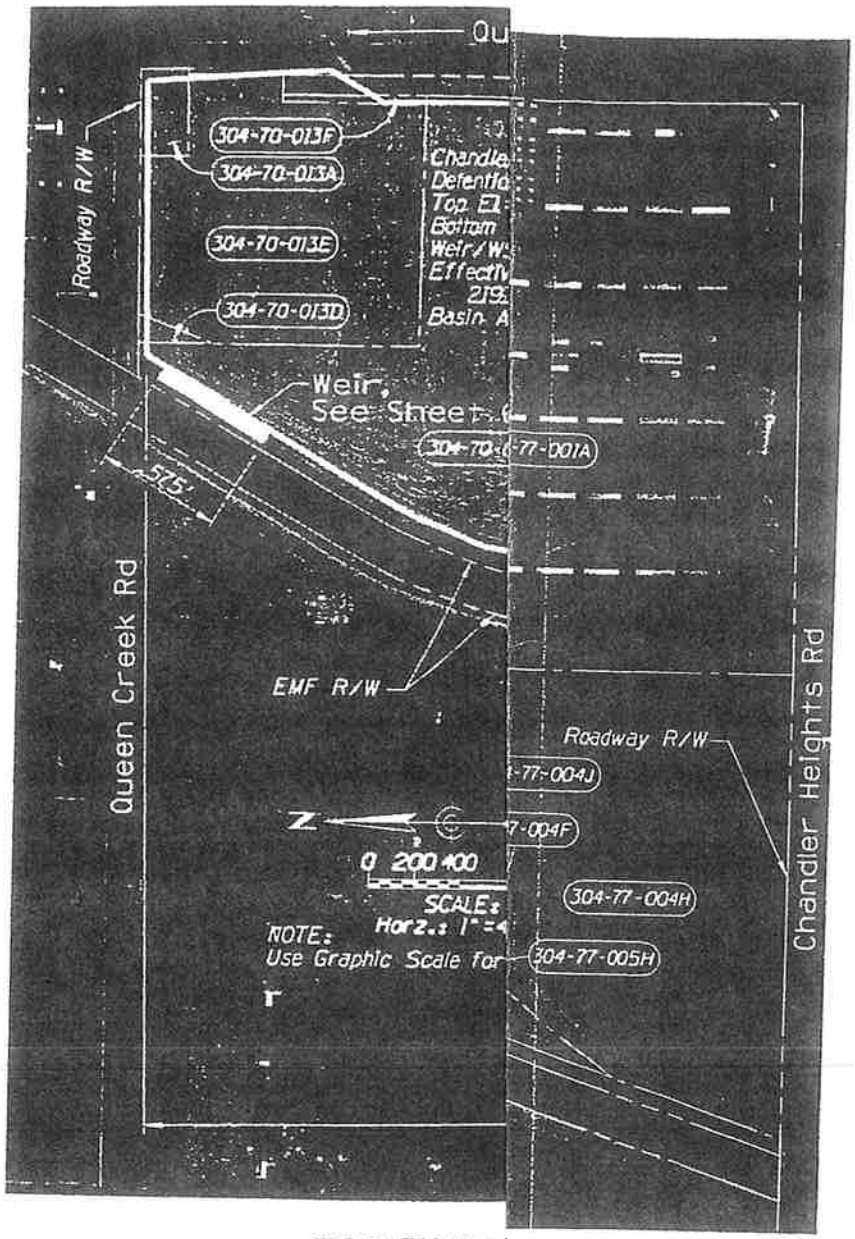
APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 3 OF 8

AERIAL MAPPING COMPANY,
CONTROL SURVEY BY COLLINS/PINA CONSULTING ENGINEERS, INC.
FLIGHT DATE 11-5-97

FILE: plan_01.dwg DATE: 0_37 FILE: plan.pc2



KNOWN FCDMC PF

Parcel Num
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304-70-0
304-70-0
304-70-0
304-70-0
304-70-0
304-70-0
304-70-0
304-77-0
304-77-0
304-77-0
304-77-0
304-77-0

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

QUEEN CREEK/SANOKAI WASH HYDRAULIC
MASTER PLAN & EAST MARICOPA FLOODWAY
CAPACITY MITIGATION STUDY - FCD 98-26

	BY	DATE
DESIGNED	C. JOY	09/01/99
DRAWN	C. JOY, R. STEELE	09/01/99
CHECKED	F. DUREN	09/01/99

Registered Professional Engineer (Civil) CERTIFICATE 12258 FRED K. DUREN, JR. ARIZONA, U.S.A.

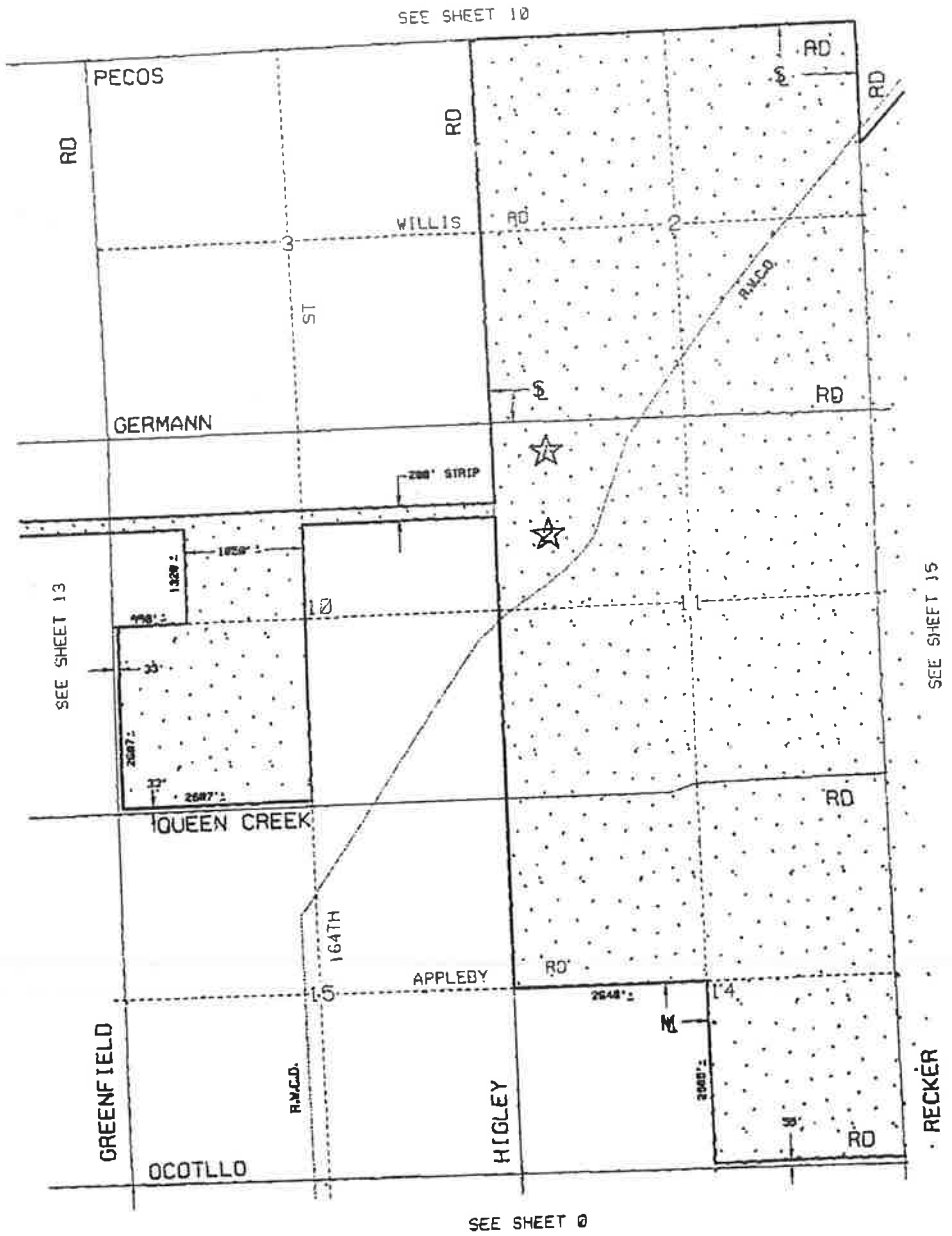
HUITT-ZOLLARS Engineering

CONCEPTUAL PLAN - CHANDLER HEIGHTS
DETENTION BASIN

SHEET 2 OF 9

&DGNSPEC&

&DATE& &TIME& &USERNAME& &PENTAI



GILBERT

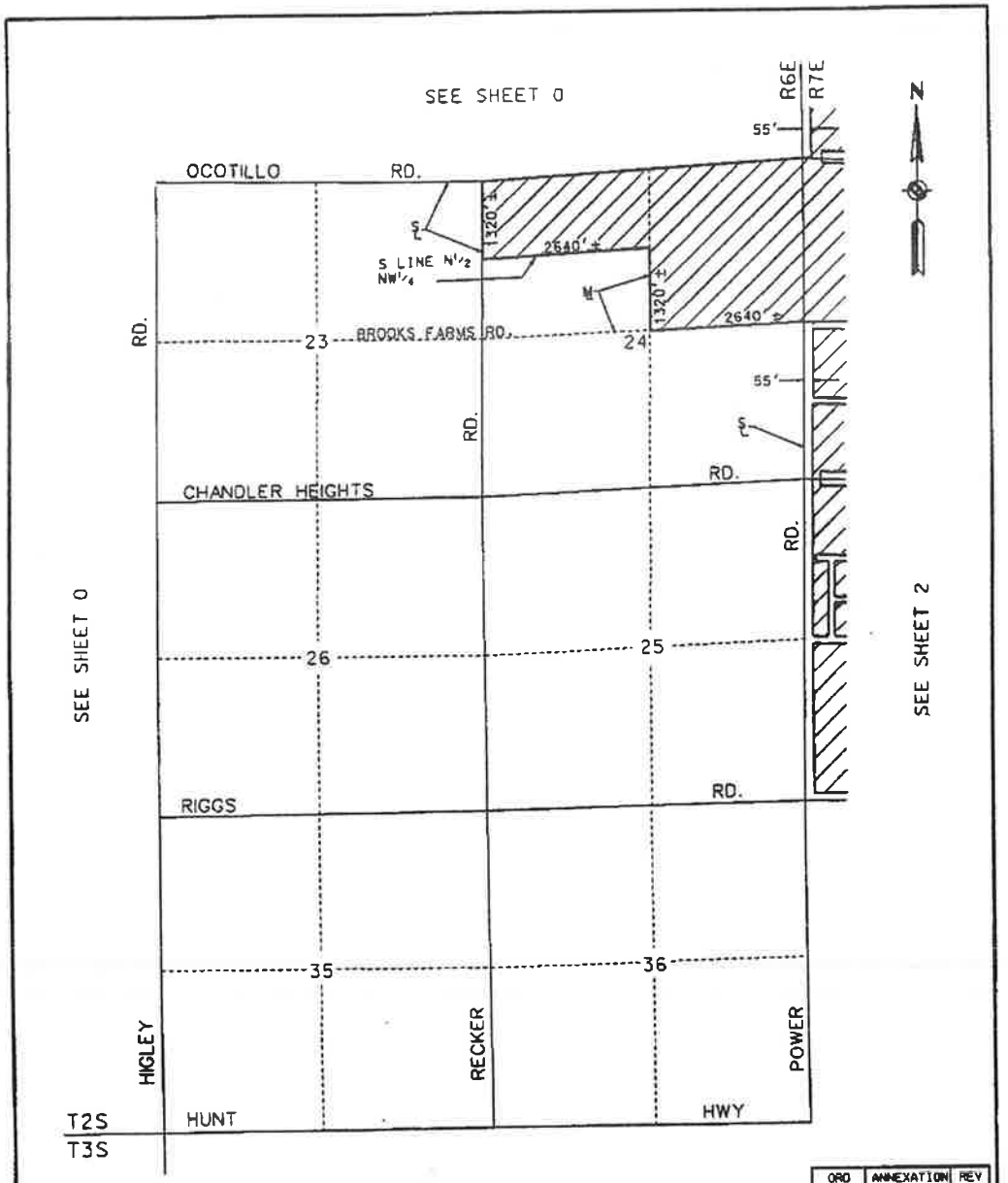
T2S- R6E

14

ORD NO	ANNEXATION EFF DATE	REV BY
1072	1/9/98	DG
REV	1/7/99	DG
1150	3/16/99	DG
1151	3/16/99	DG

THIS CITY LIMIT SHEET IS TO BE USED AS A GUIDE ONLY! MARICOPA COUNTY WILL NOT BE RESPONSIBLE FOR ERRORS OR OMISSIONS THAT MIGHT OCCUR.

. INCORPORATED AREA



ORD NO	ANNEXATION EFF DATE	REV BY
104-97	MAY 7, 1997	C.L.

THIS CITY LIMIT SHEET IS TO BE USED AS A GUIDE ONLY! MARICOPA COUNTY WILL NOT BE RESPONSIBLE FOR ERRORS OR OMISSIONS THAT MIGHT OCCUR.

▨ - INCORPORATED AREA

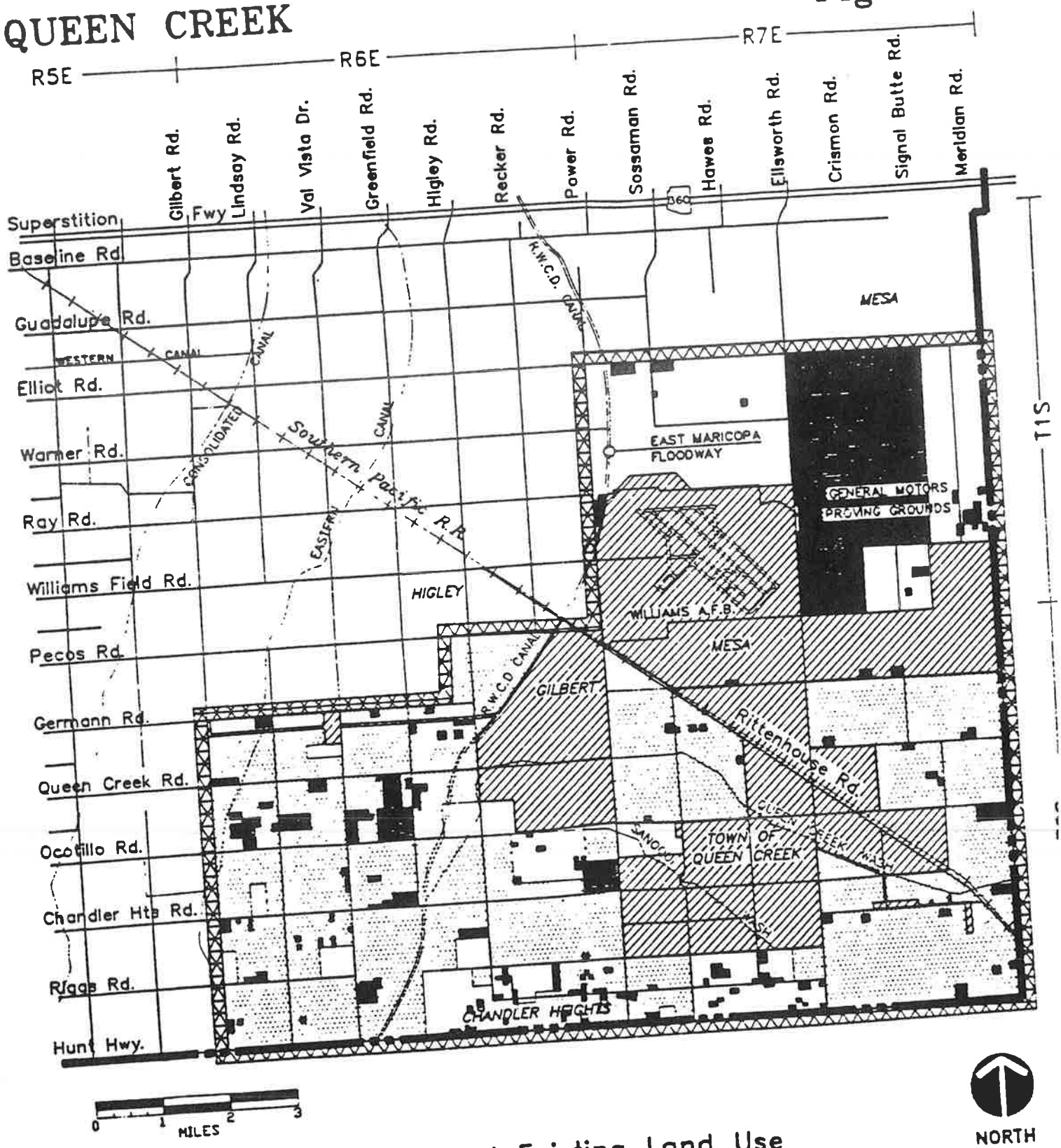
T2S- R6E

1

QUEEN CREEK

Figure 11

QUEEN CREEK



Generalized Existing Land Use

- Vacant
- Agriculture
- Developed
- Incorporated

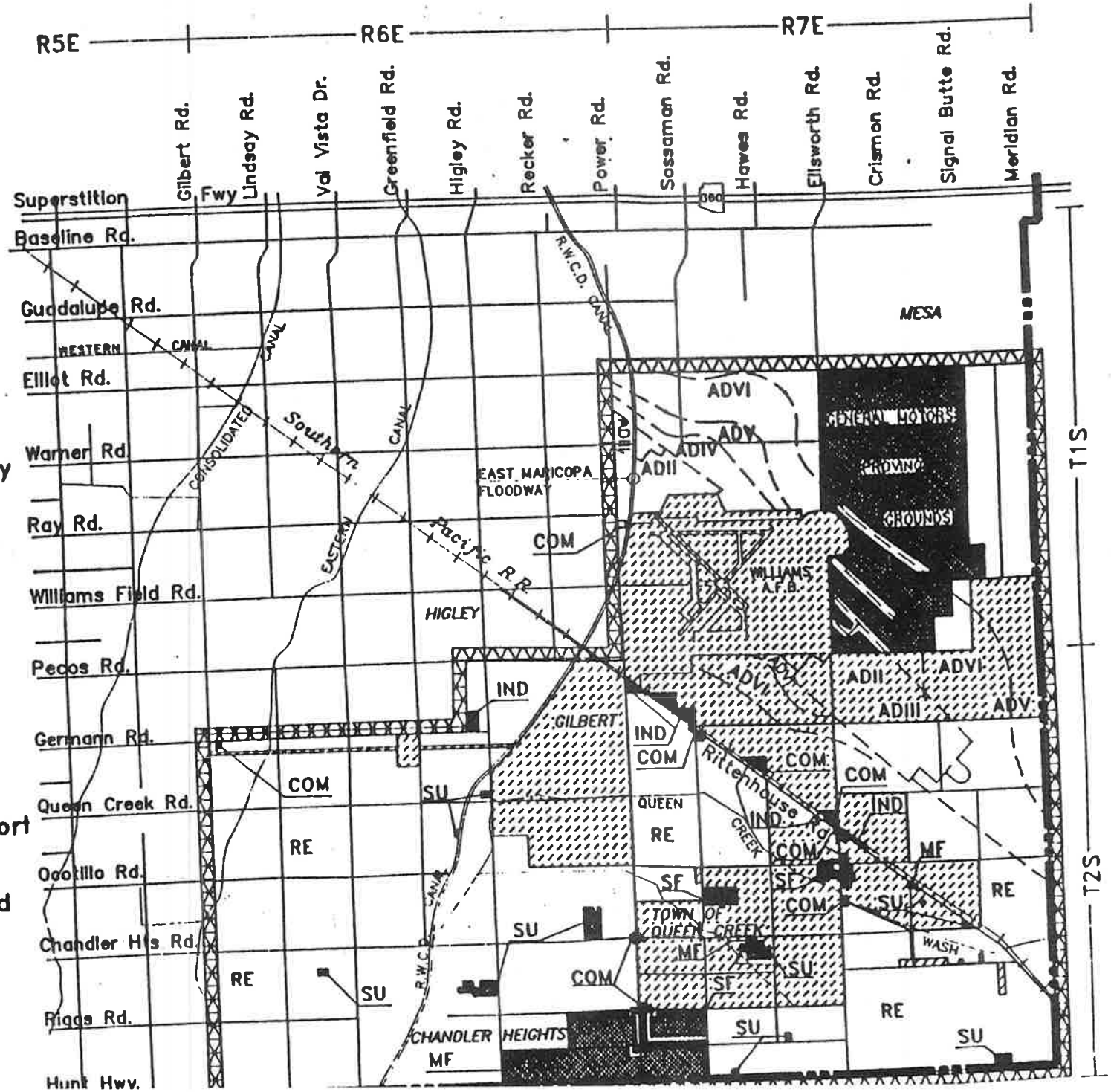
Source: Maricopa County Dept. of Planning & Development

Figure 12

QUEEN CREEK

Generalized Existing Zoning

- RE Residential Estates
- SF Single Family
- MF Multi-Family
- COM Commercial
- IND Industrial
- SU Special Use
- Military Airport District
- Incorporated Areas

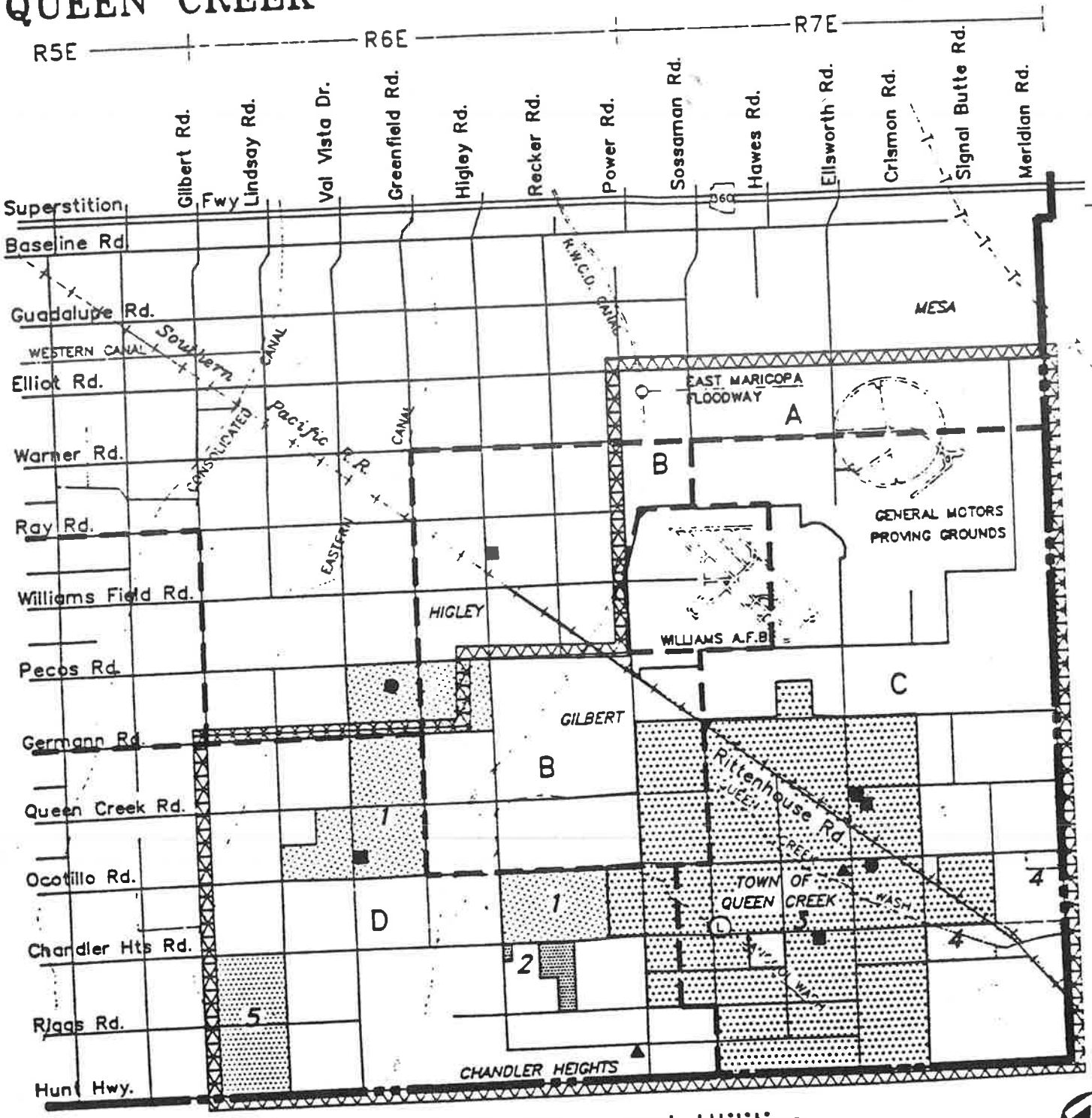


NORTH

0 1 2 3 MILES

QUEEN CREEK

Figure 15



Existing Facilities and Utilities

School

Fire Station

Post Office

Landfill

Major Utility Line

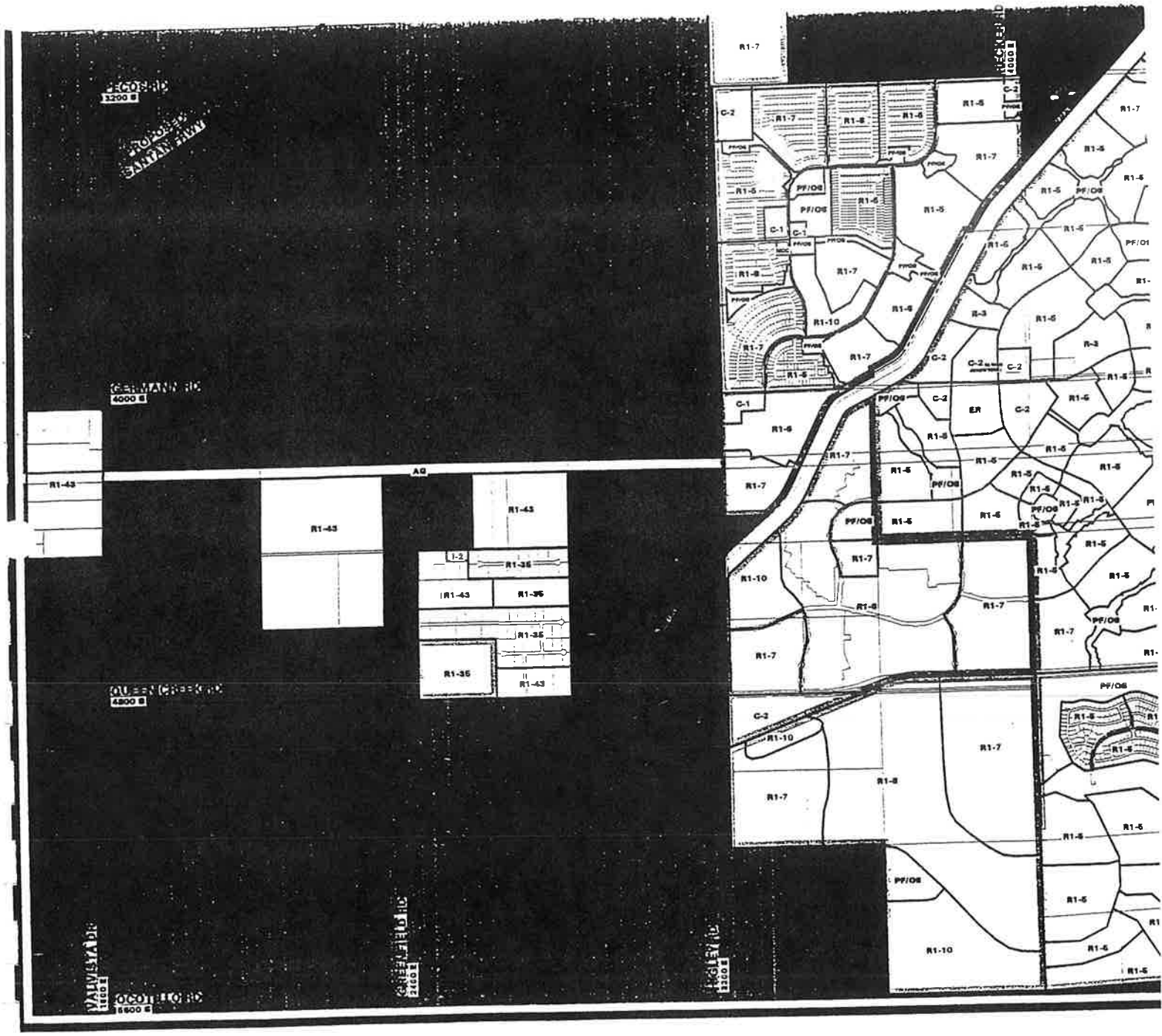
School District

A Gilbert Unified
B Higley Unified
C Queen Creek Unified
D Chandler Unified

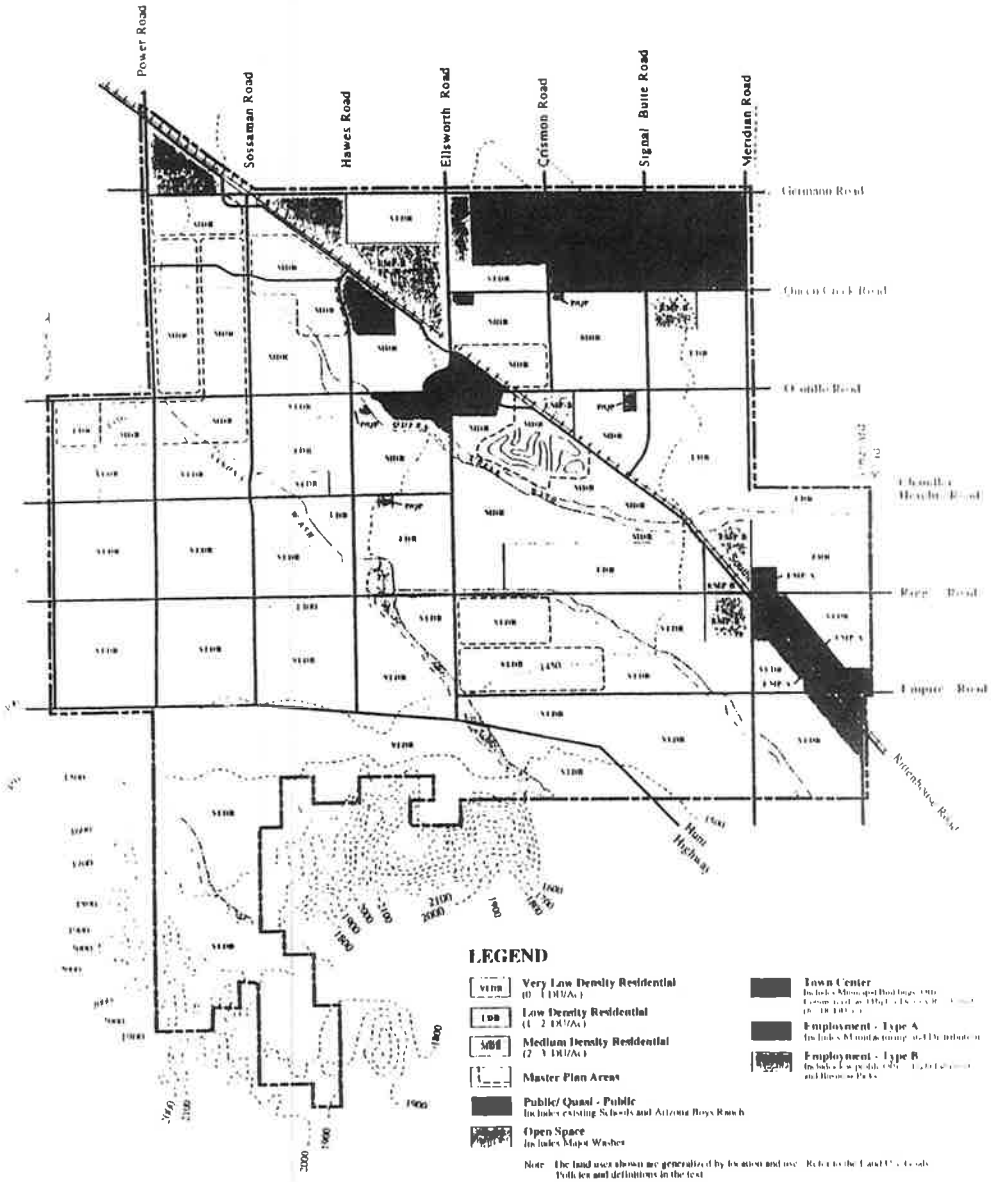
Water Company Service Area

1 Tankersley Water Co.
2 Blue Goose Water Co.
3 Queen Creek Water Co.
4 H20, Inc.
5 City of Chandler

GILBERT
ARIZONA
A COMMUNITY OF EXCELLENCE



ANNEXATION UPDATED: 7-12-99
LAND BASE UPDATED: 5-1-99
SUBDIVISIONS UPDATED: 5-1-99
ZONING UPDATED: 7-12-99



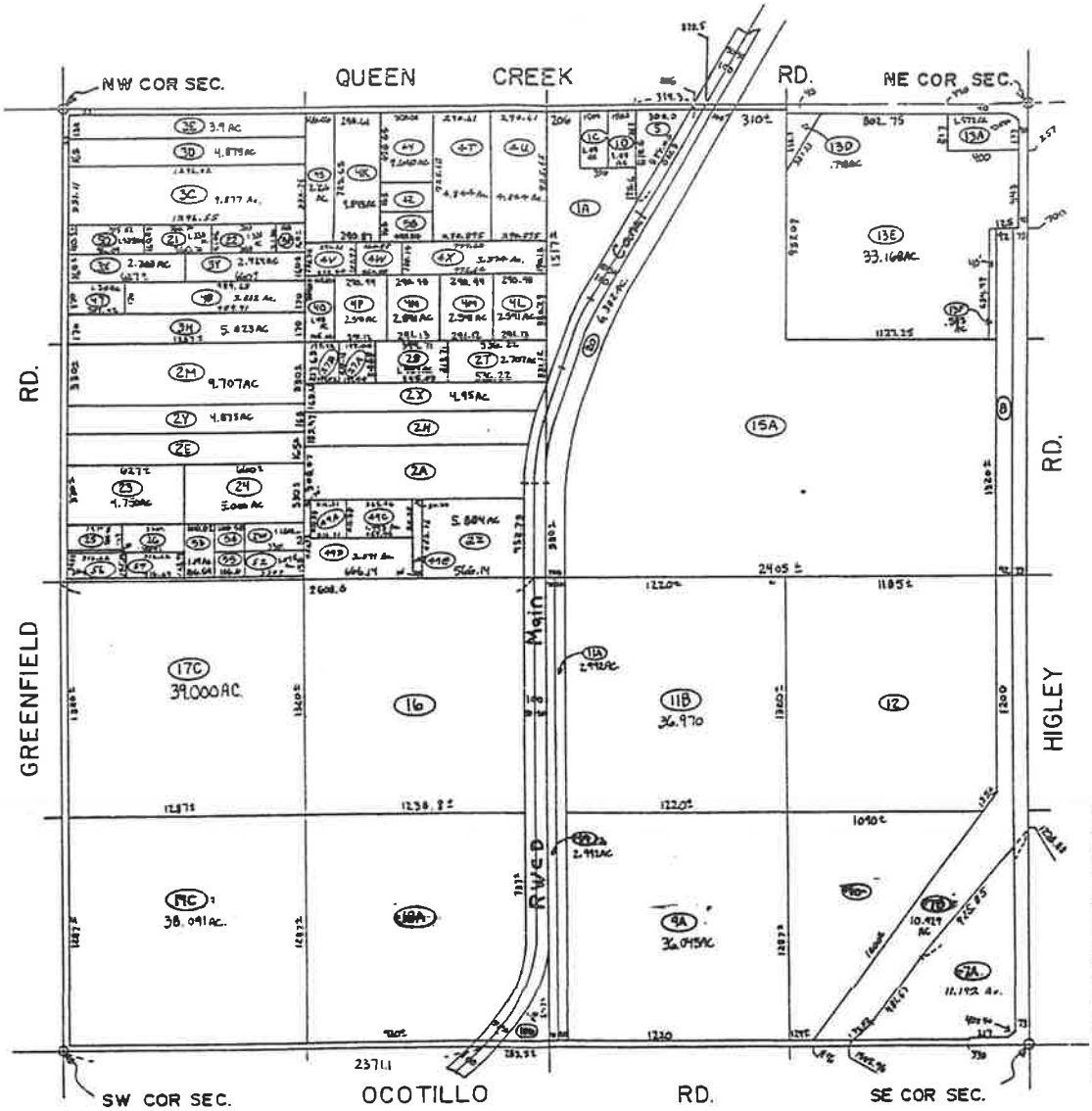
LAND USE PLAN
Exhibit 4

town of
QUEEN CREEK
general plan

CornoyerHedrick
2425 East Camelback Road
Suite 400
Phoenix, AZ 85016
602 381 4848

SEC. 15, T-2S R-6E

BOOK 304
MAP 70

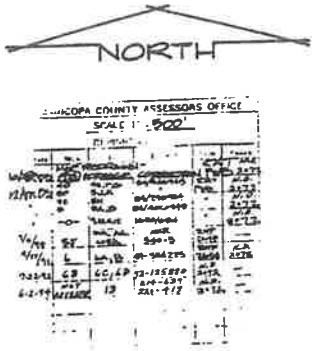


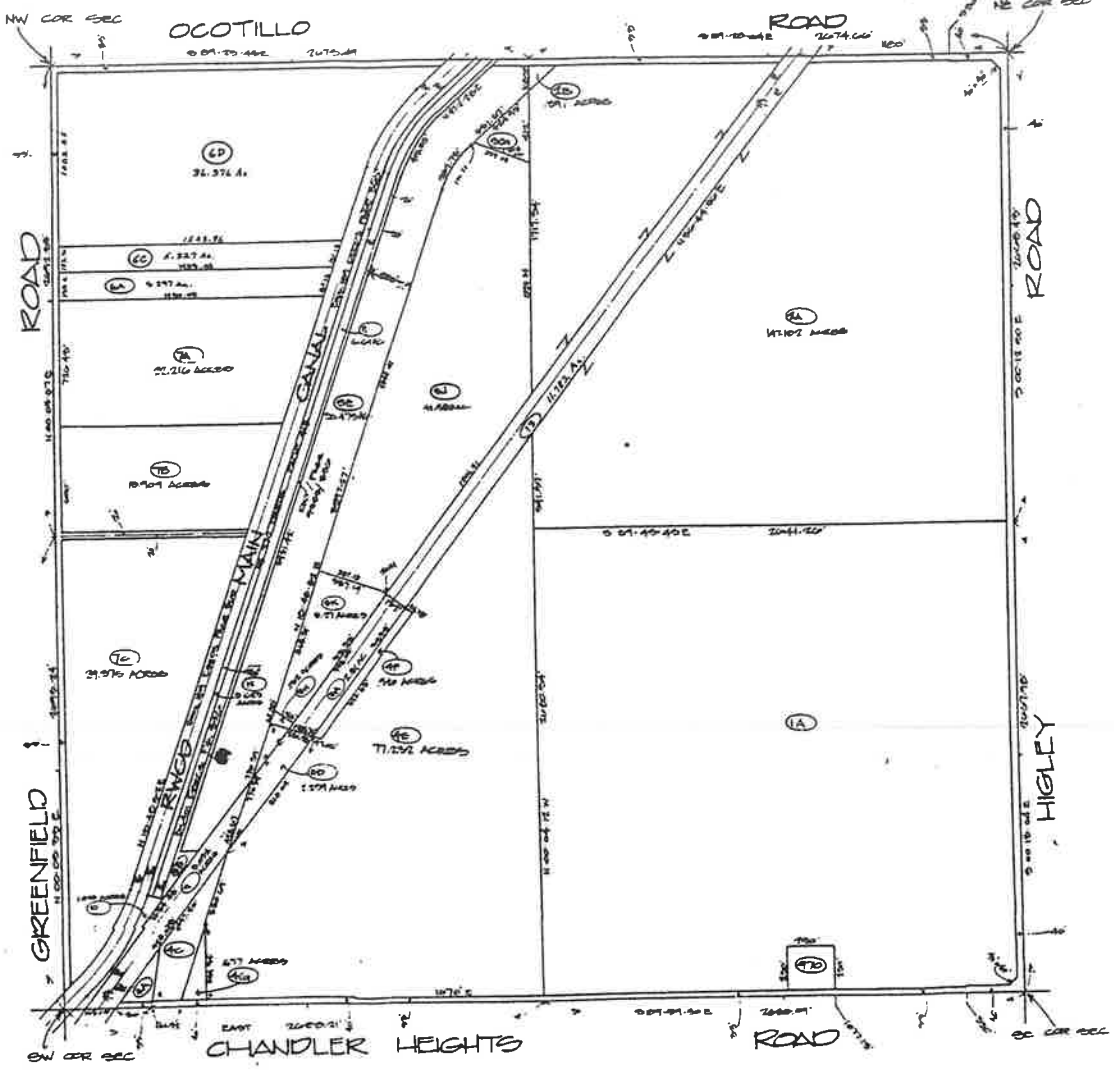
MARICOPA COUNTY ASSESSORS OFFICE
SCALE 1" = 500'
REVISIONS:

Date	Map	Parcel	Description	By	Check
10/17/86	35.37	50	Combine Parcels		—
7/1/89		Map	REDRAW		
7-26	4H	4T, 4U, 4V, 4W, 4X			—
10-24-92	2L	51, 52, 54, 57, 59			—
7-8-96	2V, 51				—
7-8-96	48				—
7/14/94	2V, 44				—
3-24-97	30				—
3-4-97	37	37A, B			—
3-4-97	4R	4U, W, X			—
7-29-97	49	49A, B, C			—
7-29-97	49B	49D, E			—
12-29-97	2K	51, 57			—
12/97	4J	4L, 2, 50			

SEC 22, 2S 6E

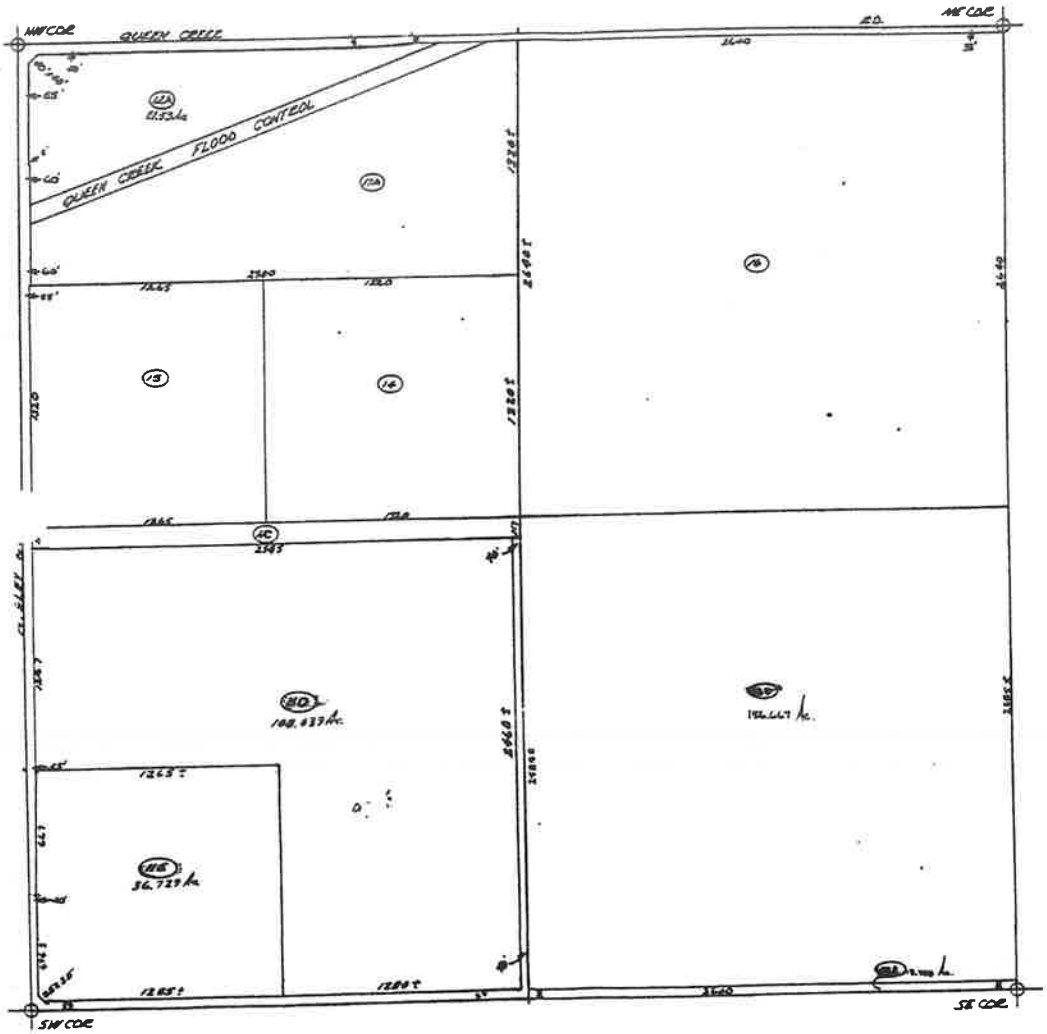
book 304
map 77





SEC 14 T2S-R6E

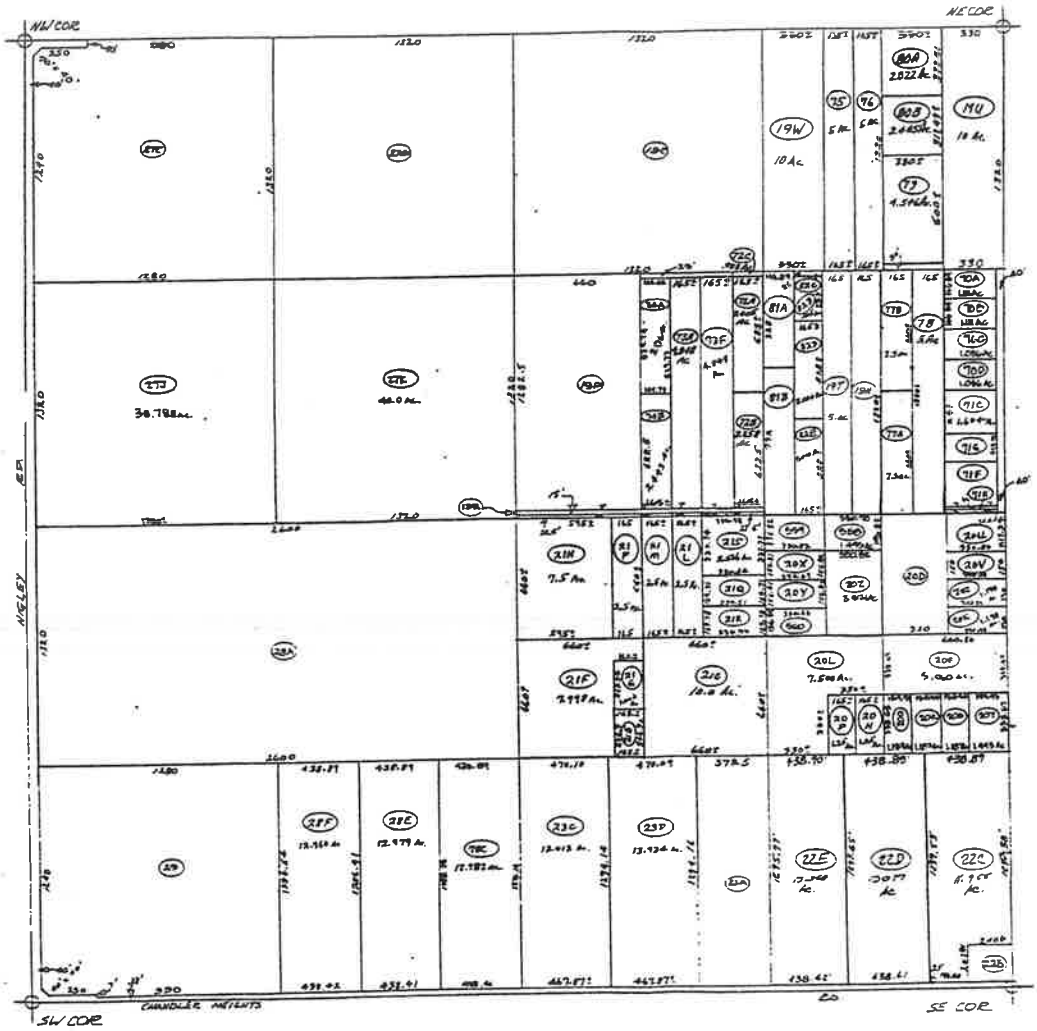
BOOK 304
MAP 69
~~SHEET 1 of 5~~

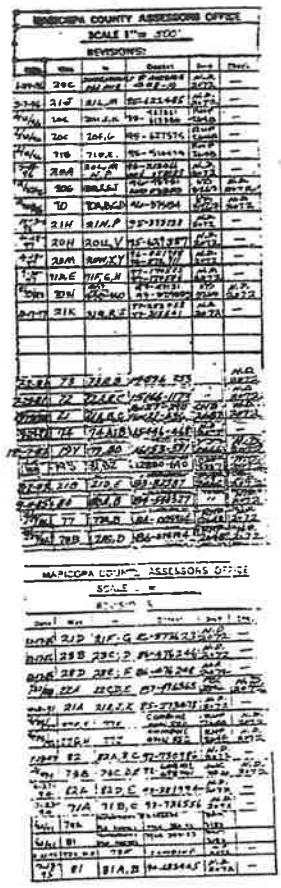


MARICOPA COUNTY ASSESSOR'S OFFICE
SCALE 1" = 500'
REVISIONS

SEC 23 T2S-R6E

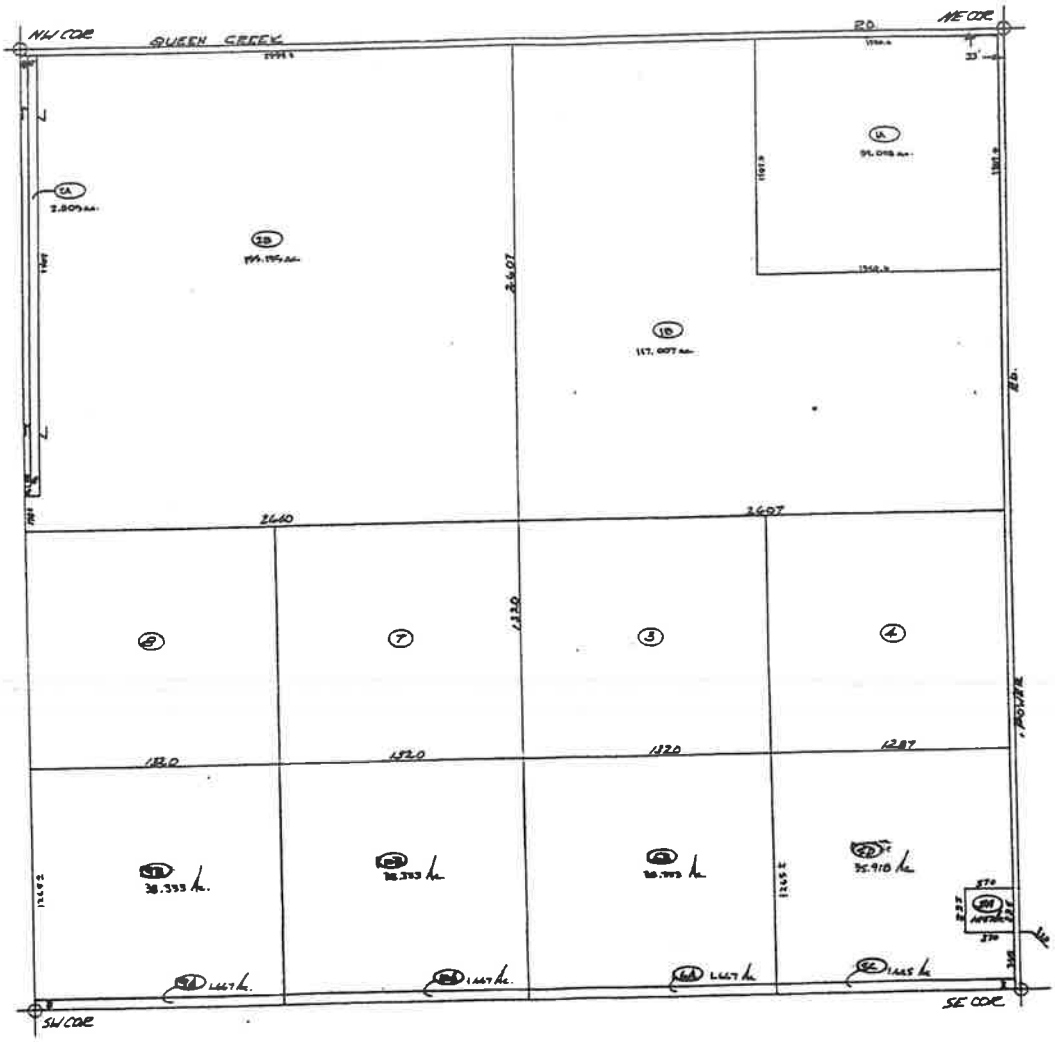
BOOK 304
MAP 69
SHEET 4





BOOK 304
MAP 69
SHEET 2

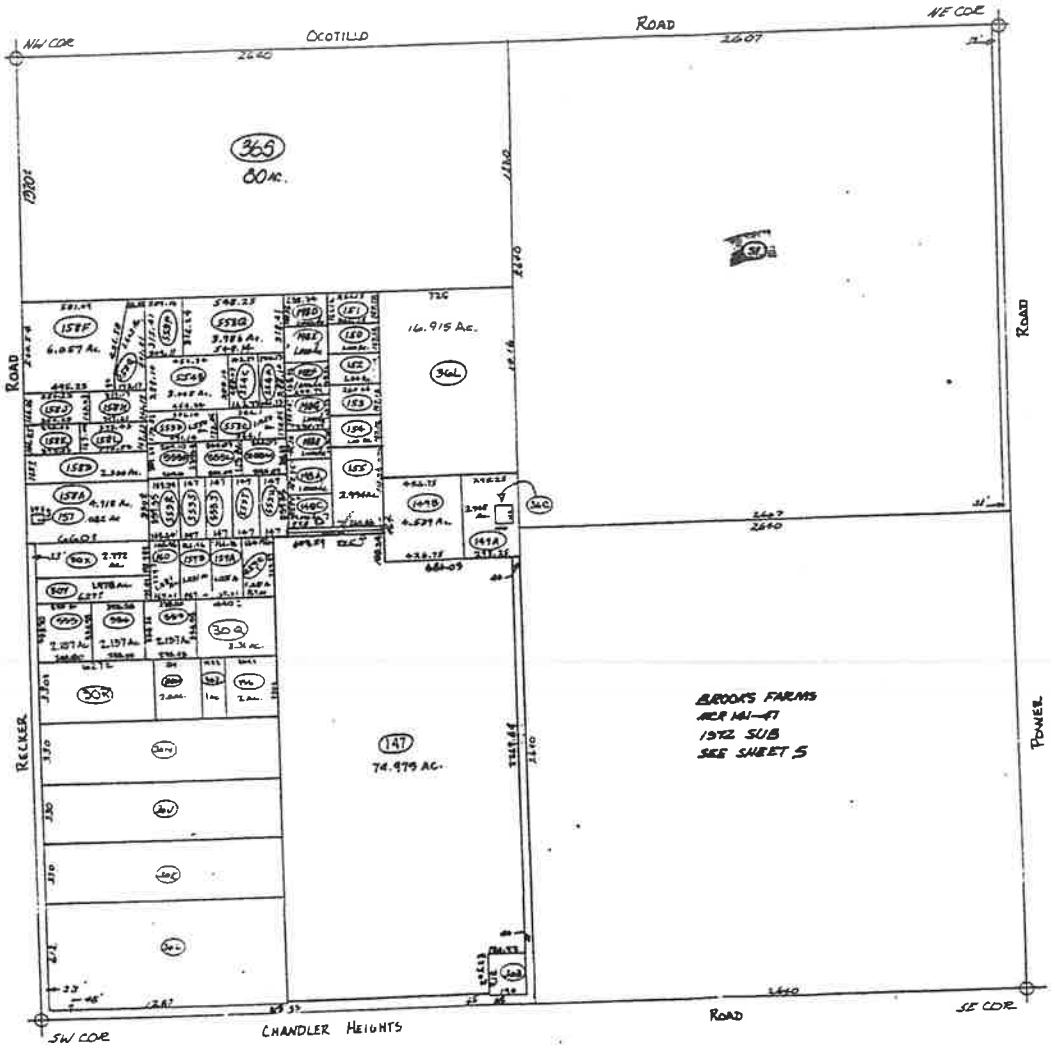
SEC 13 T2S-R6E

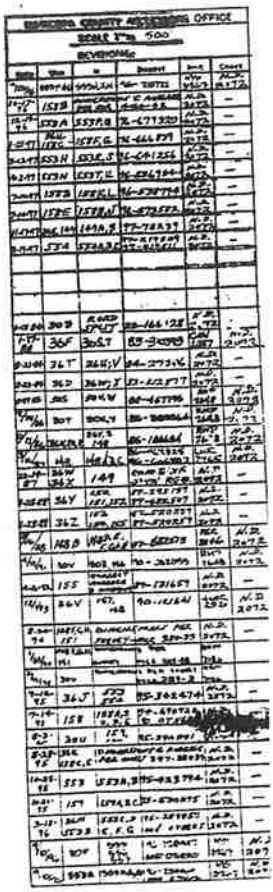


MARICOPA COUNTY ASSESSORS OFFICE
SCALE 1" = 500'
REVISIONS:

SEC 24 T25-R6E

BOOK 304
MAP 69
SHEET 3





Queen Creek Subdivisions

Subdivision Name	Location	Developer	Acres	Lots	Lot Size	Current Zoning	Units Per Acre	General Plan	Final Plat Approval
Arroyo de la Riena (16)	NWC of Ocotillo and Hawes		30	30	18,000-35,000	1-18, R1-35 PAI	1	MDR (2-4)	☑
Chuparosa (2)	SWC of Rittenhouse and Ocotillo	GNP Holdings	547	2100	6,000-10,000s.f.	R1-8, R1-6, R-3	5.5	MDR (2-4)	☐
Circle G Unit I (6)	NWC of Chandler Heights and Hawes	Circle G Property Dev.	39	24	35,000	R1-35	1.02	LDR (1-2)	☑
Circle G Unit II/IIA (7)	NWC of Chandler Heights and Hawes	Circle G Property Dev.	59	40	35,000	R1-35	0.9	LDR (1-2)	☑
Circle G Unit III (18)	NWC of Chandler Heights and Hawes	Circle G Property Dev.	40	37	35,000	R1-35	0.98	LDR (1-2)	☑
Circle G Unit IV (31)	West side of Hawes, 1/4 mile south of Ocotillo	Circle G Property Dev.	72	69	35,000 s.f.	R1-35 PAD	0.98	LDR (1-2)	☐
Country Park Estates (23)	NWC of Riggs and 196th St. alignment	Haught Development	30	24	1 acre	R1-43	0.76	VLDR (0-1)	☐
Creek View Ranches (27)	Hawes Rd, 1/4 mile south of Chandler Heights	Sunburst Capital, Inc	16	16	35,000 s.f.	R1-35 PAD	0.98	LDR (1-2)	☐
Crismon Ranch Estates (3)	SEC of Crismon and Queen Creek	Joe Agee	40	19	1.5-2 acres	R1-43	0.48	MDR (2-4)	☐
Emans Estates (13)	North side of Ocotillo, 1/2 mile west of Hawes	Bill Van Kamp	9	8	41,500 s.f.	R1-35	0.94	MDR (2-4)	☑
Emperor Estates (14)	South of Rittenhouse between Sossaman and Hawes	Alba 450 LLC	450	1400	6,000-18,000s.f.	PAD	3.27	MDR (2-4)	☑

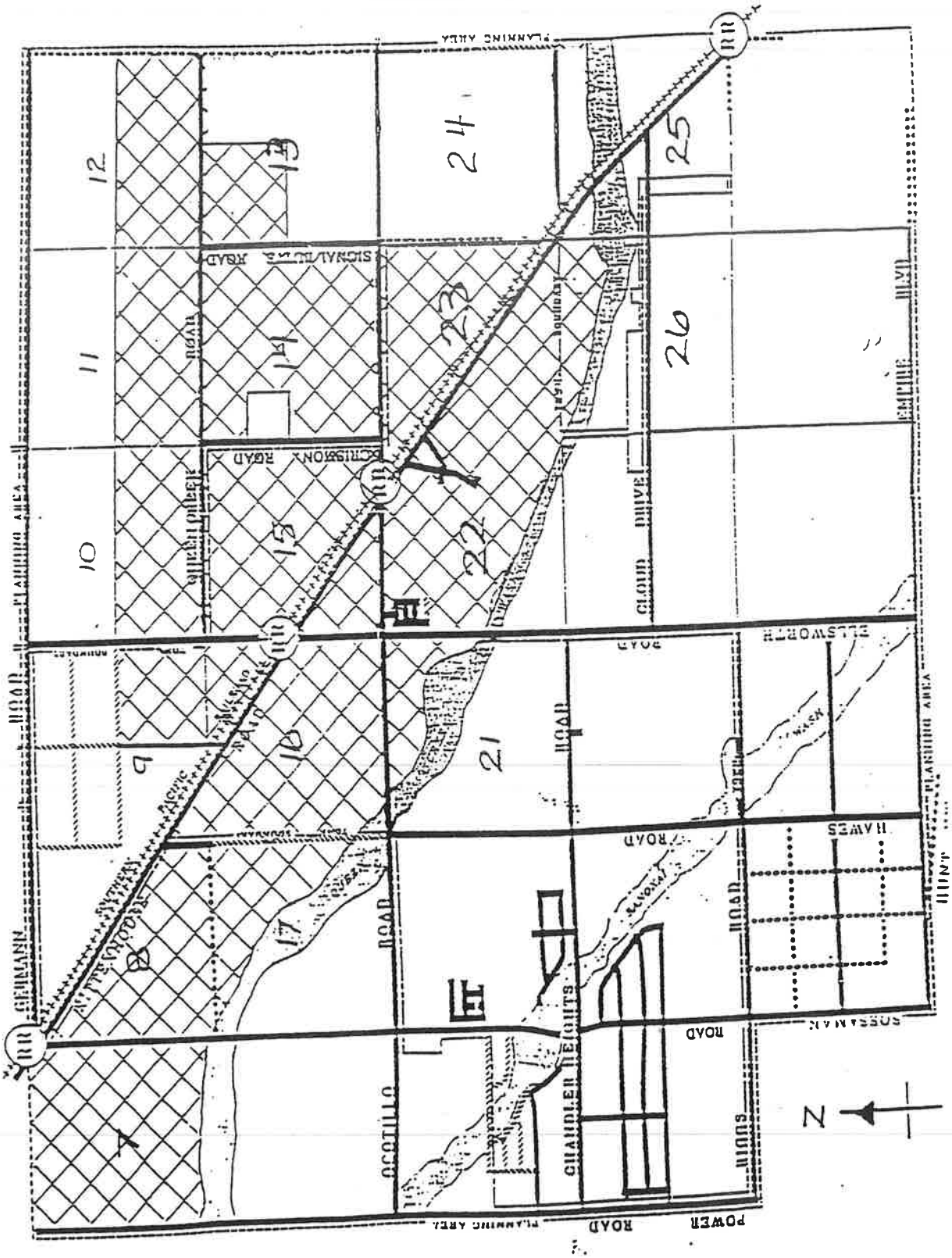
Subdivision Name	Location	Developer	Acres	Lots	Lot Size	Current Zoning	Units Per Acre	General Plan	Final Plat Approval
Greenside Residential PAD (15)	SEC of Ocotillo and Rittenhouse	Greenside Res. LLC	25	141	5,500 s.f.	R1-6 PAD	3.47	MDR (2-4)	☐
Heritage Square and Emperor Estates (17)	NEC of Ellsworth and Ocotillo	Emperor Estates Dev. Inc.	264	821	6,000-8,000 s.f.	PAD	5.3	TC/MDR (2-4)	☐
Langley Gateway Estates I (19)	SEC of Ellsworth and Queen Creek Rd.	Langley Properties	132	366	6,000-12,000 s.f.	6, R1-8, R1-12 F	3.13	MDR (2-4)	☐
Langley Gateway Estates II (24)	SWC of Crismon and Queen Creek Rd	Langley Properties	119	352	6,000-12,000 s.f.	31-8, R1-9, R1-1	3.5	MDR (2-4)	☐
Ocotillo Heights (30)	SWC of Ocotillo and Signal Butte alignment	Ocotillo Heights LLC	67	187	7,000-9,000 s.f.	R1-7,R1-9 PAD	2.96	MDR (2-4)	☐
Orchard Ranchettes (11)	SEC Riggs and Ellsworth	Ranch Equities LLC	277	277	35,000 s.f.	R1-35	1.2	VLDR (0-1)	☑
Pegasus Airpark (1)	NEC of Ellsworth and Hunt Highway	Circle G Property Dev.	319	159	1 acre	R1-43	0.49	VLDR (0-1)	☑
Power and Germann PAD (22)	South of Germann between Power and Sossaman	Cathton Investments	447	1278	2,000-12,000 s.f.	6, R1-8, R1-12 F	3.04	MDR (2-4)	☐
Queen Creek 46 (28)	SEC of Sossaman and Queen Creek, south of Emperor Estates	Queen Creek 46 General Partnership	47	142	5,500-9,000 s.f.	PAD	3.2	MDR (2-4)	☐
Queen Creek Ranch Estates (20)	East side of Hawes south of Chandler Heights	Brady-Auerlich & Assoc.	11	8	1.07-1.14 acres	R1-43	0.8	LDR (1-2)	☑
Queen Creek Ranchettes I (4)	SEC of Sossaman and Ocotillo	Queen Creek Ltd Partnership	39	50	18,000-47,000 s.f.	R1-18 RUPD	1.2	LDR (1-2)	☑
Queen Creek Ranchettes II (4)	SEC of Sossaman and Ocotillo	Queen Creek Ltd Partnership	41	59	18,000-47,000 s.f.	R1-18 RUPD	1.4	LDR (1-2)	☑

Subdivision Name	Location	Developer	Acres	Lots	Lot Size	Current Zoning	Units Per Acre	General Plan	Final Plat Approval
Queen Creek Ranchettes III (12)	1/4 mile north of Chandler Heights/east side of Sossaman	Queen Creek Ltd Partnership	60	60	35,000 s.f.	R1-35	1.04	LDR (1-2)	☑
Ranchos Haciendas de Caballos (5)	NWC of Riggs and Sossaman	Chuck Niedhart	30	24	1 acre	R1-43	1	VLDR (0-1)	☑
Ranchos Paseo de Caballos (25)	Eas of Sossaman, 1/4 mile north of Riggs	Lee Sun Chen Org	19	16	1+ acre	R1-43	0.96	VLDR (0-1)	☐
Rittenhouse Ranch on the Creek (26)	Rittenhouse Rd and the Chandler Heights Rd alignment	Rittenhouse Ranch on the Creek LLC	107	311	7,000-12,000 s.f.	7, R1-9, R1-12 F	2.93	MDR (2-4)	☐
San Marquis Estates (9)	SWC Chandler Heights and Hawes	Ecco Homes	45	45	18,000 s.f	R1-35 PAD	1	LDR (1-2)	☑
San Tan Vistas Ranch (21)	1/4 mile east of Sossaman between Cloud and Riggs	Recorp Colony Properties	34	27	1 acre	R1-43	0.76	VLDR (0-1)	☐
Sossaman Estates (32)	Between Power & Sossman south of Queen Creek Road	Sossaman Land / Ryland Homes	1262	3096	7,000-35,000 s.f.	R1-43	2.7	MDR (2-4)	☐
Terraranch (29)	NWC of Hawes and Chandler Heights	Mark Brinton	40	57	18,000 s.f.	R1-18	1.79	MDR (2-4)	☐
The Groves (10)	SEC Chandler Heights and Hawes	Art Sanders	13	11	35,000 s.f	R1-35	0.85	LDR (1-2)	☑
Victoria PAD (33)	NWC of Ocotillo and Ellsworth	Hankins LLC	323	800	7,000-18,000 s.f.	:1-9, R1-12, R1-	2.86	MDR (2-4)	☐
Will Roger's Equestrian Ranch (8)	South side of Ocotillo between Hawes and Ellsworth	America West Development	52	125	9,776-24,000 s.f.	R1-8 PAD	3.89	MDR (2-4)	☑
			Total Acres	Total Lots					
			5105	12179					

(1) Map location number

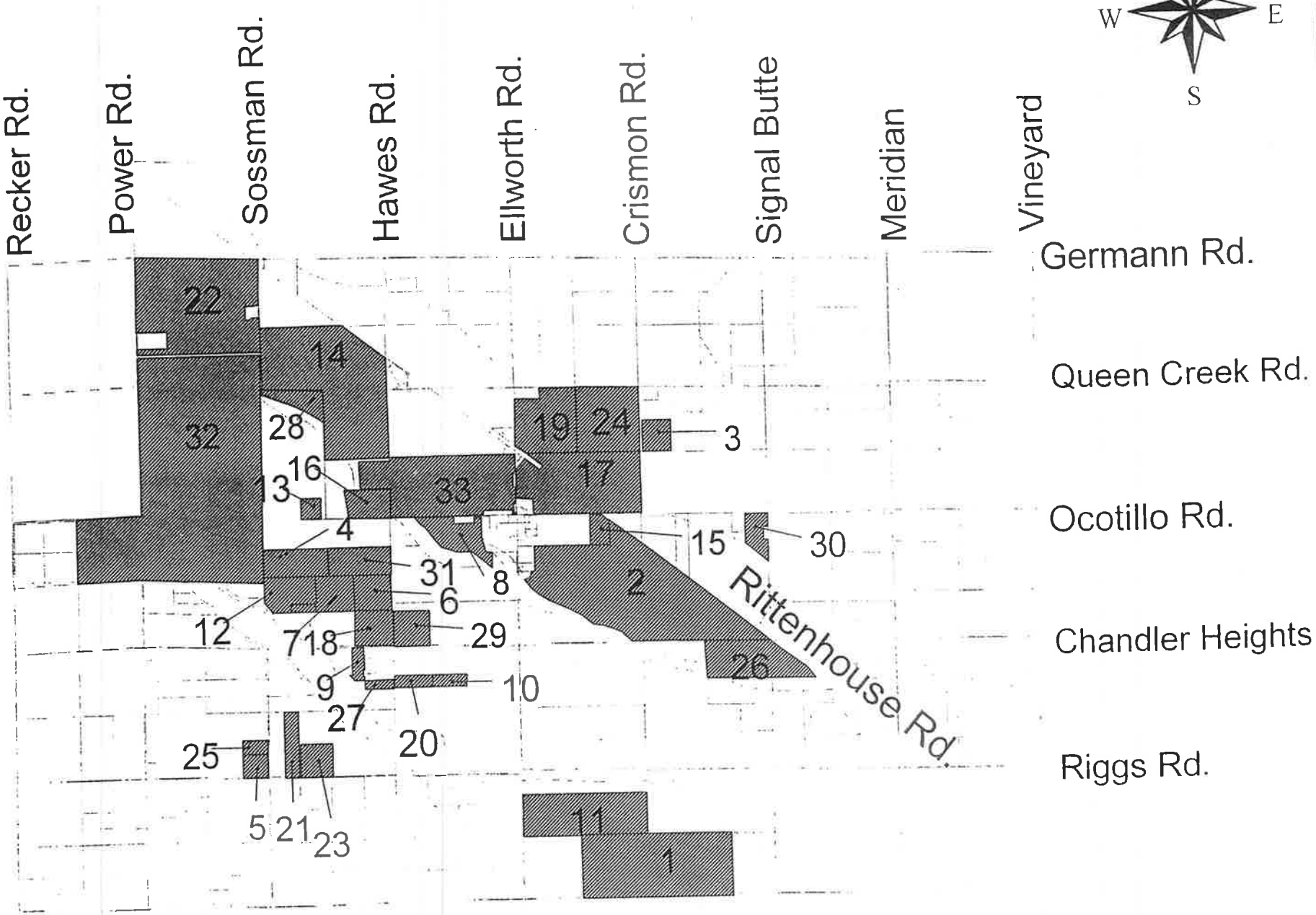
Thursday, September 16, 1999

EXHIBIT "B"



WASTE WATER COLLECTION SYSTEM AREA

Queen Creek Subdivisions



APPENDIX E

MEETING MINUTES

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: October 25, 1999

LOCATION AND DATE: Ocotillo Road and Greenfield Road
Wednesday, October 20, 1999 at 8:00 am

PARTICIPANTS:

Mike Smith	Maricopa County Department of Transportation (MCDOT)
Saeed Al-Saffar	MCDOT
Toni Soderman	MCDOT
Mike Marietti	MCDOT
John Thayer	MCDOT
Rick Boeger	MCDOT
Steve Mishler	Sverdrup
Brad Olbert	Sverdrup

SUBJECT: **Contract CY 1999-15**
On-Call Services
Ocotillo Road, Greenfield Road to Recker Road

SUMMARY:

The above participants met at MCDOT at 8:00 am and drove to the project site.

The review of the project site was broken down into four segments and the meeting minutes will address the issues discussed at each location separately.

GREENFIELD ROAD & OCOTILLO ROAD
The section corner was observed on Greenfield Road at Ocotillo Road. The section corner was in line with the existing Ocotillo Road centerline to the west but was offset four feet to the west of the Greenfield Road centerline. Ocotillo Road is currently a dirt road that runs a half-mile east to the Roosevelt Canal. Overhead power poles were located approximately 33 feet north (≈8 wooden & 1 metal, 69 KV) and south (≈10 wooden, 12 KV) of the existing dirt Ocotillo Road. A concrete irrigation structure is located along the north side of Ocotillo Road, just south of the overhead power poles. A 12 KV power line crosses Ocotillo Road on the east side of Greenfield Road. A telephone drop is present on the power pole located at the southeast corner of the intersection. The overhead telephone line heads south from the intersection and the underground cable heads west under the intersection with a telephone pedestal in the southwest corner of the intersection.

A Maricopa Planning and Zoning (P&Z) notice was located on the southeast quadrant of Ocotillo Road and Greenfield Road. A P&Z meeting is scheduled for November 4th, 1999 at 9:30 am at 205 West Jefferson in Phoenix. Steven M. Verfurth, representing JM Land Development (480-443-4222), is proposing rezoning (Zoning Case No. Z 98-88 and Subdivision S 98-40) north and south of Ocotillo Road to develop a sub-division and shopping center. The rezoning will affect Ocotillo Road between Greenfield Road east to Roosevelt Water Conservation District's East Canal, having a proposed right-

of-way of 55-feet both sides of the Section Line. There was some discussion on modifying the future roadway classification from a Rural Minor Arterial to an Urban Minor Arterial section to match the proposed development in the area.

OCOTILLO ROAD, WEST OF THE EAST CANAL

The location of the proposed Ocotillo Road was discussed. A bridge would be required to cross the Roosevelt Water Conservation District's East Canal, the East Maricopa Floodway and Queen Creek. Because the top of the berm along the East Canal is higher than the existing dirt Ocotillo Road then the roadway profile will need to be raised a couple of feet to span this facility. If the proposed roadway were to stay on the existing centerline then this would require the irrigation weir structure on the East Canal to be moved to the south and an irrigation gate with diversion structure moved further to the north. There is a private well located on the southwest corner of Ocotillo Road and the East Canal that will need to be relocated to the south. The concrete lined ditch canal and overhead 69 KV power lines north of Ocotillo Road would need to be removed and relocated. The 69 KV power line jogs to the southeast as the line crosses over the East Canal and East Maricopa Floodway, then continues due east. No other utilities were observed in the area.

OCOTILLO ROAD & HIGLEY ROAD

The section corner was observed on the Higley Road centerline and is located approximately 44± feet south of the overhead 69 KV power lines. However, the power lines east of the East Canal appear to be located an additional 100± feet south of their location west of the East Canal. Thus, the section corner appears to be 100± feet south of what would be expected. Additional information will be required to determine the bearings of the section lines at the Higley Road location. Perhaps the location of SRP's overhead power lines will provide more information at this location. No other utilities were observed in the area.

The approach for the CAR will be to discuss the shift in the section corner and present a horizontal alignment that may require significant adjustments during final design. One of the main purposes of the CAR is to determine reasonable project costs for planning purposes. The horizontal alignment can be adjusted later during final design.

The low flows from Sanoqui Wash crosses under Higley Road through a 48-inch CMP south of the Ocotillo Road alignment. The pipe was half clogged with sediment. In addition, there was considerable rilling along the west shoulder of Higley Road south of the Ocotillo Road alignment. The rilling would have been caused by flows from Sanoqui Wash flowing over Higley Road.

OCOTILLO ROAD & RECKER ROAD

Because the Sanoqui Wash runs along the section line between the sections (Sections 14 and 23 of T 2S R 6E), it was discussed to place the roadway to the north of the Sanoqui Wash. The City of Mesa and the Town of Gilbert have posted the land to the north of the Sanoqui Wash as a Future Recharge site for Reclaimed Wastewater as a joint project. The FCDMC Area Drainage Master Study for the area calls for widening of the Queen Creek and Sanoqui Wash, which may be able to supply borrow for the Ocotillo Road project if the proposed profile needs to be elevated a couple of feet. Coordination will be required with the Town of Gilbert and Queen Creek to determine what their future plans are with Ocotillo Road and Sanoqui Wash from Power Road west to Greenfield Road. No utilities were observed in the area.

Sverdrup will contact FCDMC to confirm drainage concepts involving the East Maricopa Floodway, Queen Creek and Sanoqui Wash. Sverdrup will also contact the Town of Gilbert and Queen Creek to determine their concepts for developing Ocotillo Road and Sanoqui Wash.

Please contact me at (480) 303-9799 if you have any questions.

Signed: Bradford D. Olbert, P. E.

Distribution: Attendees/W7428400 – 3.01

637 S. 48th Street, Suite 101 Tempe, Arizona 85281 Tel. (480) 303-9799 Fax. (480) 303-9899

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: November 3, 1999

LOCATION AND DATE:	Queen Creek Town Hall Monday, November 1, 1999 at 2:00 pm	
PARTICIPANTS:	Dick Schaner	Town of Queen Creek
	Steve Mishler	Sverdrup
	Brad Olbert	Sverdrup
SUBJECT:	**Contract CY 1999-15** **On-Call Services** **Ocotillo Road, Greenfield Road to Recker Road**	

SUMMARY:

The above participants met at the Queen Creek Town Hall at 2:00 pm.

Mr. Dick Schaner presented an overview of the development and listed several studies within the Town of Queen Creek. Below is a summary of the information presented.

There are several new developments proposed for this area and are as follows:

- Sossaman Estates sub-division is a proposed development south of Ocotillo Road at Power Road in the NE ¼ of Section 24 and in the SW and NW ¼ of Section 18 (Township 2S, Range 6E).
- Power Ranch sub-division is currently being developed north of Ocotillo Road between Recker Road and Power Road (Township 2S, Range 6E, Section 13).
- The Seville Development is being proposed between Riggs Road north to Chandler Heights Road and between Higley Road east to Power Road (Township 2S, Range 6E, Sections 25 & 26).

Based on current development trends within the town, the town is anticipating build-out occurring within the next twenty years. **Kimley-Horn (Jim Renshaw at 602-997-2382)** is currently preparing a "Transportation Element Report" for the Town of Queen Creek. Their traffic projections for build-out (20-Year Design Volumes) are showing an ADT in the range of 13,000 – 15,000 for Ocotillo Road. Sverdrup will be able to obtain a copy of the traffic volume figures once Dick has reviewed the report and Kimley-Horn has updated the report. Queen Creek is using a 5-lane roadway section, similar to MCDOT's 68-foot Urban Minor Arterial Road, for mile streets north of Riggs Road and a 2-lane roadway section for mile streets south of Riggs Road.

There are several future roadway improvements proposed for this area and have been listed below:

- Queen Creek Road will continue through between Recker and Hawes Road.
- Construction of Germann Road between Recker and Power Road is proposed for year 2001 through

an agreement with the Power Ranch development.

- Riggs Road is proposed to go through east all the way to Vineyard Road, a major north/south road for Pinal County.

Entellus (602-244-2566) prepared the "Sanoqui Wash Flood Plain Delineation Study" and shows an approximate flow of 3,000 cubic feet per second. **Hewitt-Zoller (Fred Duren & Charlie Joy at 480-952-9123)** is preparing a Master Hydraulic Plan for the Sanoqui and Queen Creek Wash. Hewitt-Zoller's current alternatives for the Sanoqui Wash show a channel width of 250-feet at the top of the channel, 7-feet deep, with an approximate flow of 3,000 cubic feet per second. The **Flood Control District of Maricopa County** contact is **Tim Phillips (602-506-4718).** Dick also mentioned that Queen Creek Wash and Sanoqui Wash would also be used as a recreational path for pedestrians/bicycles along the top berm and an equestrian trail at the bottom of the wash. Because of the equestrian trails, a minimum vertical clearance of 10-feet should be used for all bridge crossings.

Queen Creek is in the planning phase for a 36-inch sewer out fall along the Ocotillo Road alignment from Power Road west to Greenfield Road. At Greenfield Road, the sewer line would run north to a ¼ mile south of Queen Creek Road to an existing pump station. In the future the pump station site will become a treatment/recharge site.

No CAP Irrigation Distribution is proposed along Ocotillo Road west of Power Road.

Please contact me at (480) 303-9799 if you have any questions or comments.

Signed: Bradford D. Olbert

Bradford D. Olbert, P. E.

Distribution: W7428400 – 3.01
Dick Schaner, Town of Queen Creek
Saeed Al-Saffar, MCDOT

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: November 4, 1999

LOCATION AND DATE: Flood Control District of Maricopa County (FCDMC)
Thursday, November 4, 1999 at 2:00 pm

PARTICIPANTS: Dave Degerness FCDMC
Steve Mishler Sverdrup

SUBJECT: **Contract CY 1999-15**
On-Call Services
Ocotillo Road, Greenfield Road to Recker Road

SUMMARY:

I met Mr. Degerness at the Flood Control District of Maricopa County (FCDMC) at 2:00 pm.

Mr. Degerness presented an overview of the hydrology and listed several studies within the project area. Below is a summary of the information presented.

The Queen Creek Area Drainage Master Study was completed for the Flood Control District of Maricopa County (FCDMC) by **Wood and Associates Consulting Engineers. Entellus (602-244-2566)** prepared the "Sanokai Wash Flood Plain Delineation Study" and shows an approximate flow of 3,000 cubic feet per second. **Huitt-Zollars (Fred Duren & Charlie Joy at 480-952-9123)** is preparing the "Queen Creek/Sanokai Wash Hydraulic Master Plan & East Maricopa Floodway." A copy of Huitt-Zollar's proposed detention basin for the East Maricopa Floodway (EMF) is attached to this memo but has not been finalized. Huitt-Zollar's current alternatives for the Sanoqui Wash show a channel width of 250-feet at the top of the channel, 7-feet deep, with an approximate flow of 3,000 cubic feet per second. **Coe & Van Loo** is working on the development plans for the Power Ranch and Sossaman Estates developments, which involves the Queen Creek and Sanoqui Wash.

Although the studies listed above were using 3,000 cfs for both the Queen Creek Wash and the Sanoqui Wash, Mr. Degerness had some recent numbers and are as follows:

- Sanoqui Wash at Ocotillo & Higley Road is 3,800 cfs
- Queen Creek Wash at Ocotillo & Hawes Road is 3,564 cfs

There is study examining the use of the EMF land for multipurpose trails and there is some discussion on whether the side slopes for both the Sanoqui and Queen Creek Wash should be either 4:1 or 12:1 but has not been finalized.

Please contact me at (480) 303-9799 if you have any questions.

Signed: Steve Mishler

Steve Mishler

Distribution: W7428400 – 3.01

637 S. 48th Street, Suite 101 Tempe, Arizona 85281 Tel. (480) 303-9799 Fax. (480) 303-9899

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: November 8, 1999

LOCATION AND DATE:	Flood Control District of Maricopa County Tuesday, November 2, 1999 at 8:00 am

PARTICIPANTS:

Tim Phillips	Flood Control District of Maricopa County (FCDMC)
Mike Smith	Maricopa County Department of Transportation (MCDOT)
Saeed Al-Saffar	MCDOT
Steve Mishler	Sverdrup
Brad Olbert	Sverdrup

SUBJECT:

Contract CY 1999-15
On-Call Services
Ocotillo Road, Greenfield Road to Recker Road

SUMMARY:

The above participants met at the Flood Control District of Maricopa County (FCDMC) at 8:00 am.

The Master Hydraulic Plan being prepared by Huitt-Zollars on the Queen Creek and Sanoqui Wash will not be completed until the spring of 2000. One of the alternatives being proposed for Queen Creek Wash would have the wash parallel to Queen Creek Road and tie into the East Maricopa Floodway (EMF). The study is also looking into utilizing the EMF land for recreational use.

The Town of Queen Creek wants a more natural looking channel, which would be wider and shallower for the Sanoqui Wash

The FCDMC has a couple studies examining the EMF. The first study examines increasing the capacity of the EMF. The EMF is currently undersized for the 100-year flood. The second study examines the EMF land to be utilized for bicycle, pedestrian and equestrian purposes. This land could be used as part of the open space concept for the east valley, utilizing the Sanoqui Wash as the east/west corridor to the San Tan Mountains and the East Canal as the north/south corridor. The FCDMC is also looking at purchasing land between the EMF (west), Queen Creek Wash (east), Queen Creek Road (north) and a half-mile south of Ocotillo Road for a detention basin, that could also be utilized for multi use purposes.

Huitt-Zollars (Fred Duren at 480-952-9123) is preparing a Master Hydraulic Plan for the Sanoqui and Queen Creek Wash. Contact Huitt-Zollars or **Dave Degerness at FCDM (602-506-4730)** to get the channel dimensions for the Queen Creek and Sanoqui Wash. **Coe & Van Loo Consultants (Greg Rodzenko 480-264-6831)** are working on a structure over the Queen Creek Wash on Sossaman Road. Contact **Tom Sonnemann at MCDOT (602-506-4880)** for information on structure sizes crossing the East Canal and the East Maricopa Floodway. Mr. Smith said to use this information for structure sizes for Ocotillo Road.

Mr. Phillips mentioned that while working for SRP, they typically used a 20-foot buffer between a bridge and an SRP structure. Move the irrigation gate structure to provide a 20-foot buffer along the East Canal upstream of downstream of the proposed box culvert.

Mr. Phillips said, for the development of the Candidate Assessment Report keep the roadway on the section line because the floodplain for the Sanoqui Wash is so wide along Ocotillo Road. The FCDMC will assume that the Sanoqui Wash will be located to the south of the roadway.

Please contact me at (480) 303-9799 if you have any questions.

Signed: Bradford D. Olbert

Bradford D. Olbert, P. E.

Distribution:

W7428400 – 3.01

Tim Phillips	FCDMC
Mike Smith	MCDOT
Saeed Al-Saffar	MCDOT

TELECON

Sverdrup Civil, Inc.

Date: January 5, 2000
Time: 8:55 am

TO: Aruna Vasudev
Town of Gilbert
1025 S. Gilbert Road
Gilbert, AZ 85296
E-mail: arunav@ci.gilbert.az.us
Phone: (480) 503-6805
Title: Planner

FROM: Steve Mishler
Tempe, AZ Office

SUBJECT: **Contract No. 99-15**
On-Call Services
Ocotillo Road, Greenfield Road to Recker Road
Land Use of NE Corner of Higley Road & Ocotillo Road

SUMMARY:

The Town of Gilbert's current plan for the land in the northeast quadrant of Higley Road and Ocotillo Road was discussed. Gilbert recently annexed the land but the City of Mesa owns the land. The annexation was approved on December 7th, 1999 and will be finalized 30 days later on January 7th, 2000.

The land is currently posted with signs as a "Future Discharge Site for Reclaimed Waste Water" owned jointly by Mesa and Gilbert. The Town of Gilbert does not currently have any other plans for the land but she did mention that the land would remain public use land and that the land would not become residential.

Please call me if you have any questions.

Signed: Steve Mishler
Steve Mishler

Distribution: BDO/W7427400

637 South 48th Street, Suite 101 Tempe, Arizona 85281 Tel. (480) 303-9799 Fax. (480) 303-9899

Kimley»Horn

In collaboration with

Aqua Engineering Inc.

Fucello Architects

pros consulting
Inspiring Communities to Lead Forward

RJM DESIGN GROUP