MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

ENGINEERING DIVISION

DESIGN CONCEPT REPORT

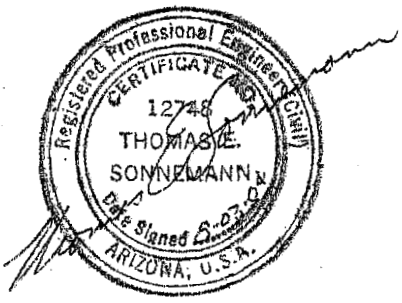
CHANDLER HEIGHTS ROAD BRIDGE

AT

SONOQUI WASH

MCDOT WORK ORDER NO 69026

DATE: AUGUST 3, 2004



PREPARED BY

MCDOT ENGINEERING STAFF

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1.0 INTRODUCTION

1.1 OVERVIEW AND PROJECT BACKGROUND

The present crossing of Chandler Heights Road at the Sonoqui Wash is a "dip" crossing. The approach roadway descends into the wash bottom to a depth of 6.4 feet with slopes of 3.1% from the west and 3.6% from the east, which results in reduced sight distances and undesirable driving conditions. During significant flood events, the crossing must be closed. After the flow has subsided, mud, sand, and debris need to be removed prior to the roadway being reopened.

The project vicinity is in transition from a rural environment to a developed one with increasing traffic volumes. Due to the development, the Flood Control District has initiated a study for Sonoqui Wash that has generated new flow rates and channel geometry. Currently, the FCD Sonoqui Wash improvements downstream of Chandler Heights Road are in the stage of final design.

This Project represents an improvement to the Chandler Heights Road crossing at Sonoqui Wash. The improvement consists of constructing a new, 5-lane bridge that will provide an all-weather crossing, mitigate the future traffic congestion, reduce existing sight distance restriction, and remove the current traffic hazard during periods of flow in Sonoqui Wash. This bridge will be necessary, when the FCD designed improvements will be constructed. The bridge is designed to conform to the Flood Control District's hydraulic requirements and the Town of Queen Creek's equestrian requirements. A governing vertical clearance under the bridge is derived from these requirements. The higher of these two clearances, combined with the depth of the bridge superstructure, results in a need to raise the roadway profile grade at the proposed bridge location above that of the existing approaches. The elevated approaches will conform to both ASSHTO roadway standards and the geometric requirements of the bridge. This Project is focusing on the bridge, not on the approach roadway improvements; therefore, it includes only two-lane approaches to the bridge. The bridge is designed as a five-lane facility to allow future widening of the of the road. The concept is that the widened bridge will be built ahead of time, even though the traffic demand will not yet require the road widening. The close coordination of this bridge design with FCD is necessary, as a permanent channel transition and a temporary, paved, two-lane diversionary road built on embankment across the channel during construction of the Project are proposed.

1.2 PURPOSE OF THE REPORT

The purpose of this Design Concept Report (DCR) is to expand upon the results of the Candidate Assessment Report (CAR); to develop the design parameters; to produce refined cost estimates to be used in the bridge type selection; to define right-of-way requirements; and to recommend a strong, yet aesthetically acceptable bridge structure for the least cost and least impact to the community. This DCR may also serve as a basis for starting the intergovernmental agreement (IGA) process with potential financial partners.

The CAR evaluated two options; the Full Cost Alternative (a bridge) and the Low Cost Alternative (a box culvert). This DCR will expand the recommended Full Cost Alternative, providing several structure alternatives with a selection of a preferred bridge type.

2.0 CHARACTERISTICS OF THE CORRIDOR

2.1 LAND USE PATTERNS

2.1.1 General Location

This Project is located on Chandler Heights Road in southeast Maricopa County, at the Sonoqui Wash crossing, approximately 1800 feet east of the Sossaman Road intersection. The site is two (2) miles north of the southern county boundary and 3 ½ miles west of the eastern county boundary in this portion of Maricopa County. See the Vicinity Map in Section 1 of the Appendix.

2.1.2 Jurisdictions

The Project site is surrounded by the Town of Queen Creek, which has annexed all adjacent land except for 55-foot half-widths on either side of the section lines along Chandler Heights, Sossaman and Hawes Roads. Some portions of these half-widths have been annexed to the section line (see City Limits Map, Appendix, Sec. 2).

Zoning in the vicinity of the Project is R1-43 and R1-35. Several units of the Ranchos Jardines development are located to the west and northeast of the Project site.

2.1.3 Municipal, State Transportation and Other Infrastructure

The San Tan Freeway is scheduled for construction by ADOT during the years 2004-06. The east-west alignment is

approximately 6 ¼ miles north of this Project, between Ray and Warner Roads.

The Williams Gateway Airport/ASU Campus is 4 miles north of the Project.

2.2 TOPOGRAPHIC FEATURES

The Project is situated in gently sloping terrain that drains the northern portion of the San Tan Mountains. These mountains are located to the south of the Project site, just outside Maricopa County, in Pinal County. Sonoqui Wash, the principal drainage feature in this area, originates outside of Maricopa County, entering it approximately at the intersection of Empire and Ellsworth Roads. It continues to flow in a northwesterly direction, historically draining into Queen Creek Wash near Queen Creek Road and the Recker Road alignment. Currently, both Queen Creek and Sonoqui Washes flow into the Power Ranch Trilogy Golf Course basin system, and then west into the East Maricopa Floodway. The Flood Control District of Maricopa County plans to channelize the entire length of Sonoqui Wash and provide a new location of its confluence with the East Maricopa Floodway north of its present location. This will be further explained in Section 2.5 of this document.

2.3 UTILITIES

The following summarizes the existing utilities and impacts in the Project vicinity:

2.3.1 Electric Power Facilities

Salt River Project (SRP) is the electrical power provider in the Project vicinity. There are overhead 12kV power lines on the north side of Chandler Heights Road, extending both east and west of the Project location. Additionally, there is a second line extending to the north on the east side of Sossaman Road. There are four (4) poles in the immediate vicinity of the Project improvements that may need relocation for this Project. Approximately halfway between the Sossaman Road intersection and the existing wash crossing, an electrical line crosses under Chandler Heights Road to service residences on the south side of the road.

2.3.2. Communication Facilities

There are underground telephone lines (Qwest) on the both sides of Chandler Heights Road, as well as the east side of Sossaman Road. An underground crossing of Chandler Heights Road, just west of the wash, provides service to residences on the south side

of the road. There are four (4) telephone manholes along the south side of the road, of which two (2) will require a grade adjustment.

Overhead coax and fiber optic lines (Cable America) are mounted on SRP's poles on the north side of Chandler Heights Road. These lines also cross Chandler Heights Road to residences on the south side of the road, as described in the Section 2.3.1.

2.3.3 Irrigation Facilities

There is no irrigation district or private irrigation facility impacted by this Project.

2.3.4 Municipal and Other Local Utilities

Queen Creek Water Company has a 6-inch waterline on the south side of Chandler Heights Road east of the wash. The line crosses the road at the east end of the easternmost residence immediately west of the wash and continues eastward along the north side of the road.

2.3.5 Other Utilities

There are no other utilities in the Project vicinity at this time.

2.3.6 Utilities That May Have Prior Rights

All major electric, telephone, TV cable, and waterline facilities are located within the existing right-of-way, so they probably do not have prior rights. The only lines within the Project limits that are outside of the current right-of-way are delivery lines to private residences and are located on private property. These are far enough away from the road as not to require relocation.

2.3.7 Basis of Project Utility Relocation Cost Estimates

All of the utilities along the Project corridor will be impacted by the proposed improvements. These are either underground conduit/pipe or utility pole/pedestal/cabinet/manhole relocations or adjustments. As these facilities are located within the existing right-of-way, MCDOT policy is to assume that, unless proven otherwise, the County has prior rights and will not bear the costs of the relocation. However, for the purpose of this Project cost estimating, $100,000 is budgeted for utility relocation.

2.4 RIGHT-OF-WAY

2.4.1 Summary of Existing Right-of-Way

Existing right-of-way half-widths on either side of the section line along the Chandler Heights Road, in the Project vicinity, vary from 40 feet to 75 feet. The north half-width is 55 feet from the section line between Sossaman Road and 196th Street. The south half-width is 75 feet from the section line beginning at Sossaman Road to approximately 1220 feet east of Sossaman Road, where it changes to 40' for the remaining distance up to 196th Street. See the Preliminary Right-of-Way Requirements Map in Section 6 of the Appendix.

The Town of Queen Creek is in the process of acquiring the undeveloped property north of Chandler Heights Road, east of Sossaman Road, for a future park. This is also the proposed location of one of the Flood Control District's retention basins for Sonoqui Wash. The Town also plans to acquire the undeveloped property south of Chandler Heights Road at some future date to add to the proposed park.

2.4.2 Summary of Proposed Project Right-of-Way

The permanent right-of-way and TCE requirements for this Project are shown on the plan in Appendix 6. On the north side of Chandler Heights Road, from the Sossaman Road intersection to a point approximately 900 feet west of the center of the proposed bridge, the existing half-width needs to be increased from 55 feet to 75 feet. Further to the east, it has to be increased from 55 feet to 100 feet up to the private development property line on the east side of the Sonoqui Wash. On the south side of the Chandler Heights Road, the existing 40 feet half-width has to be increased to 100 feet for a distance of approximately 970 feet as shown on the plan. All of the above described right-of-way would be taken from the two undeveloped properties under consideration for purchase by the Town of Queen Creek (see previous paragraph).

Temporary construction easements will be needed along the wash to provide the necessary transitions from the Flood Control channel geometry to be used under the bridge to the existing channel configurations upstream and downstream of the project. These easements would be entirely within the two undeveloped properties north and south of Chandler Heights Road. In addition, a

temporary construction easement will be required along the south side of Chandler Heights Road, between the wash and 196th Street for the east end of a temporary diversion roadway during the bridge construction.

The estimated cost for permanent right-of-way in the undeveloped land traversed by the wash is $15,000-$20,000/acre.

2.5 HYDROLOGY AND HYDRAULICS

2.5.1 Existing Conditions

Currently Chandler Heights Road's only hydraulic conveyance features at Sonoqui Wash are some riprap bank protection northeast of the crossing and a series of earthen berms both north and south of the crossing. One of the berms extends from Chandler Heights Road to Sossaman Road on the west side of the channel. It serves to relocate the Sonoqui Wash channel to the northeast of its historic alignment in the vicinity of the Project. This realignment begins approximately ¼-mile southeast of the Chandler Heights Road crossing and continues to a point approximately ¼-mile northwest of the Sossaman Road crossing, where it appears to rejoin its historic alignment. The current wash alignment, as defined by the west berm, changes direction at the Chandler Heights Road crossing. To the southeast (upstream) of the crossing the approximate angle of intersection between the wash and the road is 64 degrees. To the northwest (downstream) the approximate angle of intersection is 41 degrees. This amounts to a 23-degree deflection in the wash alignment as it crosses the road.

Downstream, there is a lowflow pipe with headwalls under Sossaman Road, together with a pipe outlet and headwall adjacent to the upstream end of the Sossaman pipe headwall, which conveys local drainage from the development north along Sossaman Road.

There are currently no roadway drainage facilities in the immediate vicinity of the Project. The dip section does not appear to be armored to prevent washout of the pavement during a major flows.

The latest Sonoqui Wash flows and water surface elevations are specified in the "Sanokai Wash Flood Delineation Study" (FCD 97-11) produced by the Flood Control District of Maricopa County, in 1999 (Note the difference of the Sonoqui Wash name spelling). This study indicates a 100-year flow at Chandler Heights Road of 4,020 c.f.s, with a water surface elevation of 1371.61. This

elevation is based on the National Geodic Vertical Datum of 1929 ("NGVD 29"). Since MCDOT uses NAVD 88, the conversion is NGVD 29 + 2.23 feet = NAVD 88.

2.5.2 Proposed Channel Improvements

In November 2000, Flood Control District Maricopa County completed the "Queen Creek & Sanokai Wash Hydraulic Master Plan" (FCD 98-26). This has been amended in 2004. This study is assessing the hydraulic conveyance capacity for the subject drainage system and is making recommendations to ensure that, considering the ongoing development, the 100-year event flow produced by the system's drainage area is properly conveyed to the East Maricopa Floodway. The bridge design project shall be closely coordinated with this study. The study defines a 310 feet long channel reach covering the Project vicinity. The proposed reach parameters* are as follows:

Design Q100 (cfs)	3,200
Downstream Invert Elev. (ft)	1348.20
Upstream Invert Elev. (ft)	1348.50
Average Channel Slope (ft/ft)	0.0015
Manning's n-Value	0.035
Bottom Width (ft)	80.0
Average Depth of Flow (ft)	6.5
Design Freeboard (ft)	1.0
Side Slopes (H:1)	4
Channel Top Width (ft)	164.0
Average Velocity (fps)	4.4
Average Froude Number	0.35

* Subject to further refinements by the ongoing Flood Control District study.

The study does not call for any drop structures near the Chandler Heights Road crossing.

The study indicates that the flow at Chandler Heights Road is contingent on the presence of two (2) upstream detention basins which would lower the peak flows downstream of their locations. These basins are on the East Branch of Sonoqui Wash, which diverges from the Main Branch at Riggs Road, approximately ¼ mile east of Ellsworth Road. It then proceeds eastward upstream to the Crismon Road Alignment, then runs east-southeast to the Signal Butte Road alignment and then into Pinal County. The

proposed locations of the basins are at Signal Butte Road and ½ mile east of Hawes Road, diverting 1060 c.f.s. and 700 c.f.s., respectively. A third proposed basin will divert 1230 c.f.s. immediately downstream of the proposed Project, at the northeast corner of Chandler Heights and Sossaman Roads.

The proposed Project channel work in Sonoqui Wash will conform to the Queen Creek/Sonoqui Wash Hydraulic Master Plan requirements, except as noted below. It will also provide suitable transitions to upstream and downstream configurations at the time of Project construction.

As the implementation of the Master Plan is contingent on developmental schedules, it cannot be assumed, at this time, that the upstream basins will be in place at the time of the construction of this Project's bridge. Therefore, the Project design will add the diverted upstream flows to the Master Plan flow at Chandler Heights Road for a total 100-year flow of 3,200 c.f.s. While this is a very conservative approach, the resulting water surface is not the governing criterion for the vertical clearance under the bridge.

The only aspect of this Project, that will vary from the study, is that its horizontal alignment will be "straightened" across Chandler Heights Road to provide improved hydraulic characteristics for the bridge (see Section 3.1, Bridge Design Criteria).

Lacking any hydrologic study of this watershed that generates a 500-year rate of flow, a factor of 1.69 has been determined by Flood Control to be the ratio of the 500-year to 100-year event. This yields corresponding 500-year event values of 5,408 c.f.s. for the delineation study.

2.5.3 Proposed Bridge & Roadway Drainage Features

On-site approach road and bridge deck drainage will be conveyed to a series of catch basins by way of concrete barriers and curbs along the sides of the deck and widened shoulders adjacent to the guardrails and retaining wall. The runoff will then be delivered to the retention area northwest of the bridge on the west approach and southeast of the bridge on the east approach via concrete pipes and headwalls.

2.6 ROADWAY CHARACTERISTICS

Chandler Heights Road is a two-lane, 28 feet wide, asphalt concrete paved road with unpaved shoulders, with no left turn median. The roadway crosses Sonoqui Wash via a dip crossing, which approximately matches the current wash flowline at its lowest point. West of the crossing, Sossaman Road intersects Chandler Heights Road at an angle of approximately 65 degrees, as Sossaman Road begins a curve around the historic site of a former stagecoach station. Chandler Heights Road maintains a straight east-west alignment along the section line. Both two-lane roads are striped for two-way traffic. There are currently no turn lanes in any direction at the intersection.

The existing functional classification of both roads is Rural Major Collector. The ultimate functional classification will be Urban Minor Arterial.

2.7 BRIDGE STRUCTURE

The considered bridge is a 3- to 5-span, 5-lane structure, approximately 230 feet in length by 89 feet wide. To minimize the rise of the roadway profile at the bridge structure, a shallow-depth, cast-in-place concrete slab bridge seems the most suitable choice, although precast girders, precast voided slab and posttensioned box girder alternatives will be studied. The foundation (piers and abutments) will be aligned with the modified channel alignment. The modification will realign the channel to avoid a kink in the vicinity of the bridge. The resulting skew angle (the angle measured from the perpendicular to the road) will be approximately 40 degrees left. The superstructure will include 5-foot wide bike lanes and type "F" barriers next to the outside traffic lanes, with a concrete walkway and chain link fence on outside edges of the deck. The fence may be replaced in future with a more aesthetically pleasing railing to match any development motif.

2.8 TRAFFIC ANALYSIS

2.8.1 New Traffic Volume Measurement

YEAR	Chandler Heights Rd	Sossaman Rd
2002	3,267 (13% Trucks)	2,282 (12% Trucks)

2.8.2 Three Year Traffic Volumes

YEAR	Chandler Heights E of Power Rd	Chandler Heights E of Hawes Rd	Sossaman Rd N of Ch Hts Rd
2000	4,247	3,221	1,659
1999	3,354	2,666	1,444
1998	2,447	2,148	1,101

2.8.3 Projected Traffic Volume Measurement (20-Year projection)

2022	21,400 (Chandler Heights Rd)
2022	14,900 (Sossaman Rd)

2.8.4 Current Accident Volumes

According to MCDOT Traffic records, there have been seven (7) accidents reported in the Project vicinity between 1997 and 2001. Of these, three (3) accidents involved two (2) vehicles; two rear-end collisions and one (1) opposing sideswipe. Three (3) more involved a single vehicle losing control, leaving the roadway and either hitting a sign or rolling over. The remaining accident involved a passenger falling off of a bike or motorcycle. All but two (2) of the accidents occurred during daylight. Three (3) of the accidents occurred at the intersection of Chandler Heights and Sossaman Roads. The remainder occurred within a quarter mile of the intersection (0.20 mile north, 71 feet south, 75 feet east and 0.25 mile east).

2.8.5 Additional Traffic Information

Chandler Heights Road is classified as a Rural Major Collector. The design speed for a Rural Major Collector on level terrain is 50 miles/hour per the 2004 MCDOT Roadway Design Guide. The ultimate classification of Chandler Heights Road is Urban Minor Arterial, which has a design speed of 55 miles/hour. Therefore, the Arterial criteria governs. The ultimate classification is checked as the vertical curve over the 5-lane bridge needs to be designed by the worst-case criteria of the next 50 years. See Appendix, Section 7 for a copy of the Traffic Impact Study.

2.9 GEOTECHNICAL

No geotechnical data has been obtained for roadway design purposes. This is due to the fact that the roadway improvements (bridge approaches) will be placed on fill material of an undetermined source. Therefore, the pavement design will follow minimum guidelines set forth in Chapter 10, "Pavement Design Guide", of MCDOT's 2004 Roadway Design Manual.

A geotechnical investigation has been undertaken for this Project by AMEC Earth & Environmental, Inc. Four (4) borings were drilled to a depth of 80 feet below the existing ground and laboratory analysis was performed on the recovered material. The results were compiled in a geotechnical report, completed in January, 2004. Bridge foundation recommendations and soil

parameters from this report will be used to determine the size and depth of foundations of the considered structures (See Section 8 of the Appendix).

Samples of the channel bottom material will need to be obtained when scour analysis of the proposed bridge is undertaken.

2.10 ENVIRONMENTAL OVERVIEW

The proposed wash crossing for this Project is located in rural open desert area with some residential development. The natural environment adjacent to the area is mostly undisturbed. However, off-road vehicle use and other human disturbance is evident. Predominant vegetation consists of desert broom, creosote, mesquite, palo verde, and some cacti. Riparian habitat is limited and there is no evidence of any wetlands. No threatened or endangered species are likely to inhabit the project area. During the design phase of this Project, MCDOT Environmental group will identify any native vegetation impacted by the Project construction. A salvage and mitigation plan will be developed by MCDOT to alleviate these impacts.

There is a potential for cultural resources to be present in the Project area. Therefore, a cultural resource survey (Breternitz and Robinson, MCDOT Contract No.CY-2001-26) has been conducted as part of the environmental clearance process. Two sites were identified in the Project vicinity and these should be avoided by the Project. If avoidance is not possible, then plans should be developed as indicated in the above survey.

Construction of the bridge at this location will result in minimal adverse impact to the natural environment. During construction, impacts to the natural vegetation should be limited to that necessary for the construction of the Project and be in compliance with N.P.D.E.S. requirements. Permits may need to be obtained from the U.S. Army Corps of Engineers and the Arizona Department of Water Quality as part of Sections 401 and 404 of the Clean Water Act.

3.0 DESIGN CRITERIA

3.1 BRIDGE DESIGN CRITERIA

The bridge is to be designed per the AASHTO LRFD specifications for Highway Bridges, third Edition, 2004, as modified by MCDOT.

Drilled shafts will be designed with sufficient depth and strength to ensure stability of the structure in the 500-year flood event with no vehicular load on the bridge as well as in the 100-year flood event with vehicular load on the bridge.

The low chord of the bridge will be located to clear the worst case of the 100-year flow water surface elevation plus 3 feet, or 12 feet above the future proposed channel bottom for equestrian clearance. The latter turns out to be the governing criterion for the bridge profile grade.

Alternate bridge designs vary as to the type and depth of the superstructure only, with the same deck overall width of 89 feet for each alternative.

3.2 ROADWAY DESIGN CRITERIA

The roadway is to be designed per the MCDOT Roadway Design Manual, 2004 Edition.

Due to the fact that most of the reconstructed roadway for the Project will be on fill material of unknown origin, no pavement design will be done. Instead, a minimum standard pavement section of 4 inches of asphalt concrete on 10 inches of aggregate base will be used, resulting in a Structural Number (SN) of 2.88.

A standard MCDOT two-lane, 34–foot wide asphalt roadway with 7-foot wide dirt shoulders will be constructed on the both bridge approaches. In the vicinity of the bridge the shoulders will be widened to 28 feet to accommodate guardrail features. These will include paved transitions between the shoulders of the approach road and the 5-lane approach slabs. A normal 2%, two-way crown will be used along the entire reconstructed length of the Chandler Heights Road bridge approaches. In addition, paved driveway turnouts will be provided for all private driveways impacted by the Project.

Approach road geometry will be based on the ultimate Urban Minor Arterial Road classification on level terrain, 55 m.p.h. design speed (vertical curve across bridge must meet arterial standards). Current ADT on Chandler Heights Road is 3,220 with a truck component of 15%, if the current growth continues in this area, a 20-year ADT is projected to be 21,100.

Temporary diversion road criteria will be for 24-foot wide pavement with 8-foot wide shoulders, with geometry based on 40 m.p.h. design speed and a present ADT of 3,220.

3.3 HYDRAULIC DESIGN CRITERIA

Any required drainage facilities are to be sized per Drainage Design Manual for Maricopa County, Arizona Volume II, Hydraulics, 1996 Edition.

While the existing and proposed channels for Sonoqui Wash are earthen, the embankments in the vicinity of the proposed bridge will be lined with grouted riprap. The channel geometry under the bridge will be trapezoidal

with a 80-foot wide bottom and 4:1 side slopes and a longitudinal slope of 0.0015 ft./ft. The developed ends of the channel will transition into existing channel configurations both upstream and downstream of the bridged crossing.

4.0 DEVELOPMENT OF ALTERNATIVES

4.1 BRIDGE ALTERNATIVES

Five bridge alternatives were selected for evaluation for this Project. These are: (1) a 5-span voided slab bridge, (2) a 3-span AASHTO Type IV prestressed girder bridge, (3) a 4-span cast-in-place slab bridge, (4) a 4-span AASHTO Type III prestressed girder bridge, and (5) a 3-span, cast-in-place, posttensioned box girder bridge. See Section 9 of the Appendix for drawings of all five alternatives. All of the above alternatives would support the same deck configuration. In addition, all alternatives, except the last, use the same substructure type of piers and abutments, which consist of a cast-in-place, reinforced concrete cap supported by reinforced concrete columns and/or drilled shafts. The posttensioned box girder differs from the others only in that it has an internal pier cap built into the superstructure, which significantly improves its aesthetics, and may increase equestrian riders safety. The major differences among the alternatives are in the superstructure system used and the number of piers that each system requires. A brief description of each alternative is given below.

4.1.1 VOIDED SLAB

This type of structure is popular for short spans. The typical beam is a rectangular precast, prestressed member with circular openings in the center to lighten the weight of the member, which is why they are called "voided". Voided slabs are only designed for spans 50 feet or less. The type used for this application has a section size of 48" x 18", resulting in a total number of 22 units placed side-by-side to obtain the needed deck width. A composite design was used, which included an additional 5 ½ -inch cast-in-place, reinforced concrete slab above the beams, resulting in a total superstructure nominal thickness of 23 ½ inches. Four cast-in-place pier frames and two cast-in-place abutments support the superstructure. Voided slabs are produced by several local manufacturers and are very safe during the bridge construction.

4.1.2 TYPE IV AASHTO GIRDER

This type of structure is usually used for spans between 70 and 100 feet in length. AASHTO girders are precast, prestressed concrete beams which have an "I-beam" shape. The Type IV girder is 4'-6" in height. In the typical bridge application, it is bonded with the overlying cast-in-place, reinforced concrete deck with steel stirrups, so that the girder and slab act in a composite manner. For this application, 11 rows of beams, spaced 7'-9" on-center, were used in conjunction with an 8-inch reinforced concrete slab. There is a minimum 1.5-inch deep, variable depth, concrete haunch between the girder and the slab, resulting in a nominal superstructure thickness of 5'-4". Two cast-in-place pier frames and two cast-in-place abutments support the super-structure.

4.1.3 CAST-IN-PLACE REINFORCED CONCRETE SLAB

This structure is the most basic type of bridge, with the deck slab becoming the primary superstructure member. For this design the optimal configuration was found to be a 4-span, 28-inch thick concrete slab, thickened at the supports to 34 inches. Although this produces a thinner superstructure than girder-type bridges, the lack of depth results in a weaker, less rigid structure, that cannot support highway loads at span lengths comparable to AASHTO girder bridges.

This is why maximum 56-foot spans were used for this application. Three cast-in-place piers and two cast-in-place abutments support the superstructure. Construction of the cast-in-place reinforced concrete slab bridge is more labor-intensive than precast prestressed beam alternatives as the entire structure is cast-in-place, having no ready-to-erect precast members in its design. Large amounts of concrete and reinforcing steel usually make this structure less economical than prestressed structures. In addition, during its life, non-prestressed reinforced concrete structures tend to develop flexure cracks with all their negative repercussions including unsighty efflorescence and, more importantly, corrosion of reinforcing bars.

4.1.4. TYPE III AASHTO GIRDER

This type of structure is usually designed for spans between 55 and 80 feet in length. AASHTO girders are precast, prestressed concrete beams which have an "I-beam" shape. The Type III girder is 3'-9" in height. In the same manner as the AASHTO Type IV girder, it is bonded with the overlying cast-in-place, reinforced

concrete deck with steel stirrups, so that the girder and slab act in a composite manner. For this application, 11 rows of beams, spaced 7'-9" on-center, were used in conjunction with an 8-inch reinforced concrete slab. There is a minimum 1.5-inch deep, variable depth, concrete haunch between the girder and the slab, resulting in a nominal superstructure depth of 4'-7". A four-span bridge was determined to be appropriate for this configuration. This resulted in three cast-in-place piers and two cast-in-place abutments to support the superstructure.

4.1.5 CAST-IN-PLACE, POST-TENSIONED BOX GIRDER

This type of structure is usually used for spans between 100 and 300 feet in length. This type of bridge usually has a trapezoidal-shaped cross section with deck overhangs along the sides, resulting a shape that looks like an inverted hat. The piers are internal to the section, so that only the supporting columns are visible below the superstructure. Although the entire superstructure is well reinforced with conventional reinforcing steel, the design obtains its efficiency through use of a series of posttensioned cables.

While the superstructure can be varied in depth and the entire channel width could easily be accommodated with two spans, the concern of minimizing the superstructure depth in order to keep the road profile as low as possible, together with aesthetic concerns lead to a 70'-83'-70' span configuration and a superstructure depth of 3'-6". The unequal span lengths resulted from a design which optimizes the moment distribution. Two cast-in-place rows of columns and two cast-in-place abutments support the superstructure.

This type of bridge is usually supported during construction whenever possible by an earthen berm, which is later removed. This reduces the amount of formwork required as weight of the steel and wet concrete is transferred to the berm instead of being supported above ground by the formwork. Additional construction time is required for the posttension jacking operations and removal of the berm, which the other bridge types presented in this selection do not incur.

4.2 EVALUATION OF ALTERNATIVES

The quantities and costs of the usual bidding items constituting each bridge type were determined. In addition, quantities and costs

were calculated for all significant bid items for the associated channel work, approach roads and construction diversion road. Since the type of bridge superstructure has an impact on approach road costs due to the different superstructure depths, separate vertical profiles for the approach road were made for each bridge type. This in turn resulted in different quantities and cost for roadway fill, pavement materials, and retaining wall areas. It was assumed that channel and diversion road quantities would not be significantly affected by the bridge alternatives. The resulting total project construction costs were tabulated. Copies of the spreadsheets can be found in Section 10 of the Appendix .

5.0 SELECTION OF THE PREFERRED ALTERNATIVE

Although cost is a major factor in determining the type of bridge to be used on the project, it is not the only one. Other factors, such as impact to the public and environment also influence the determination of which bridge type to build. Each factor, or category, is weighted as to its relative importance. This is done through the maximum number of points that a given category can have. Each bridge type is then given points for each category. The points for all of the categories are added to produce a score for that bridge type. In the following matrix, scores are sumarized to select the bridge type with the highest score.

CATEGORY	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
1. COST (30 Pts Max for Least)	25	28	21	28	30
2. NEIGHBORHOOD IMPACT (20 Pts Max for Least)	20	12	20	14	17
3. ENVIRONMENTAL IMPACT (20 Pts Max for Least)	10	20	13	13	20
4. CONSTRUCTIBILITY (20 Pts Max)	12	20	8	18	15
5. AESTHETICS (10 Pts Max)	2	6	10	4	8
TOTALS	69	86	72	77	90

Some of the above categories are more subjective than others.

Cost is the most easily quantified. The total cost for each alternative was inverted. A maximum value for the lowest cost was assigned. A factor was then calculated which converted the highest resulting number to the maximum value of 30. The others costs were multiplied by this factor to determine their relative number of points, the result being rounded to the nearest whole number.

Neighborhood impact was determined in a similar manner, using the last three digits (to hundredths of a foot) of the elevation of the crest vertical curve's point of intersection as the quantity. This value was also inverted and prorated such that the lowest elevation (the same on two of the bridge types) was converted to 20 points and the rest were a fraction of this. This was based on the concept that the worst impact to the neighborhood was the bridge that projected the highest, generating the most noise and being the most visible.

The environmental impact used the number of piers as a quantity, also inverted and prorated. This was based on the concept that piers impacted the channel environment and more piers were less desirable from an equestrian and other recreational use viewpoint. Piers also create an obstacle to the flow of water.

The final two categories were more subjective. Constructability was based on the intuitive probability of the construction problems or litigations. The AASHTO Type IV girder alternative with the least number of piers, together with its simple superstructure construction technique, was given the maximum number of points. The other alternatives were scored lower, with the AASHTO Type III girder alternative in second place because of one more pier, thus larger exposure to the drilling problems and/or litigations. The cast-in-place slab alternative scored lowest because of the large volume of the continuous concrete pour, variable depth, and use of false-work under the entire structure. The score of the post-tensioned box girder alternative was affected by the assumption that an earthen berm with drain pipes will be used as part of the forming to support the superstructure during construction until posttensioning completion. Otherwise, the construction of MCDOT's only three completed posttensioned bridges went very smooth. Although MCDOT has not constructed as many posttensioned bridges as the other types, Herb Miller of MCDOT operations saw no reason that this should deter MCDOT from constructing more and looked forward to the added experience. The voided slab alternative does have more spans and piers than any other alternative, and combines any possible problems of a

precast superstructure with possible problems of additional foundation drilling and cast-in-place substructure. This resulted in assigning it a low score of 12 points.

Aesthetics was simply given a value of one to five, which was doubled for a maximum value of 10. It was felt that the slab bridge offered the most pleasing look, with the box girder coming in second. The voided slab alternative with its many piers offered the least appeal, with the AASHTO girder designs falling in the middle.

6.0 CONCEPT DESIGN

Using the matrix method developed in the previous section, Alternative 5, the cast-in-place, posttensioned box girder, received the largest number of points. The AASHTO girder Type IV design alternative scored second place. The AASHTO girder Type III alternative scored the third place. The cast-in-place slab design came in fourth place, and the voided slab design scored the worst. Therefore Alternative 5, the cast-in-place, post-tensioned box girder bridge, is the selected alternative recommended for the final design. It should be noted that this alternative is also the least expensive one.

7.0 SCHEDULE

The Design Concept Report schedule for this project was as follows: Initial data gathering began on May 1, 2002. A public hearing was held September 25, 2002. Draft review submittal was distributed on October 11, 2002. The draft review period terminated on November 5, 2002. Comments and the latest Flood Control District channel parameters have been incorporated and a final submittal is scheduled for August, 2004. Any further comments will be evaluated and incorporated in the final design.

8.0 PUBLIC COMMENTS

Comments resulting from the public hearing of October 15, 2002 can be summarized by three topics of concern. These are as follows:

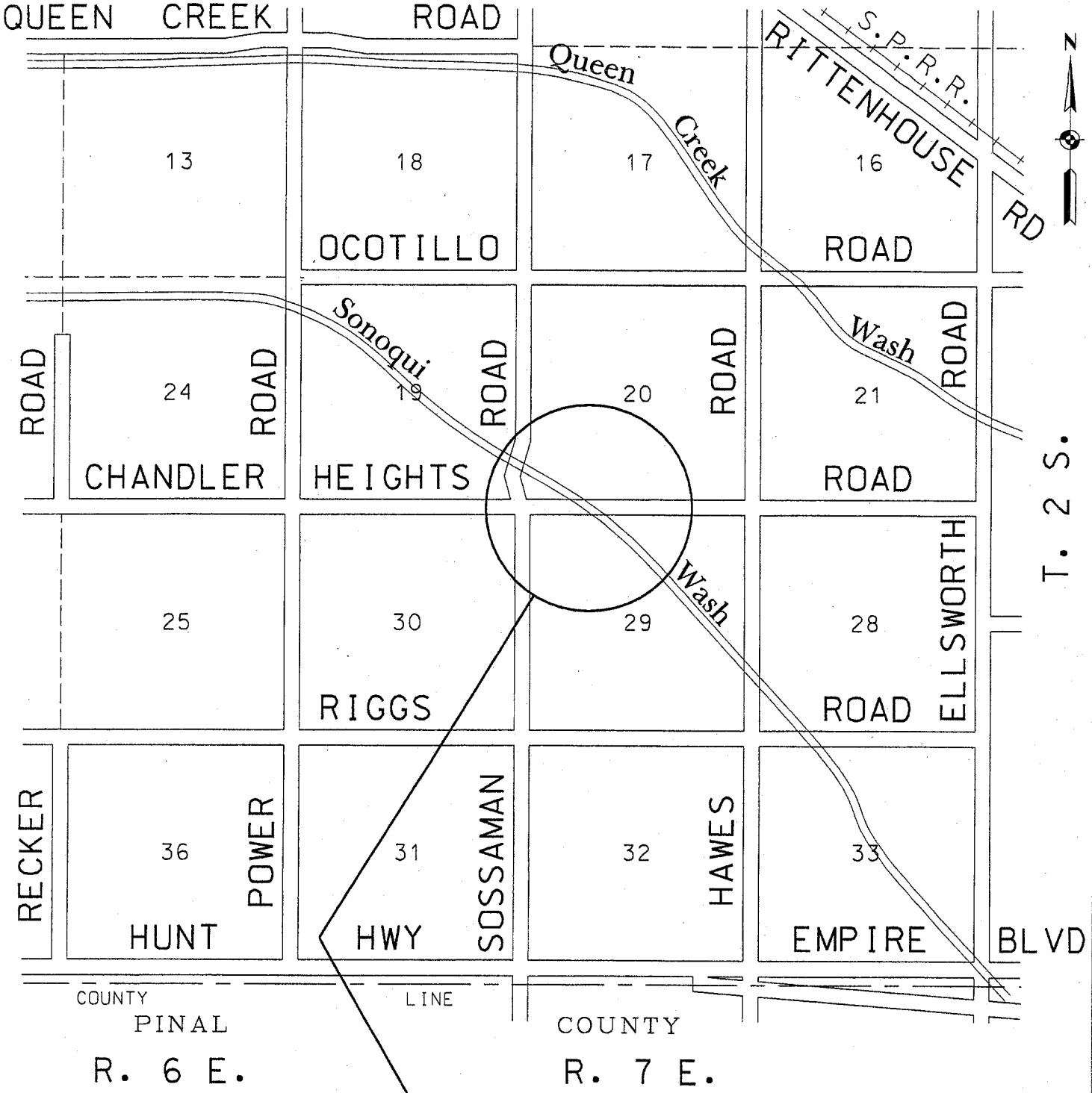
1. that there will be equestrian access under the bridge (4);
2. that a bridge is not needed due to infrequency of flows (7);
3. that a bridge would increase noise, lights, and traffic (5).

A summary of the hearing may be found in Section 11 of the Appendix to this report.

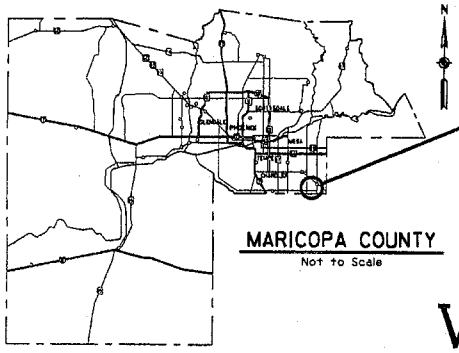
The negative comments regarding the construction of a bridge at this location was due to the lack of common knowledge of the planned channelization of Sonoqui Wash; the lack of flows in the wash due to the current drought, which has lasted for several years; and the very gradual increase in traffic volumes. These conditions are subject to change in the next few years.

APPENDIX- SECTION 1

VICINITY MAP



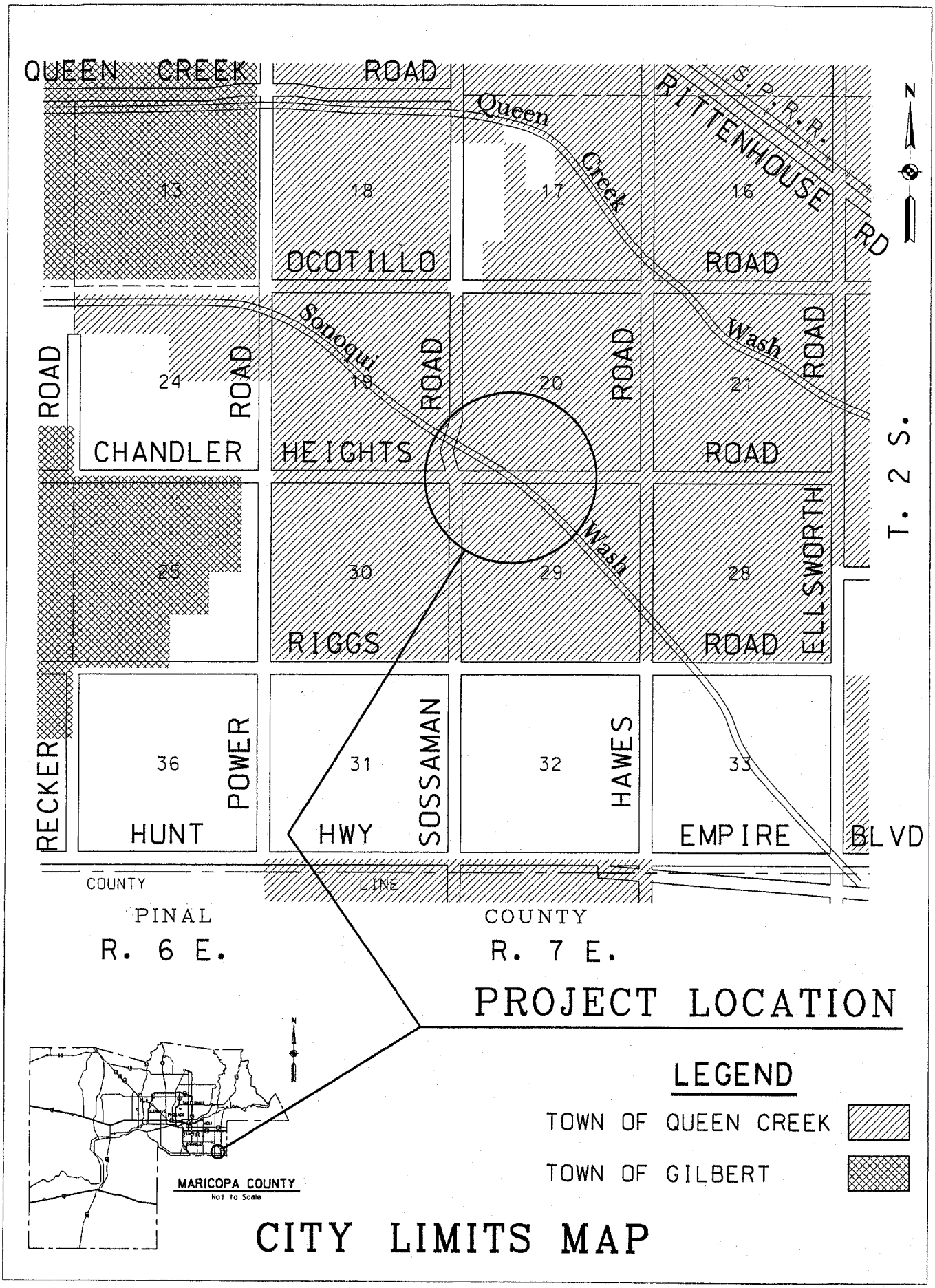
PROJECT LOCATION



VICINITY MAP

APPENDIX- SECTION 2

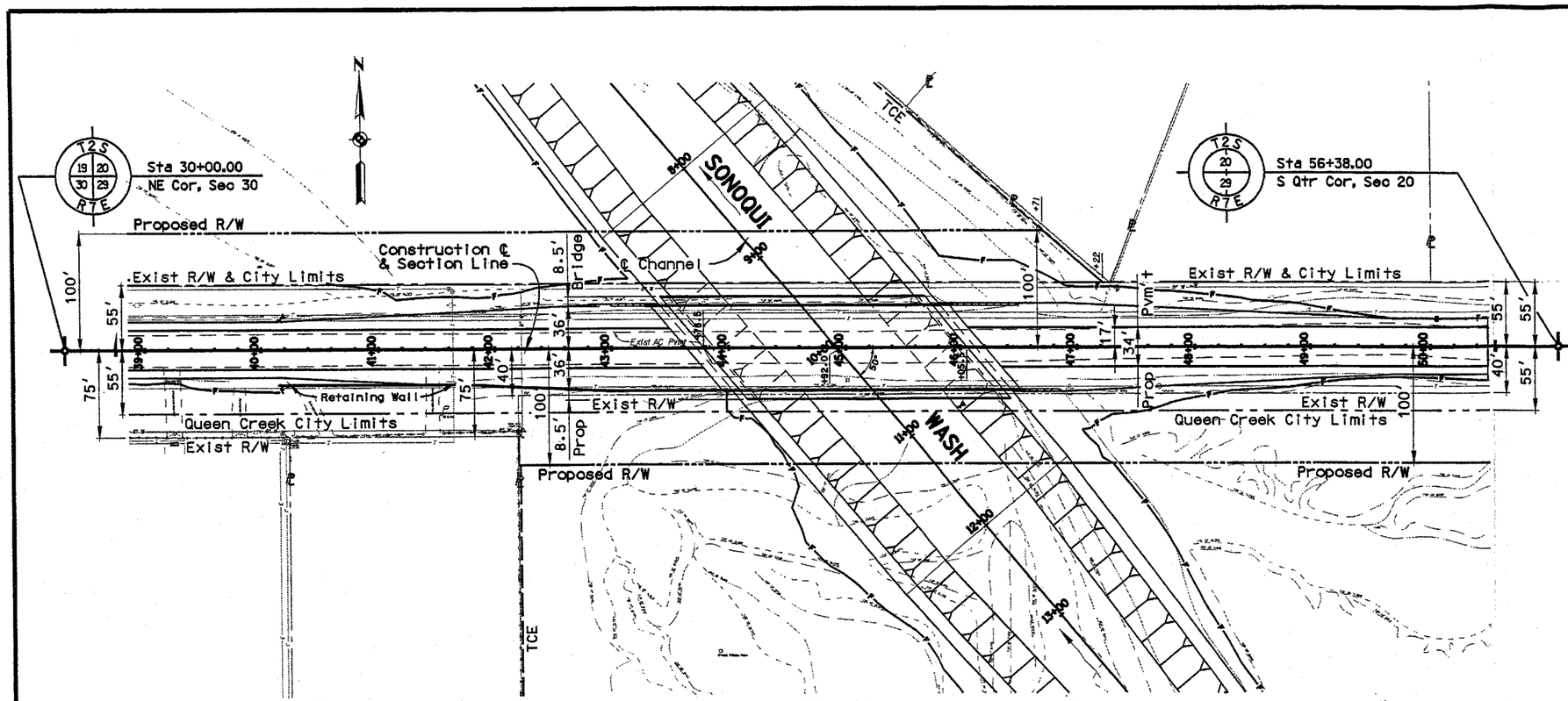
CITY LIMITS MAP


QUEEN CREEK ROAD
Queen Creek
RITTENHOUSE RD
S.P.R.R.
N
13
18
17
16
OCOTILLO ROAD
Sonoqui Wash
ROAD
24
19
20
21
CHANDLER HEIGHTS ROAD
T. 2 S.
25
30
29
28
RIGGS ROAD
ELLSWORTH
RECKER
36
POWER
31
SOSSAMAN
32
HAWES
33
HUNT
HWY
EMPIRE BLVD
COUNTY LINE
PINAL COUNTY
R. 6 E.
R. 7 E.
PROJECT LOCATION
LEGEND
TOWN OF QUEEN CREEK
TOWN OF GILBERT
MARICOPA COUNTY
Not to Scale
CITY LIMITS MAP

APPENDIX- SECTION 3

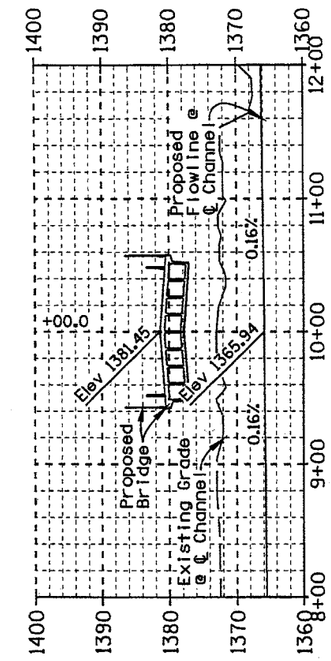
LOCATION PLAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	69026	1	1	



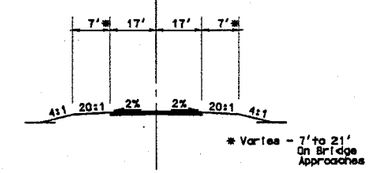
PLAN

Scale: 1" = 50'



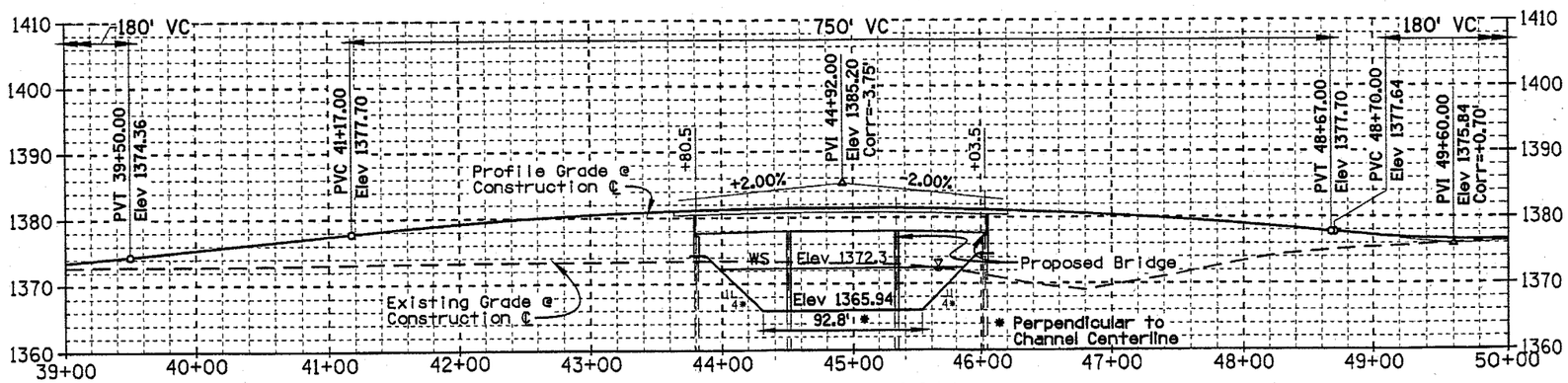
CHANNEL PROFILE

Scale: 1" = 50' Horz
1" = 10' Vert



APPROACH ROAD

Scale: 1" = 25'



ELEVATION

Scale: 1" = 50' Horz
1" = 10' Vert

NOTES:

All Elevations Based on NGVD 88

Q_{100} = 3,200 cfs

NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
AT SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	7/29/04
DRAWN	T. SONNEMANN	7/29/04
CHECKED		

LOCATION PLAN
STA 39+00.00 TO 50+00.00

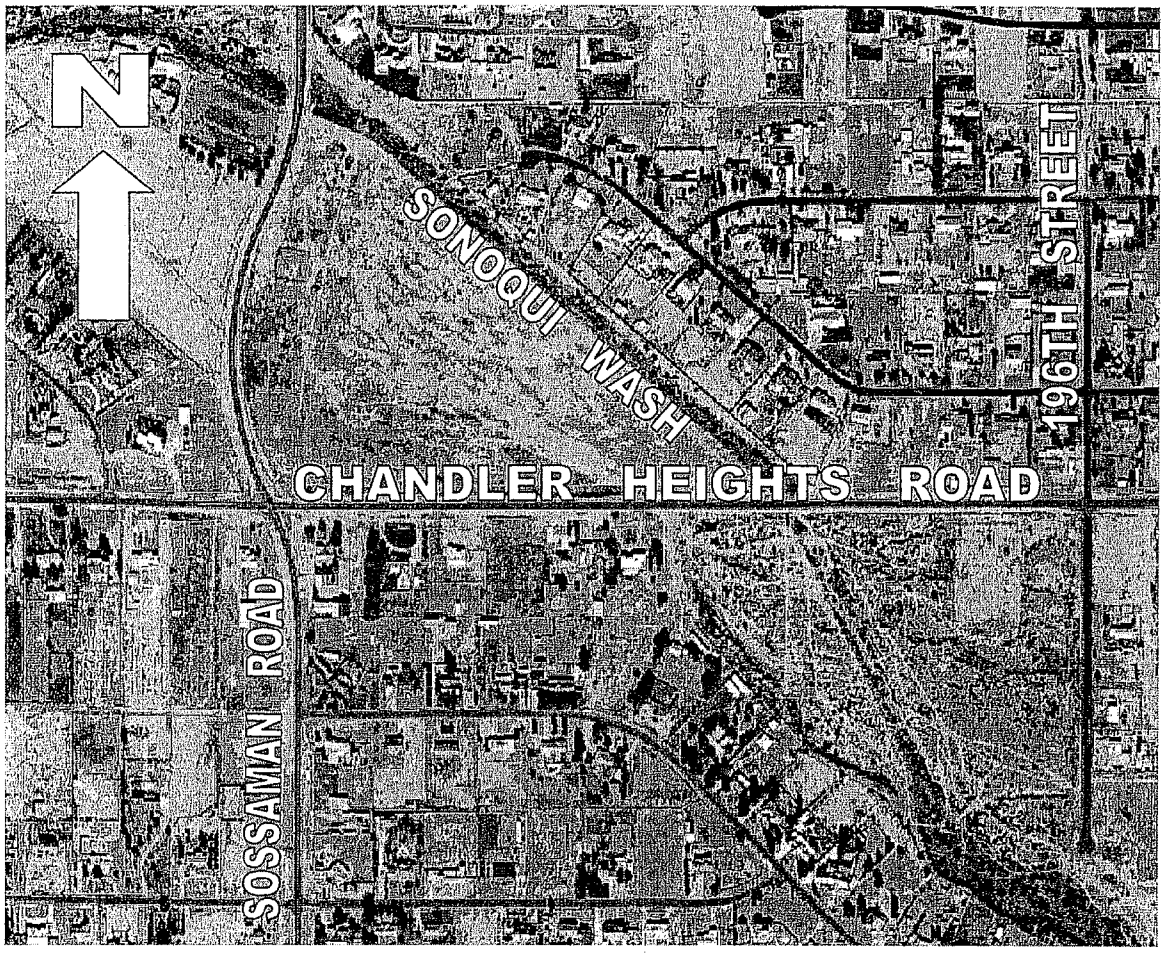
SHEET 1 OF 1

TRACS NO. SB408 01C

b.dgn 12/6/93

APPENDIX- SECTION 4

AERIAL PHOTOGRAPH OF PROJECT VICINITY



AERIAL PHOTOGRAPH OF PROJECT VICINITY

APPENDIX- SECTION 5

BRIDGE SITE PHOTOGRAPHS

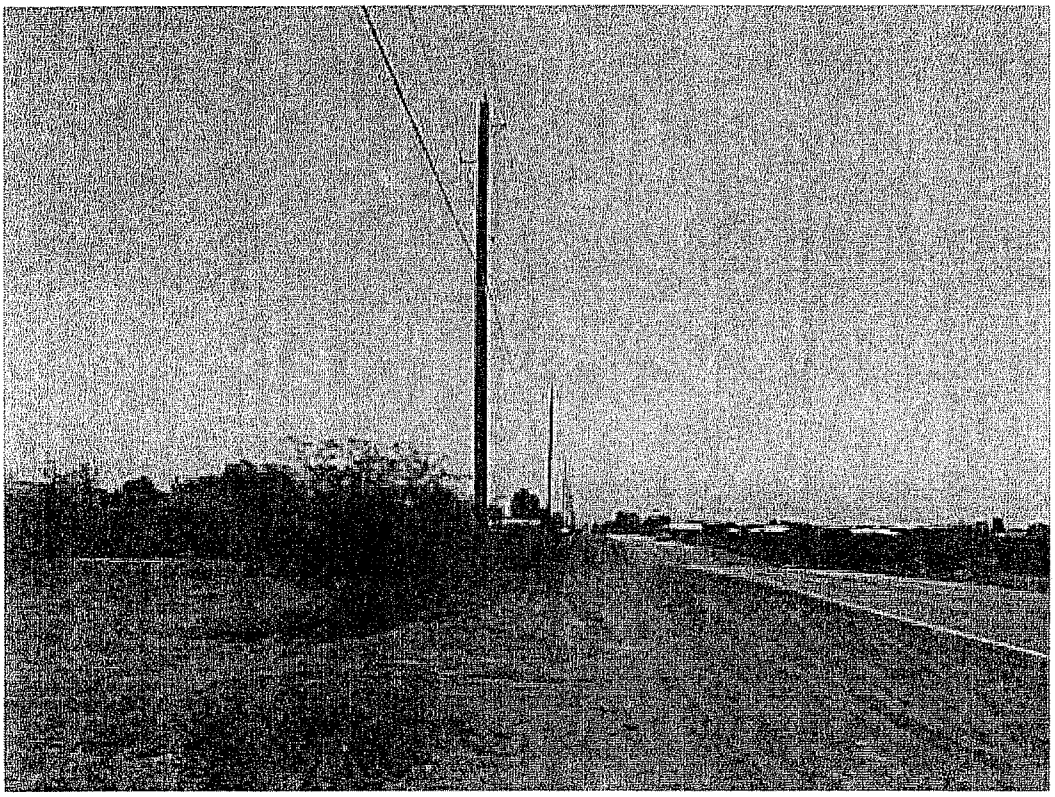


Figure 1-Looking East Along Chandler Heights Road

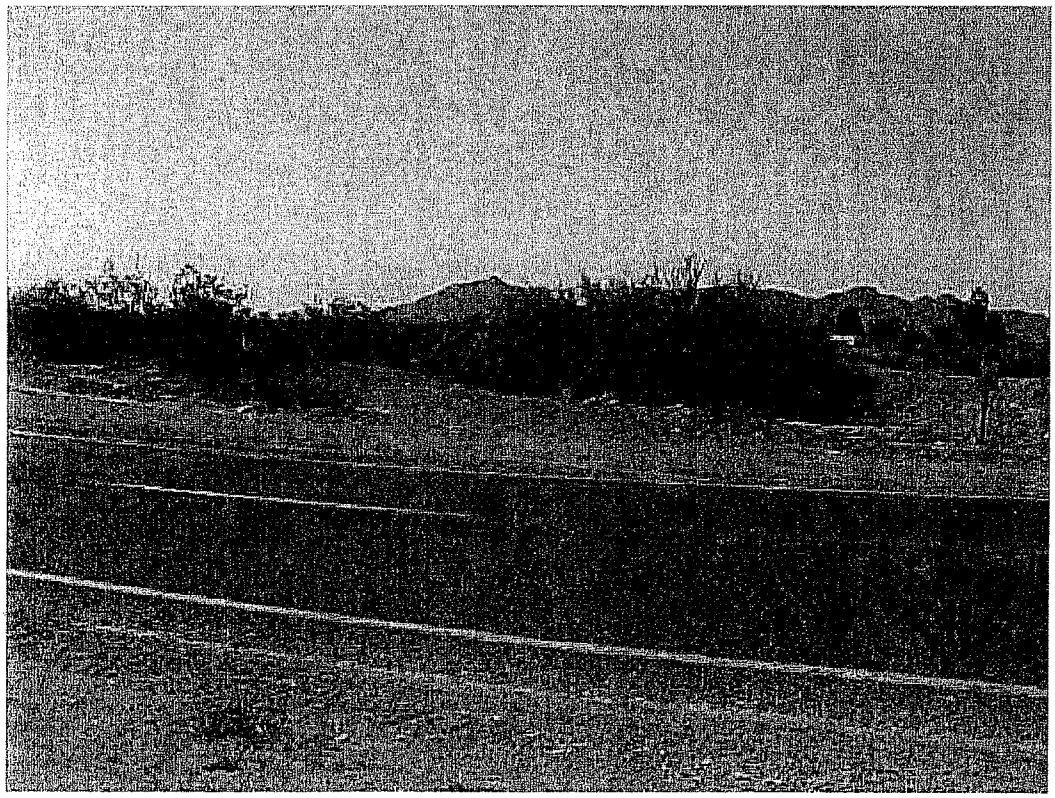
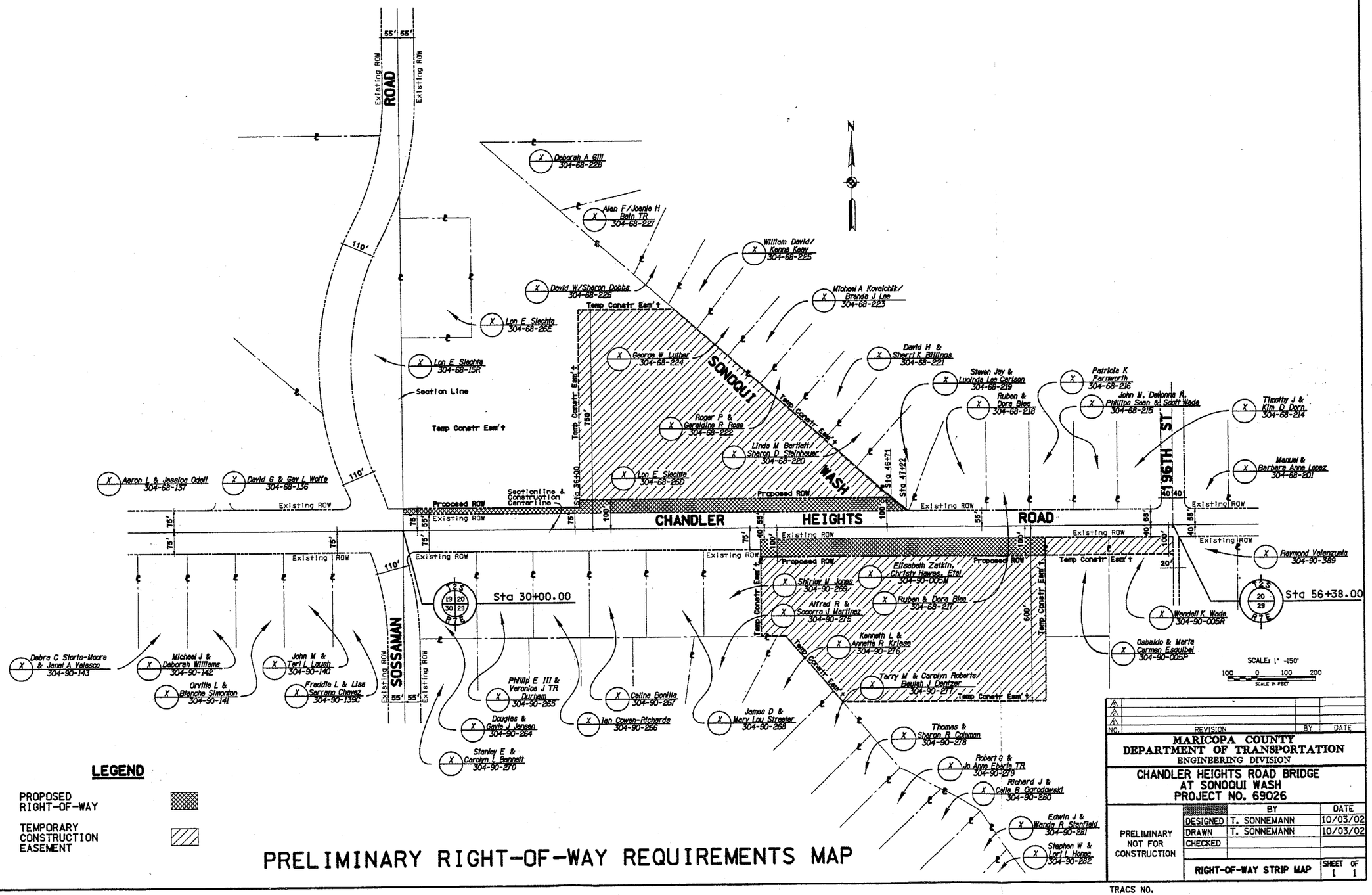


Figure 2-Looking South (Upstream) Along Sonoqui Wash

APPENDIX- SECTION 6

PRELIMINARY RIGHT-OF-WAY REQUIREMENTS MAP


ROAD
Existing ROW
55' 55'
110'
Section Line
Temp Constr Eas't
Deborah A Gill 304-68-228
Alan F/Joanie H Bain TR 304-68-227
William David/ Kenna Kemp 304-68-225
David W/Sharon Dobbs 304-68-226
Michael A Kowalchik/ Brenda J Lee 304-68-223
Lon E Slechta 304-68-26E
Lon E Slechta 304-68-15R
George W Luther 304-68-224
David H & Sherri K Billings 304-68-221
Steven Jay & Lucinda Lee Carlson 304-68-219
Patricia K Farnworth 304-68-216
Ruben & Dora Blea 304-68-218
John M, DeJonna R, Phillips Sean & Scott Wade 304-68-215
Timothy J & Kim D Dorn 304-68-214
Roger P & Geraldine R Ross 304-68-222
Linda M Bartlett/ Sharon D Steinhauer 304-68-220
Lon E Slechta 304-68-26D
Manuel & Barbara Anne Lopez 304-68-201
Aaron L & Jessica Odell 304-68-137
David G & Gay L Wolfe 304-68-136
SONOQUI WASH
Sta 36+00
Sta 46+71
Sta 47+22
Sectionline & Construction Centerline
Proposed ROW
Existing ROW
CHANDLER HEIGHTS ROAD
196TH ST
Raymond Valenzuela 304-90-389
Sta 30+00.00
Sta 56+38.00
Elisabeth Zatkin, Christy Hawes, Etal 304-90-005M
Shirley M Jones 304-90-269
Alfred R & Georgia J Martinez 304-90-275
Ruben & Dora Blea 304-68-217
Wendell K Wade 304-90-005R
Gabaldo & Maria Carmen Esquibel 304-90-005P
Kenneth L & Annette R Krlesa 304-90-276
Terry M & Carolyn Roberts/ Beulah J Dentzer 304-90-277
Temp Constr Easm't
600'
Debra C Starte-Moore & Janet A Velasco 304-90-143
Michael J & Deborah Williams 304-90-142
John M & Teri L Lauth 304-90-140
Orville L & Blanche Simpson 304-90-141
Freddie L & Lisa Serrano Chavez 304-90-139C
SOSSAMAN
Phillip E III & Veronica J TR Durham 304-90-265
Celina Bonilla 304-90-267
James D & Mary Lou Streeter 304-90-268
Douglas & Gayle J Jensen 304-90-264
Ian Cowen-Richards 304-90-266
Stanley E & Carolyn L Bennett 304-90-270
Thomas & Sharon R Coleman 304-90-278
Robert G & Jo Anne Eberle TR 304-90-279
Richard J & Celia B Ogrodowski 304-90-280
Edwin J & Wanda R Stanfield 304-90-281
Stephen W & Lori L Hanes 304-90-282
SCALE: 1" =150'
100 0 100 200
SCALE IN FEET
LEGEND
PROPOSED RIGHT-OF-WAY
TEMPORARY CONSTRUCTION EASEMENT
PRELIMINARY RIGHT-OF-WAY REQUIREMENTS MAP
NO. REVISION BY DATE
MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION
CHANDLER HEIGHTS ROAD BRIDGE
AT SONOQUI WASH
PROJECT NO. 69026
BY DATE
DESIGNED T. SONNEMANN 10/03/02
DRAWN T. SONNEMANN 10/03/02
CHECKED
PRELIMINARY NOT FOR CONSTRUCTION
RIGHT-OF-WAY STRIP MAP
SHEET 1 OF 1
TRACS NO.
mi/sonoqui5/sonnemann/ChandlrsSgn/exhibits.dgn 10/03/02

APPENDIX- SECTION 7

TRAFFIC IMPACT STUDY

TRAFFIC ANALYSIS OF CHANDLER HEIGHTS ROAD AND SOSSAMAN RD

Final Report

Prepared for

Maricopa County DOT

Prepared by

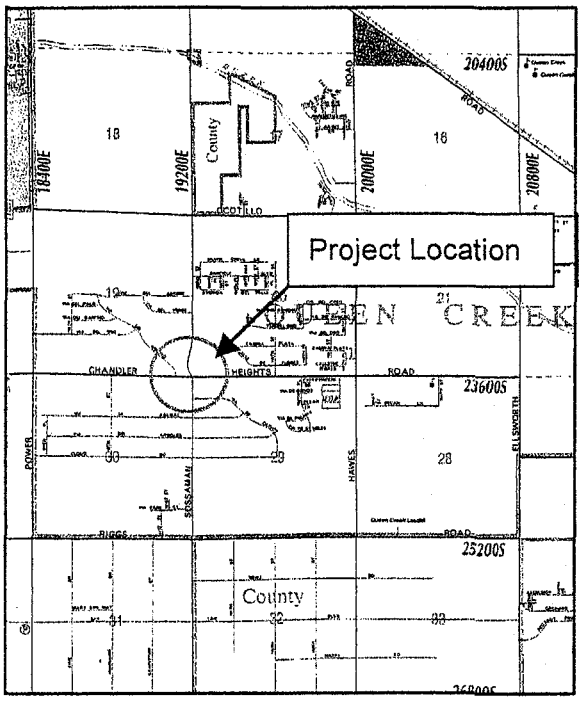
July 9, 2002

CHANDLER HEIGHTS ROAD TRAFFIC ANALYSIS

The purpose of this study is to conduct a traffic analysis for Chandler Heights Road in the vicinity of Sossaman Road to define the lane requirements for a new bridge over Sanokai Wash.

This report presents the existing and future traffic volumes, an analysis of the traffic conditions, and a recommendation for the number of lanes on the bridge and the lanes at the intersection of Chandler Heights Road and Sossaman Road.

Existing Conditions



The project site is shown to the left. Both Chandler Heights Road and Sossaman Road are section-line streets in the grid street system that extends throughout the County. Chandler Heights Road is an east-west arterial street that extends from Price Road to Ellsworth Road. Currently, it is a two lane paved road and carries an average daily traffic volume of 3,270 vehicles. Given a 1997 daily volume of 2,035 vehicles, the traffic on Chandler Heights has increased by 60 percent in the last five years.

Sossaman Road is a north-south street two-lane paved road. In the study area, it extends from Germann Road to Hunt Highway. The existing daily traffic on Sossaman Road is 2,280 vehicles.

The intersection currently operates as a four-way stop control.

Future Conditions

Adjacent Plans

In the Circulation Plan of the Queen Creek General Plan (Draft, February 15, 2002), Chandler Heights Road and Sossaman Road are identified as urban major collectors. The Plan defines urban major collector as four through lanes (2 in each direction) with a center turn lane and bike lanes.

In the Gilbert General Plan, Chandler Heights Road is labeled a major arterial roadway through Gilbert to Power Road. The draft Gilbert Arterial Streets Plan shows that Chandler Heights Road will be a four-lane roadway in the future.

The Mesa Transportation Plan includes Sossaman Road as a four-lane arterial from University Drive south to Germann Road. As part of the Plan, Sossaman Road will extend along the west side of Williams Gateway Airport providing access to airport properties.

Traffic Volumes

Traffic forecasts in the Mesa Plan indicate that the daily traffic volumes on Sossaman Road at Germann Road will be 17,000 vehicles in the year 2025. Forecasts prepared as part of the on-going Gilbert Arterial Streets Plan show that the projected buildout traffic volume on Chandler Heights Road at Power Road is 24,000 vehicles daily.

Existing traffic volumes and the traffic forecasts for the surrounding areas were used to develop traffic forecasts for the intersection of Chandler Heights Road and Sossaman Road. As stated above, the existing daily volume on Chandler Heights Road is 3,220 vehicles, which is an increase of 60 percent over the last five years. If the growth in the area continues at the same rate, in 20 years the volume will be 21,100 vehicles per day. (This is consistent with the 24,000 vehicles per day projected on Chandler Heights Road in Gilbert.) Applying the same growth rate to Sossaman Road, the future traffic volume is expected to be 14,900 vehicles per day north of Chandler Heights Rd. (This is consistent with the 17,000 vehicles per day projected on Sossaman Road in Mesa.)

Using the daily traffic forecasts described above, p.m. peak hour turning movement volumes were developed for the intersection of Chandler Heights and Sossaman. The methodology used to develop the turning movement volumes is as follows.

- A "k" factor (which represents the portion of daily traffic in the peak hour) of 10% was applied to the daily volumes.
- A directional distribution of 55/45 was applied to the peak hour volume to determine the approach volume and exiting volume on each leg.
- The turning movements were developed using 15% for left turns and 15% for right turns, then adjusted as appropriate to match the entering and exiting volumes on each leg.

Lane Requirements

Traffic analysis was performed to determine the required number of lanes for the street segments and for the intersection by estimating the future level of service (LOS).

Level of Service is a term used to describe traffic operations. Level of Service can be calculated for the various elements of a street system including road segments, signalized intersections, and unsignalized intersections. The various levels of service, which range from A to F, are generally defined as follows:

Level of Service A represents free flow.

Level of Service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.

Level of Service C is in the range of stable flow, but marks the beginning of the range in which the operation of individual users becomes significantly affected by others.

Level of Service D represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience.

Level of Service E represents operating conditions at or near the capacity level. All speeds are reduced to a low but relatively uniform value. LOS E is unstable and can quickly deteriorate to LOS F.

Level of Service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount, which can traverse the point.

The volume threshold for a two-lane segment operating at LOS D is 11,100 vehicles per day.

For a signalized intersection, the critical volumes passing through the intersection in one hour are compared to the capacity of the intersection to determine delay and level of service.

Recommendations

The future traffic volumes for three of the four intersection legs exceed the two-lane LOS D threshold of 11,100 vehicles per day. The fourth leg is projected to carry 11,000 vehicles per day. Based on this analysis and the current plans for Mesa, Gilbert, and Queen Creek, it is recommended that all four street segments be four through lanes and include a center two way left turn lane and bicycle lanes.

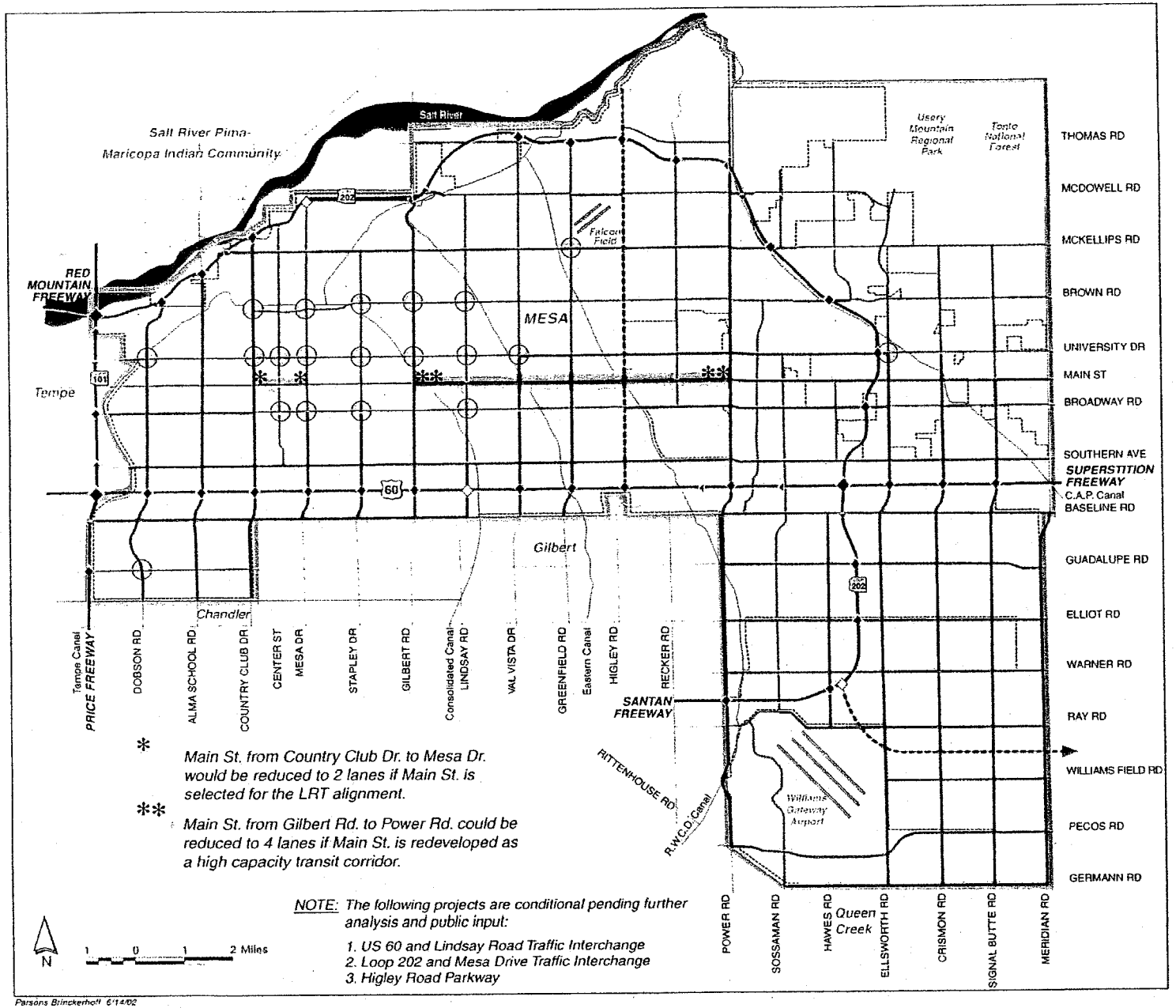
The results of the intersection analysis indicates that no additional turn lanes are required. It is recommended that each intersection approach include one left turn lane, one through lane, and one through/right lane. With this intersection geometry, the future intersection level of service is projected to be B.

Transportation Plan

MESA 2025 A Shared Vision

Recommended Street Plan

Figure 4-9



* Main St. from Country Club Dr. to Mesa Dr. would be reduced to 2 lanes if Main St. is selected for the LRT alignment.

** Main St. from Gilbert Rd. to Power Rd. could be reduced to 4 lanes if Main St. is redeveloped as a high capacity transit corridor.

NOTE: The following projects are conditional pending further analysis and public input:

1. US 60 and Lindsay Road Traffic Interchange
2. Loop 202 and Mesa Drive Traffic Interchange
3. Higley Road Parkway

- Intersection Improvement
- 6 Lane Parkway
- 4 Lane Parkway
- 6 Lane Arterial
- 4 Lane Arterial/Collector
- 2 Lane Arterial/Collector
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways

CITY OF MESA
Great People, Quality Service!

PB

Parsons Brinckerhoff 6/14/02

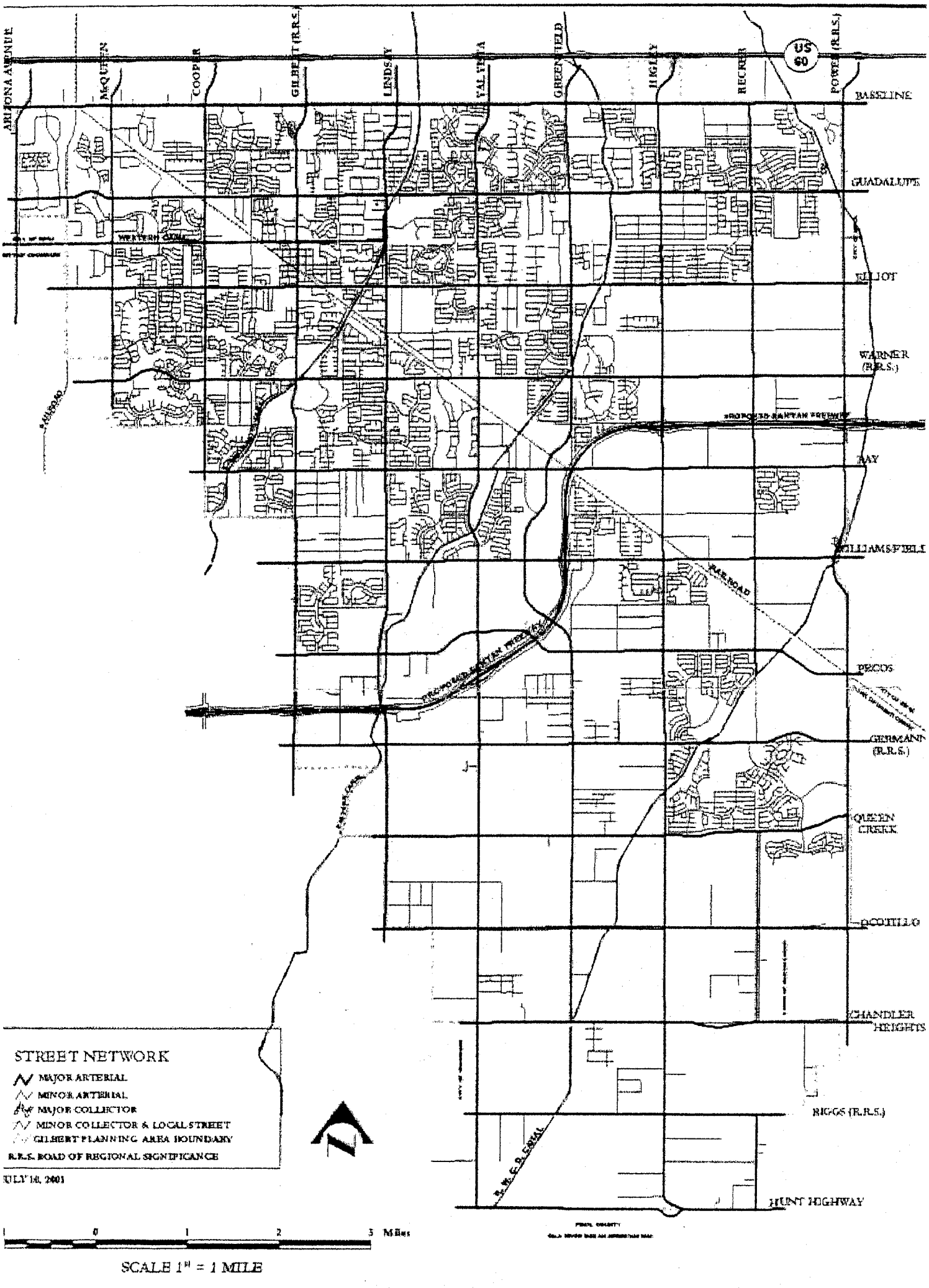
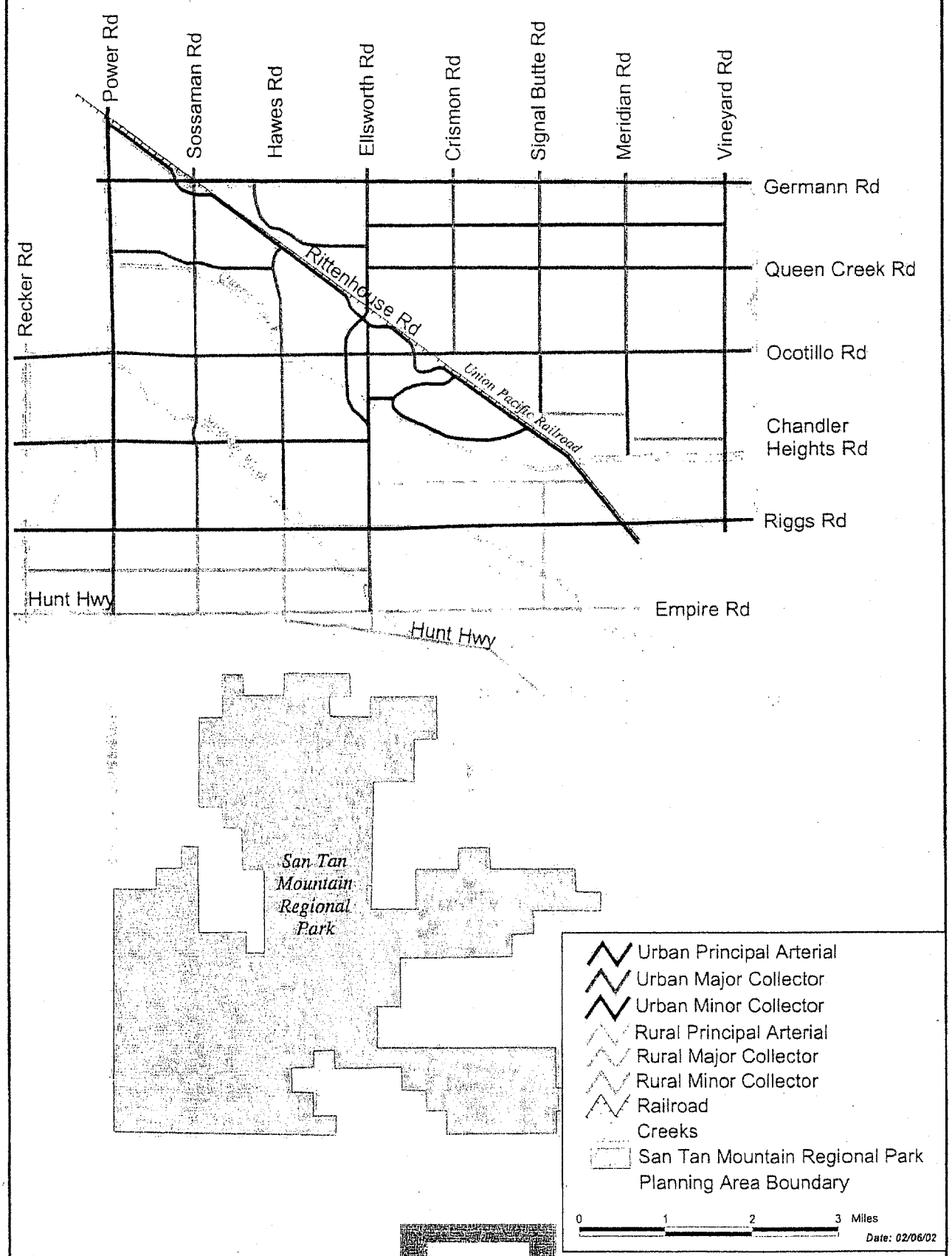

ARIZONA AVENUE
McQUEEN
COOPER
GILBERT (R.R.S.)
LINDSAY
VAL VISTA
GREENFIELD
HIGLEY
RECKER
US 60
POWER (R.R.S.)
BASELINE
GUADALUPE
ELLIOT
WARNER (R.R.S.)
PROPOSED SANTAN FREEWAY
RAY
WILLIAMS FIELD
RAILROAD
PECOS
GERMANN (R.R.S.)
QUEEN CREEK
OCOTILLO
CHANDLER HEIGHTS
RIGGS (R.R.S.)
HUNT HIGHWAY
STREET NETWORK
MAJOR ARTERIAL
MINOR ARTERIAL
MAJOR COLLECTOR
MINOR COLLECTOR & LOCAL STREET
GILBERT PLANNING AREA BOUNDARY
R.R.S. ROAD OF REGIONAL SIGNIFICANCE
JULY 10, 2001
1 0 1 2 3 Miles
SCALE 1" = 1 MILE

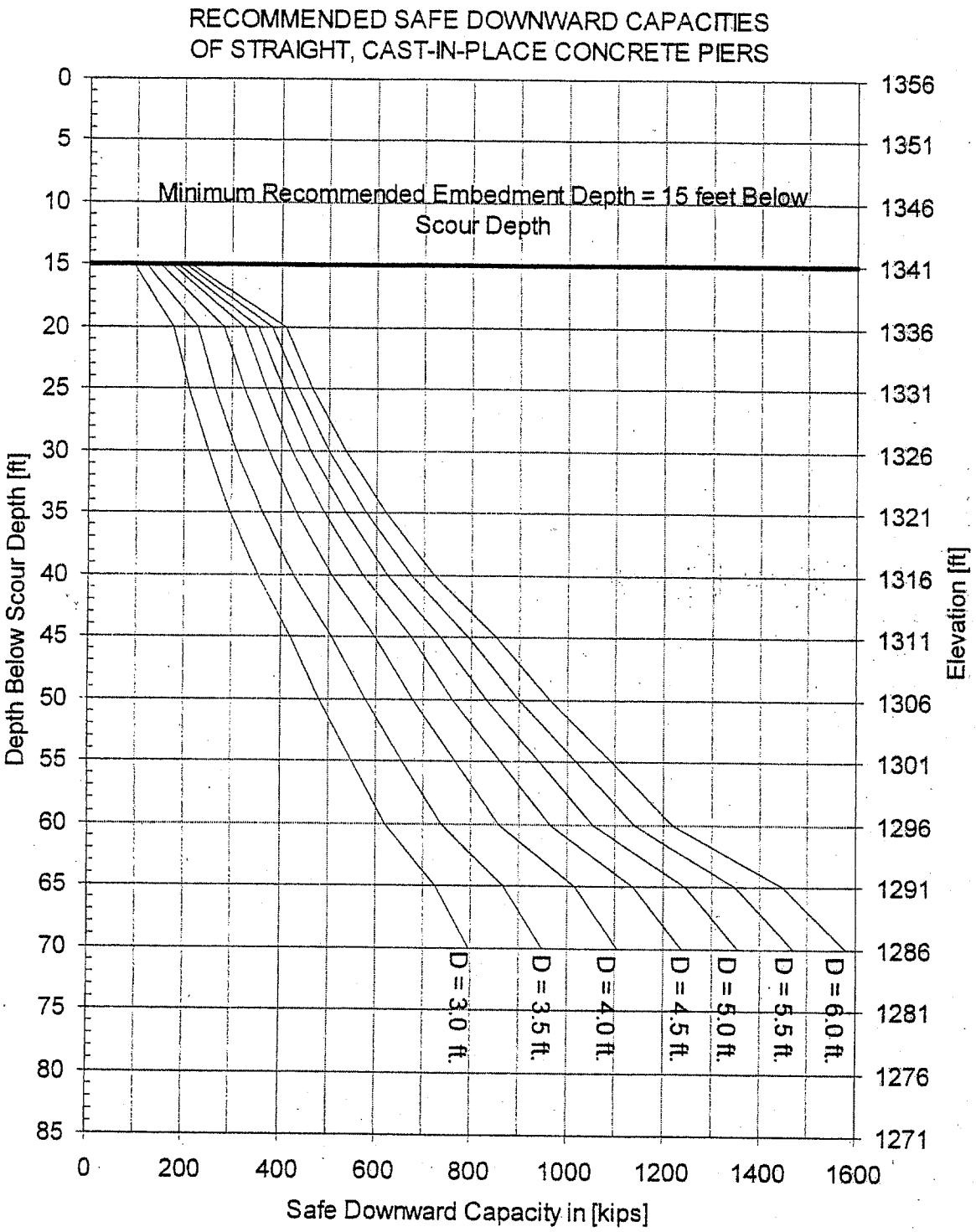
FIGURE 5.1. QUEEN CREEK GENERAL PLAN UPDATE
DRAFT CIRCULATION PLAN



Town of Queen Creek

APPENDIX- SECTION 8

GEOTECHNICAL SUMMARY CHART



JOB NO.	3-117-001090	DESIGN CHART 1	amec
DESIGN:	DNF		
DRAWN:	DNF		
DATE:	Jan. 2004	Chandler Heights Road Bridge over Sonoqui Wash	
SCALE:	NTS		

APPENDIX- SECTION 9

BRIDGE ALTERNATIVE DRAWINGS

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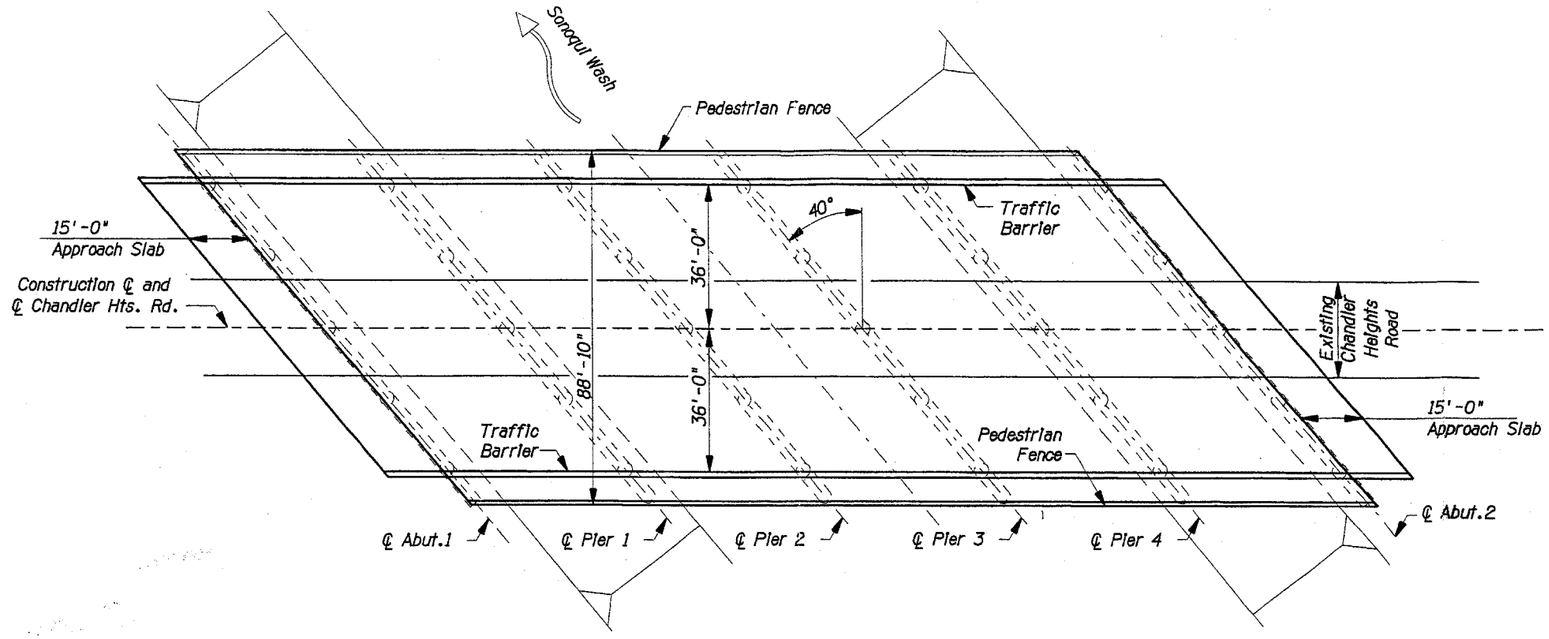
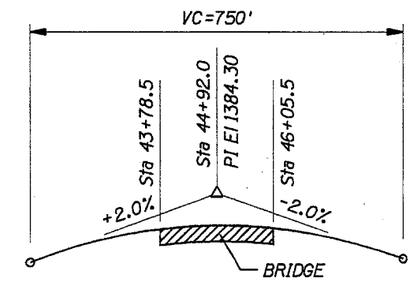
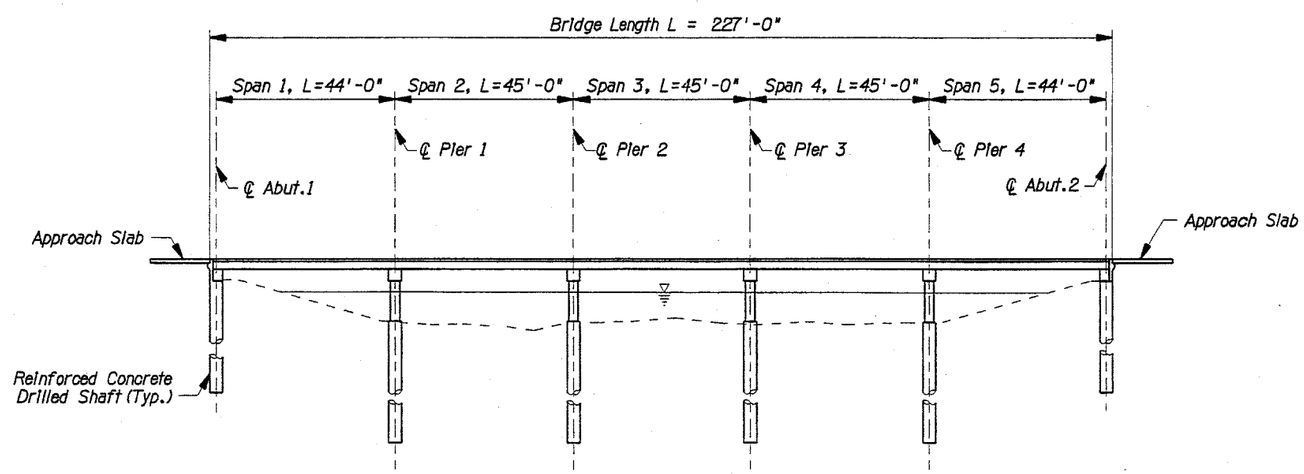


Plan
N.T.S.

New, 5 Span, 48" x 21" Prestressed Concrete Voided Slab Bridge
Cast-in-Place Concrete Deck



Vertical Curve
N.T.S.



Section at Construction Centerline
N.T.S.

NO.	REVISION	BY	DATE
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	T. SONNEMANN	07/27/04
	DRAWN	T. SONNEMANN	07/27/04
	CHECKED	A. WOJAKIEWICZ	07/28/04
	ALTERNATIVE NO. 1		SHEET 1 OF 2

TRACS NO.

Tuesday, AUG-03-2004 09:34 AM
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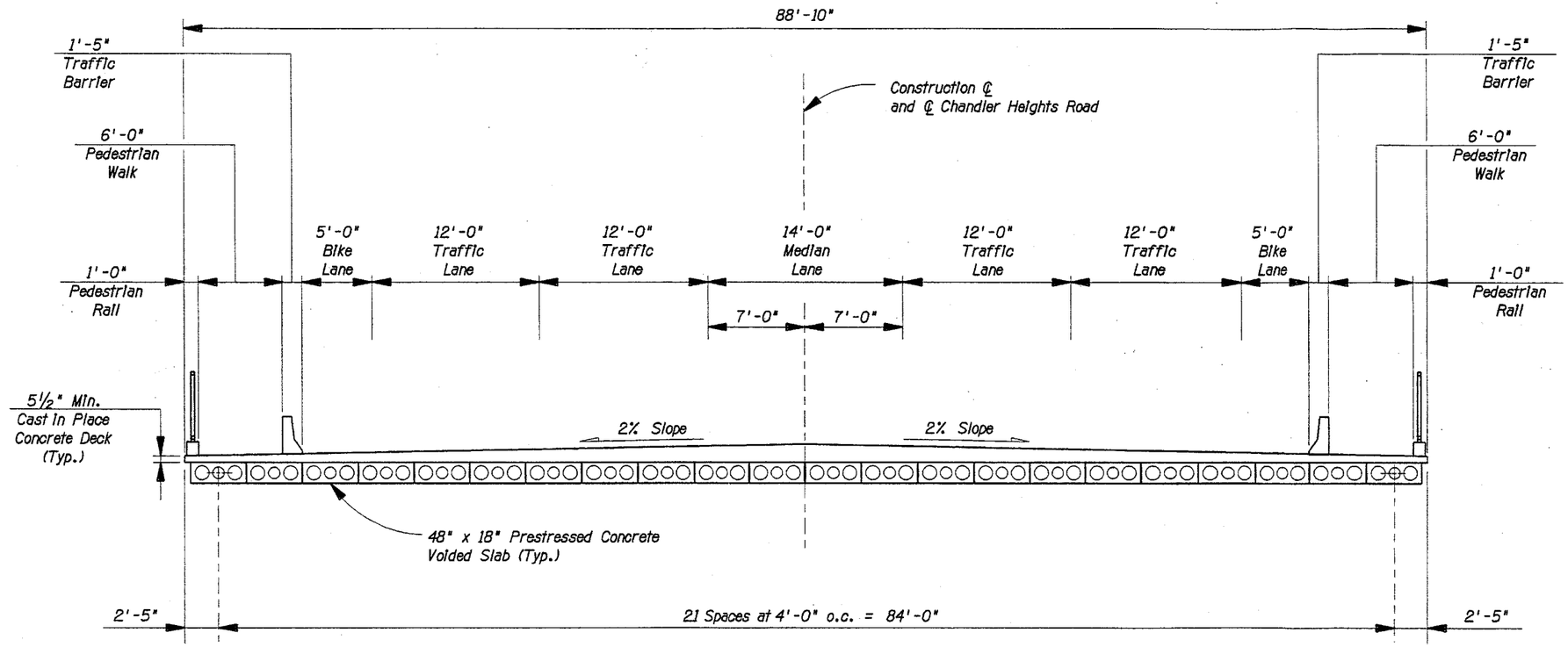
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	69026	1	1	



Typical Section Alt. No. 1

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/29/04

ALTERNATIVE NO. 1

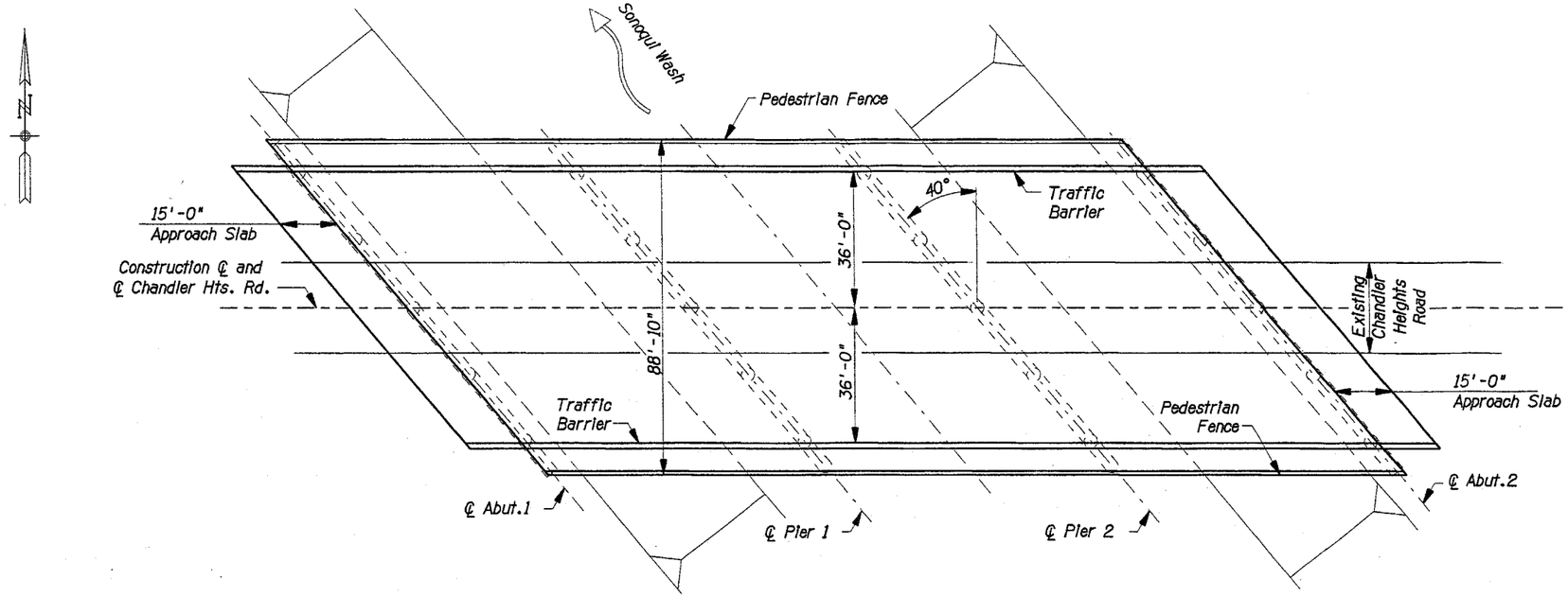
SHEET 2 OF 2

TRACS NO.

English

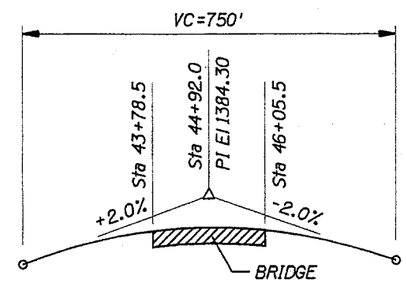
Tuesday, August 03, 2004
ms*SQUAD5*SONNEMAN*Chhtsesanok*Final DCR Materials*69026_bridge_ alts.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
	AZ.	69026	1	1	

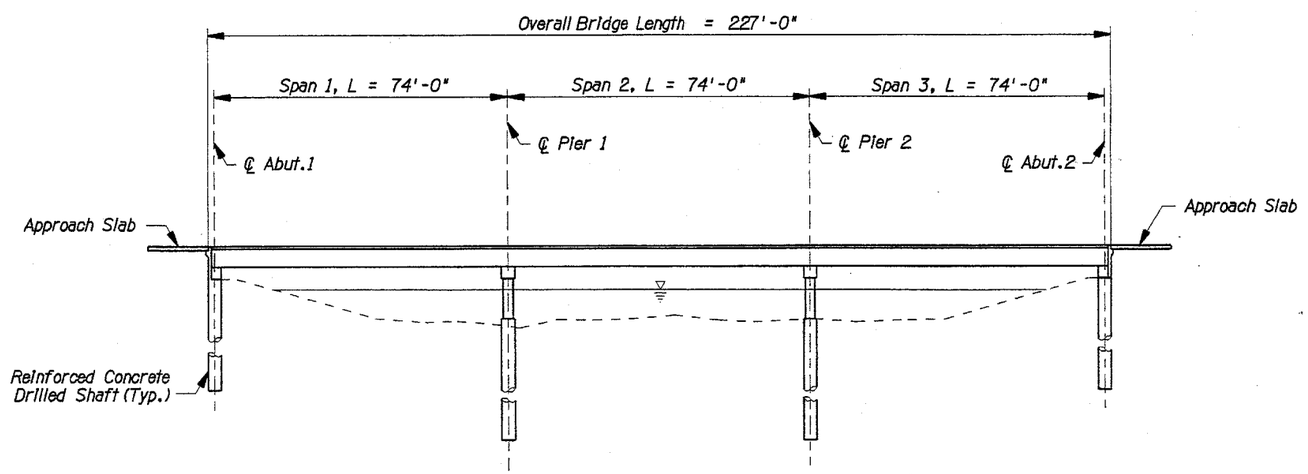


Plan
N.T.S.

New, 3 Span, AASHTO Type IV Girder Bridge with
Cast-In-Place Concrete Deck



Vertical Curve
N.T.S.



Section at Construction Centerline
N.T.S.

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	T. SONNEMANN	07/27/04
	DRAWN	T. SONNEMANN	07/27/04
	CHECKED	A. WOJAKIEWICZ	07/27/04
	ALTERNATIVE NO. 2		SHEET 1 OF 2

TRACS NO.

English

Tuesday, August 03, 2004
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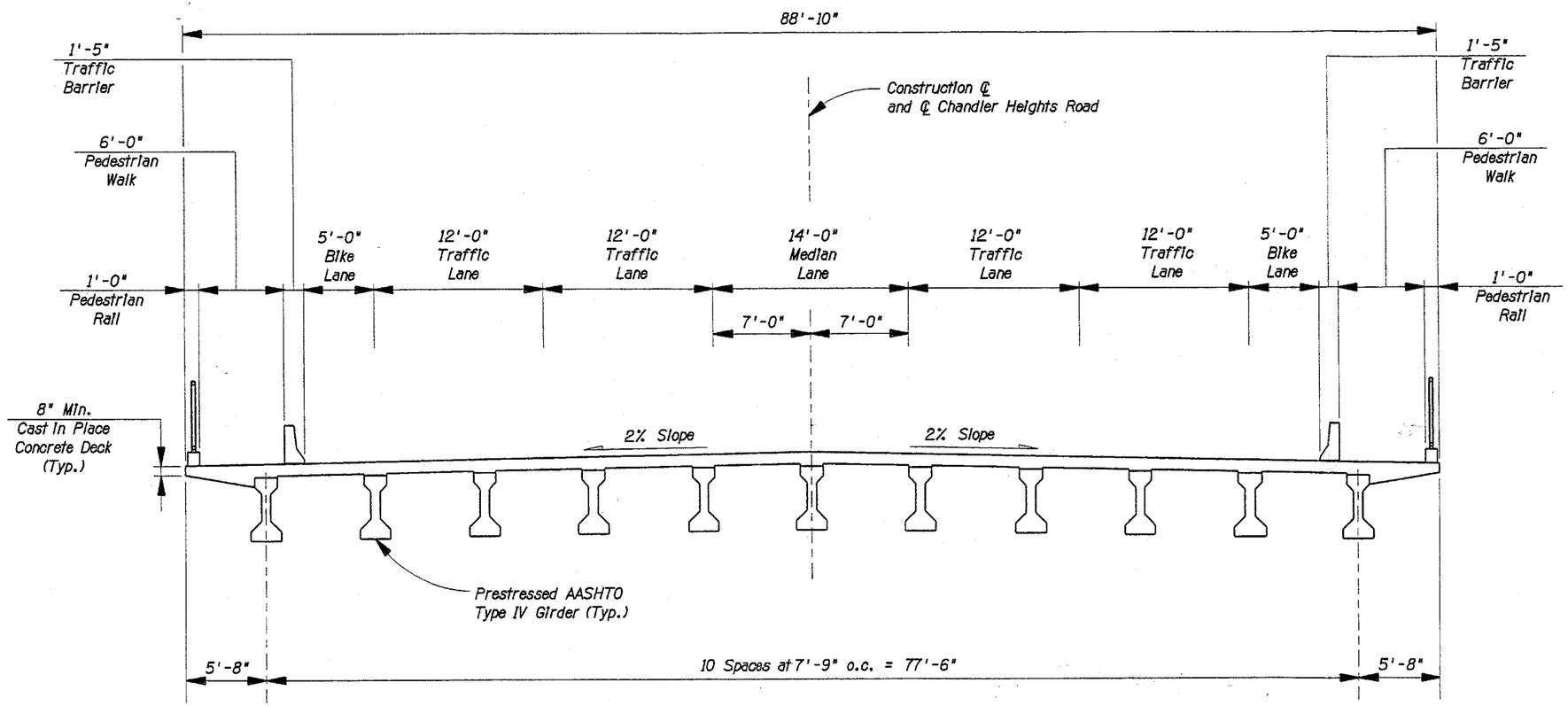

Typical Section Alt. No. 2

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/29/04

ALTERNATIVE NO. 2

SHEET 2 OF 2

TRACS NO.

English

Tuesday, August 23 08, 2004
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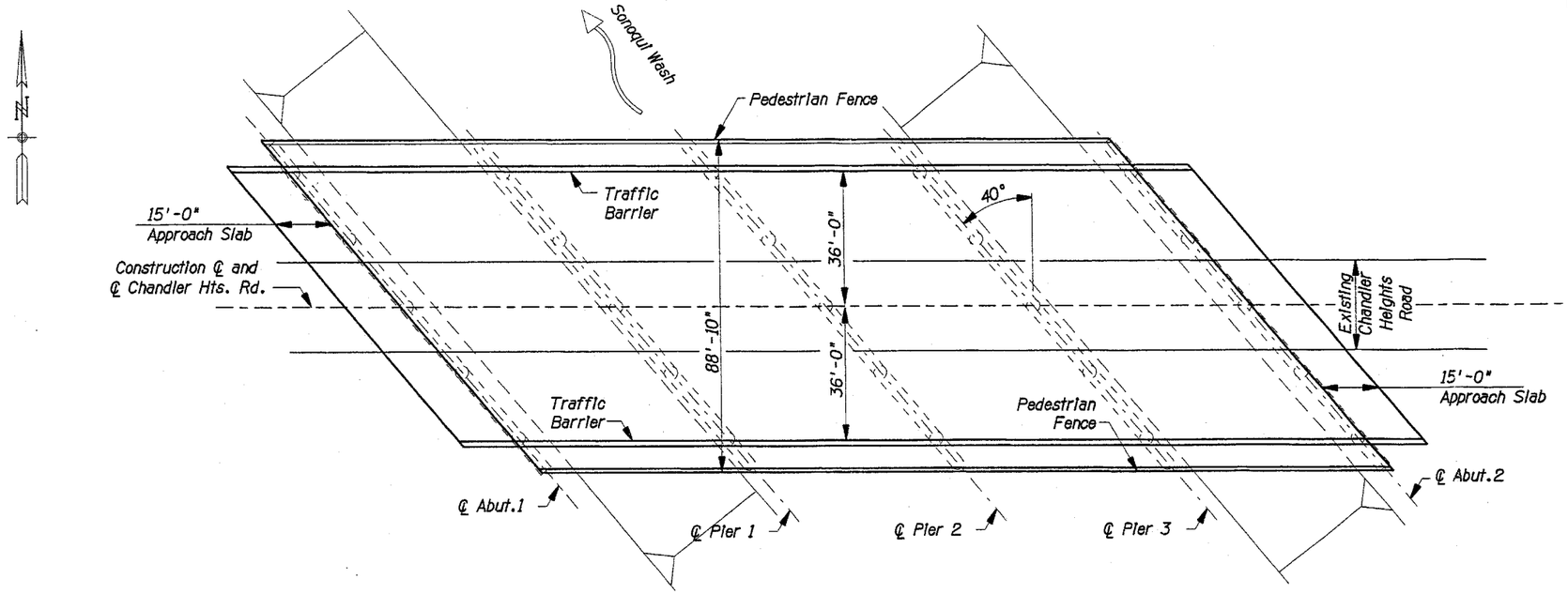
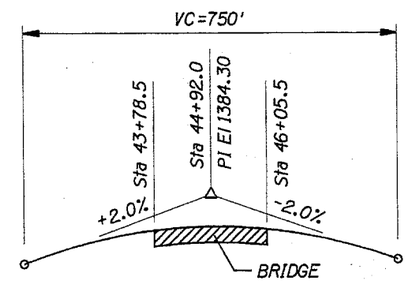


Plan
N.T.S.



Vertical Curve
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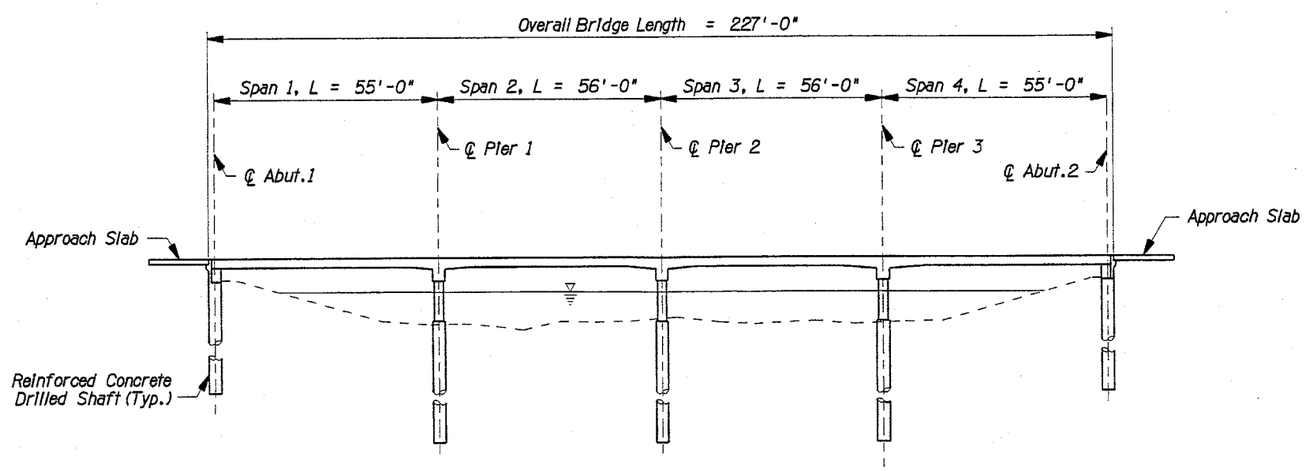

Section at Construction Centerline
N.T.S.

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	T. SONNEMANN	07/27/04
	DRAWN	T. SONNEMANN	07/27/04
	CHECKED	A. WOJAKIEWICZ	07/27/04
	ALTERNATIVE NO. 3		SHEET 1 OF 2

TRACS NO.

English

Tuesday, August 24, 2004
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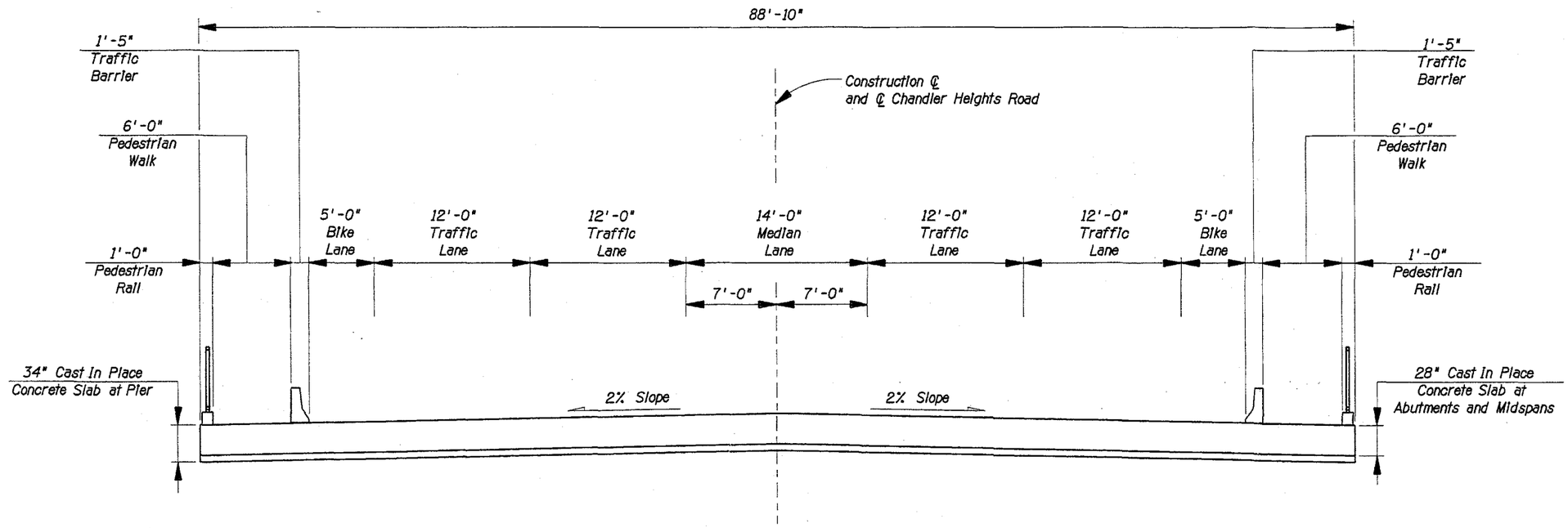
9	AZ.	69026	1	1	



Typical Section Alt. No. 3

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/27/04

ALTERNATIVE NO. 3

SHEET 2 OF 2

TRACS NO.

English

Tuesday, August 03, 2004
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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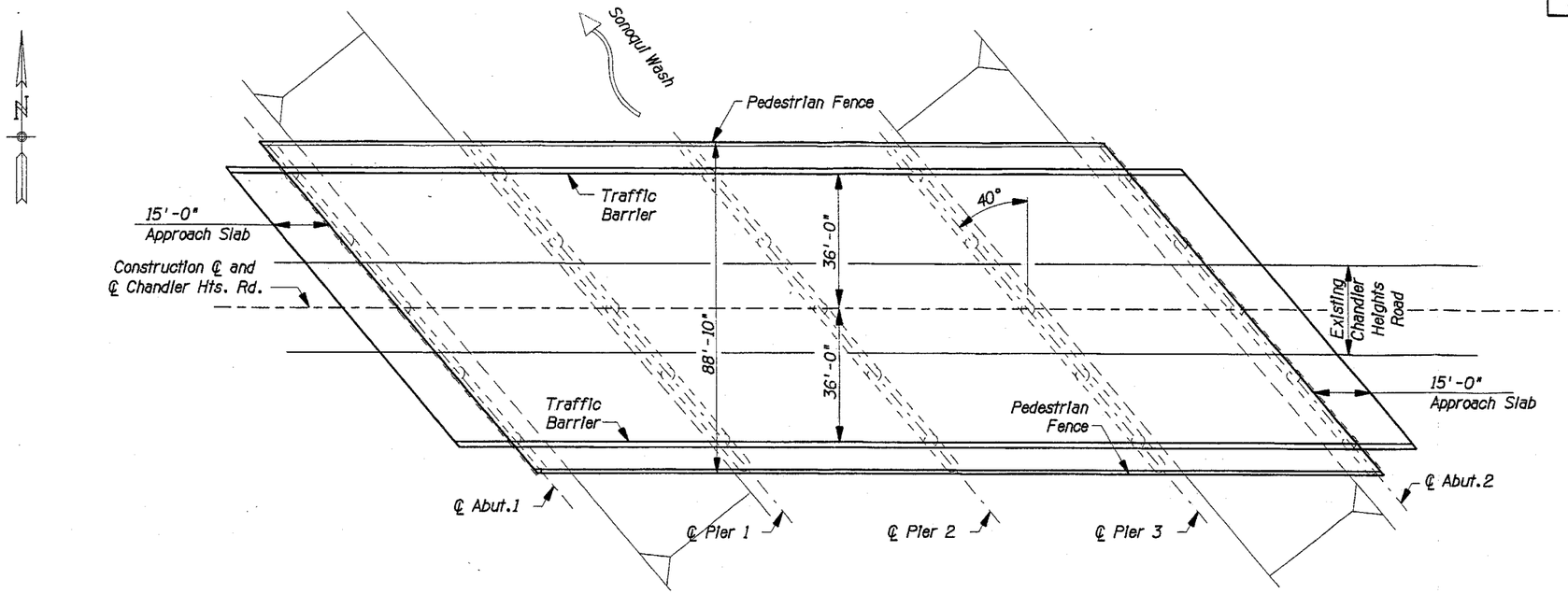
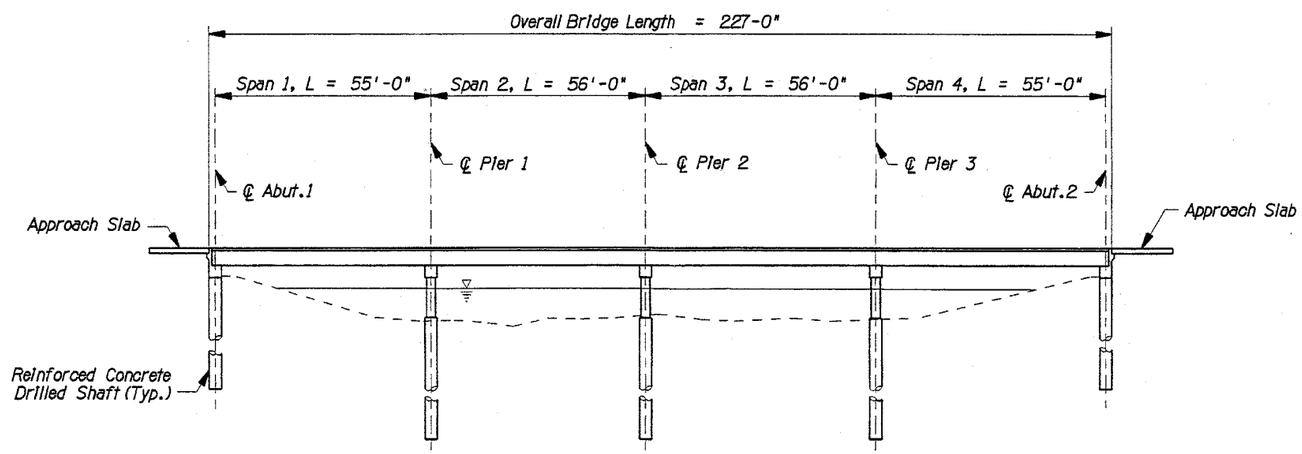
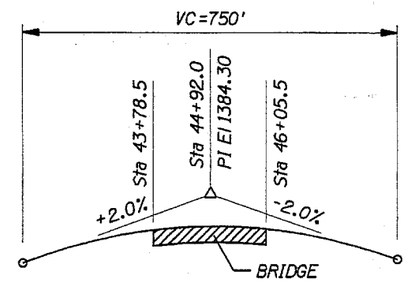


Plan
N.T.S.

New, 4 Span, AASHTO Type III Girder Bridge with Cast-In-Place Concrete Deck



Section at Construction Centerline
N.T.S.



Vertical Curve
N.T.S.

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/27/04

ALTERNATIVE NO. 4

SHEET 1 OF 2

TRACS NO.

English

Tuesday, AUG 24 2004 03:11 AM004
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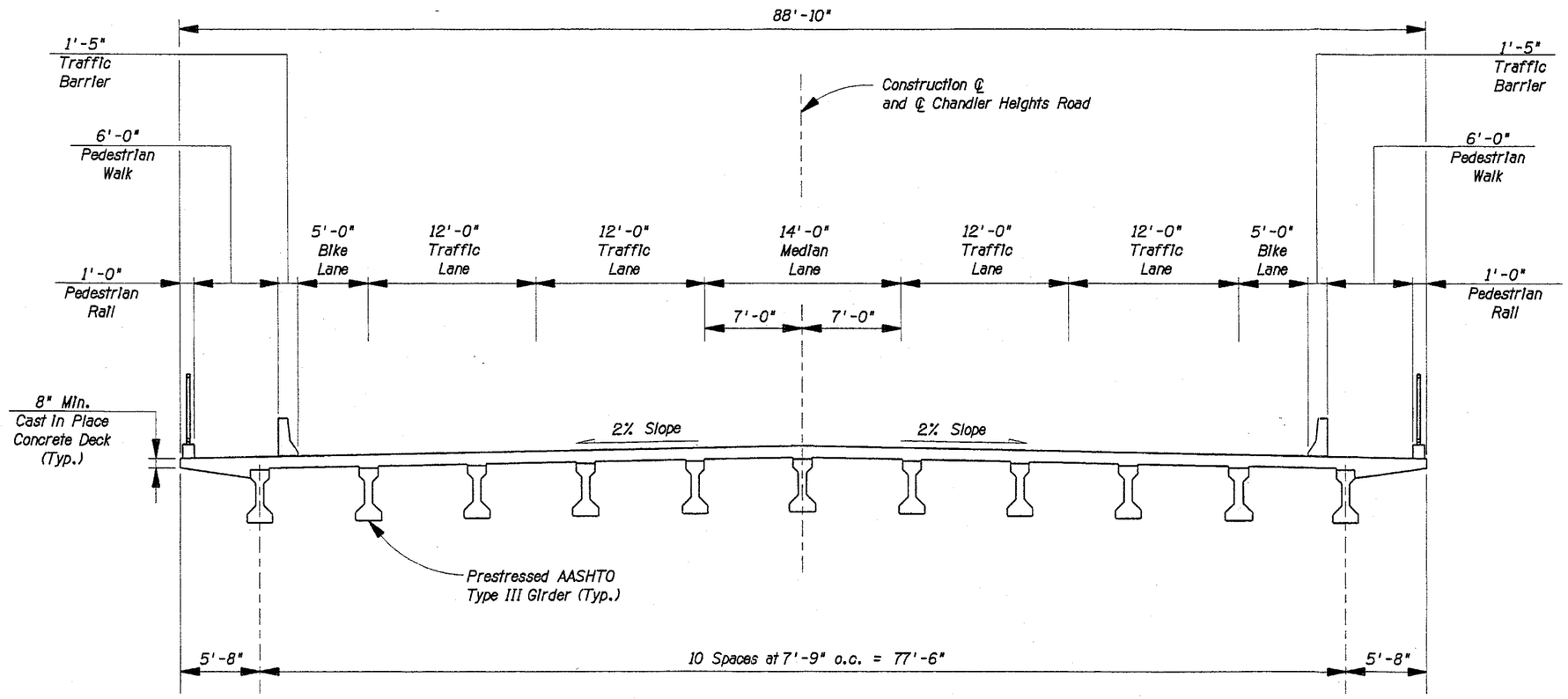
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	69026	1	1	



Typical Section Alt. No. 4

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	T. SONNEMANN	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/29/04

ALTERNATIVE NO. 4

SHEET 2 OF 2

TRACS NO.

English

Tuesday, AUGUST 03, 2004
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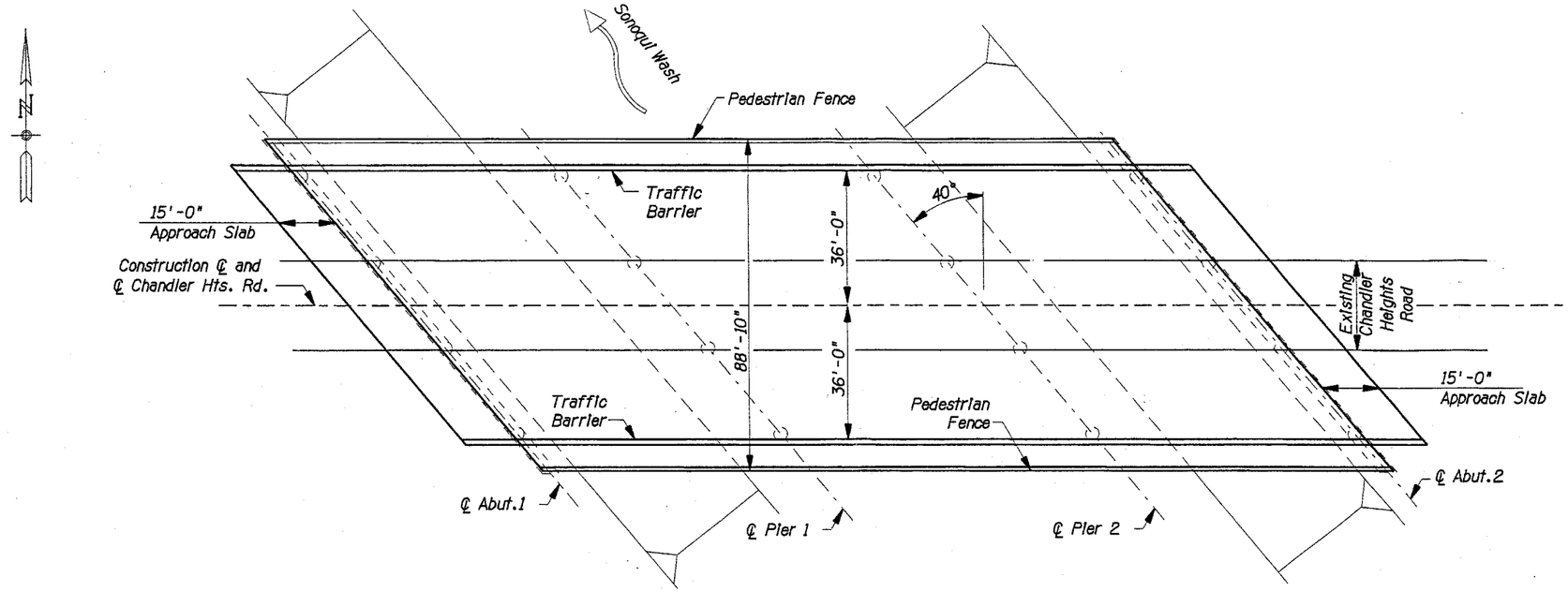
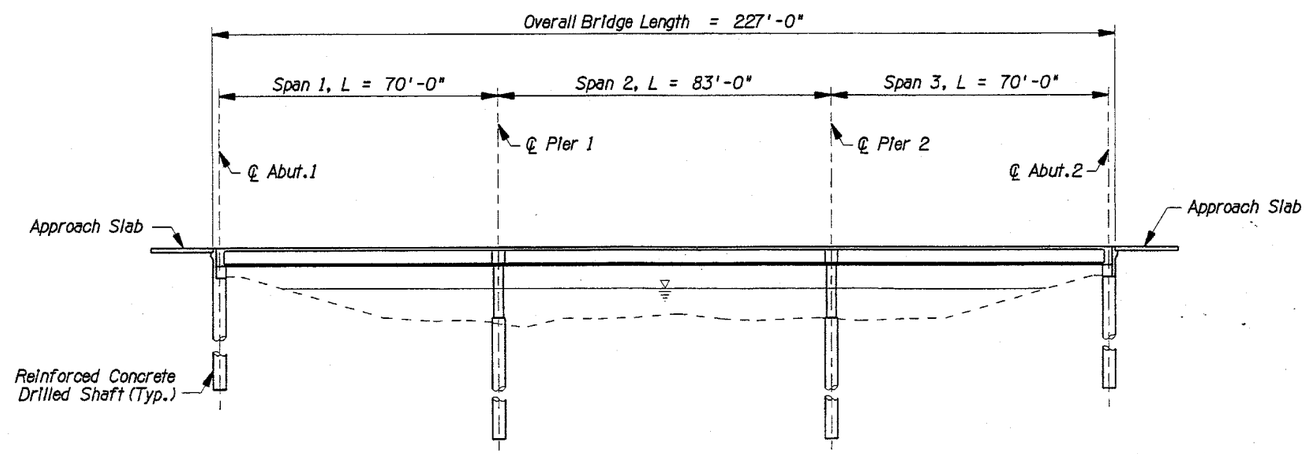
9	AZ.	69026	1	1	

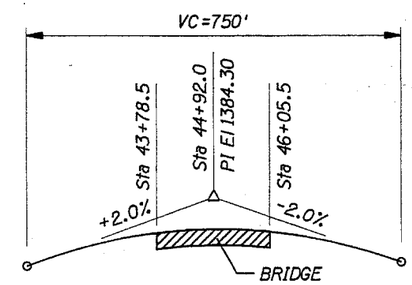


Plan
N.T.S.

New, 3 Span, Post Tensioned Concrete Box Girder Bridge



Section at Construction Centerline
N.T.S.



Vertical Curve
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	A. WOJAKIEWICZ	07/27/04
DRAWN	T. SONNEMANN	07/27/04
CHECKED	A. WOJAKIEWICZ	07/27/04

ALTERNATIVE NO. 5

SHEET 1 OF 2

TRACS NO.

English

Tuesday, Aug 27, 2013, 08:04
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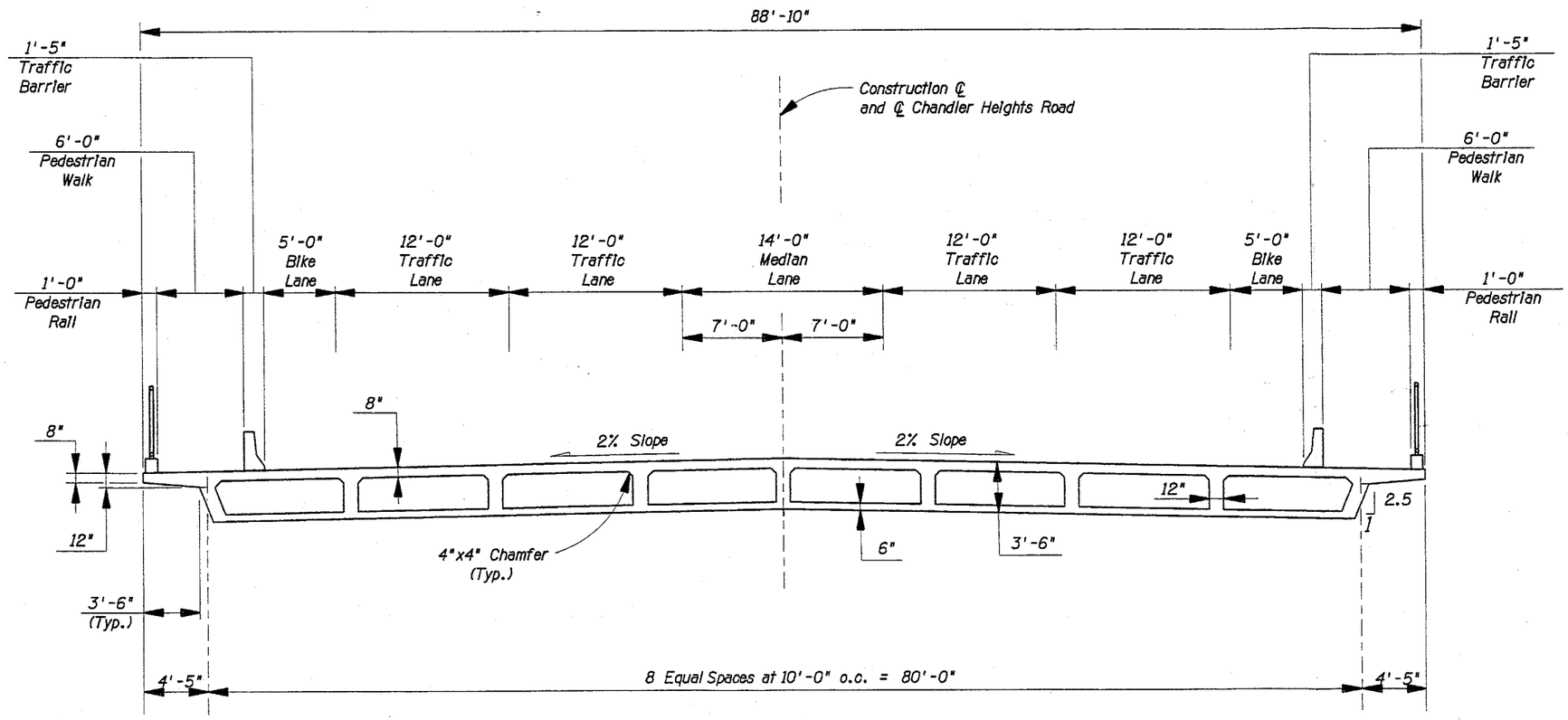
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	69026	1	1	



Typical Section Alt. No. 5

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

CHANDLER HEIGHTS ROAD BRIDGE
ACROSS SONOQUI WASH
PROJECT NO. 69026

PRELIMINARY NOT FOR CONSTRUCTION		BY	DATE
	DESIGNED	A. WOJAKIEWICZ	07/27/04
	DRAWN	T. SONNEMANN	07/27/04
	CHECKED	A. WOJAKIEWICZ	07/27/04
	ALTERNATIVE NO. 5		SHEET 2 OF 2

TRACS NO.

English

Tuesday, Aug 03, 2004
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APPENDIX- SECTION 10

PRELIMINARY CONSTRUCTION COST ESTIMATE BREAKDOWNS FOR THE FIVE BRIDGE ALTERNATIVES

CHANDLER HEIGHTS ROAD BRIDGE AT SONOQUI WASH

ALTERNATE 1 - 5 Span, Voided Slab

FINAL DESIGN CONCEPT REPORT ESTIMATE

DATE: 8/03/04

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST
107.01500	Community Relations	Allow	1	$ 15,000.00	$ 15,000.00
107.02000	N.P.D.E.S.	LS	1	$ 5,000.00	$ 5,000.00
107.02200	404 Permit Compliance	LS	1	$ 5,000.00	$ 5,000.00
109.09000	Mobilization/Demobilization	LS	1	$ 100,000.00	$ 100,000.00
111.01000	Type II Engineer's Field Office	LS	1	$ 15,000.00	$ 15,000.00
205.01150	Roadway Excavation	CY	972	$ 3.00	$ 2,916.00
211.01000	Fill Construction	CY	11,190	$ 2.50	$ 27,975.00
215.01100	Channel Excavation	CY	28,893	$ 3.50	$ 101,125.50
220.20000	Grouted Riprap	CY	3,504	$ 65.00	$ 227,760.00
301.01000	Subgrade Preparation	SY	25,282	$ 1.50	$ 37,923.00
310.03000	Aggregate Base Course	Tons	5,557	$ 10.00	$ 55,570.00
321.01200	Asphalt Concrete Pavement (12.5 mm Mix)	Tons	2,679	$ 45.00	$ 120,555.00
329.01000	Bituminous Tack Coat SS-1h, Diluted	Tons	0.80	$ 370.00	$ 296.00
340.01110	Vertical Curb & Gutter, MAG Det 220, Type A, h=6"	LF	180	$ 10.00	$ 1,800.00
345.01000	Adjust Frame & Cover to Grade, MAG Det 270	Ea	1	$ 250.00	$ 250.00
350.01000	Removal of Existing Improvements	LS	1	$ 10,000.00	$ 10,000.00
350.06000	Detour & Temporary Culvert Removal	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
401.04001	Portable Concrete Barrier	LF	600	$ 20.00	$ 12,000.00
415.03000	Thrie Beam Guardrail Transition, MCDOT Det 3012	Ea	3	$ 1,200.00	$ 3,600.00
416.02100	Guardrail Terminal (ET-2000 PLUS)	Ea	1	$ 2,000.00	$ 2,000.00
416.03000	Anchor Assembly, MCDOT Std Det 3007	Ea	2	$ 500.00	$ 1,000.00
502.01045	Drilled Shafts, 4.5' Dia.(Complete-I-P; w/ rebar)	LF	1,350	$ 140.00	$ 189,000.00
505.01100	Class AA Concrete	CY	988	$ 300.00	$ 296,400.00
505.01300	Class A Concrete	CY	144	$ 185.00	$ 26,640.00
505.01300	Reinforcing Steel	Lbs	267,579	$ 1.00	$ 267,579.00
505.04100	Bridge Deck Joint Assembly (Comp. Seal)	LF	294	$ 85.00	$ 24,990.00
505.05100	4' Bridge Deck Chain Link Fence	LF	454	$ 30.00	$ 13,620.00
505.05141	Concrete Bridge Barrier Transition, MCDOT Det	LF	80	$ 75.00	$ 6,000.00
505.05144	F-Shape Concrete Barrier, Top of Retaining Wall	LF	375	$ 45.00	$ 16,875.00
505.10120	Catch Basin, MAG Det 532, Type C	Ea	6	$ 1,000.00	$ 6,000.00
505.20000	Highway Retaining Wall	SF	1,969	$ 35.00	$ 68,915.00
506.06000	Elastomeric Bearing Pads	Ea	440	$ 200.00	$ 88,000.00
506.03000	Precast/Prestressed Concrete Voided Slabs	LF	4,994	$ 90.00	$ 449,460.00
523.12118	Headwall, MAG 501-1&2, "U" Type	Ea	4	$ 2,000.00	$ 8,000.00
618.20315	15" RGRCP, Class III	LF	320	$ 50.00	$ 16,000.00
618.20318	18" RGRCP, Class III	LF	120	$ 60.00	$ 7,200.00
622.01036	36" Temporary Pipe Culvert	LF	300	$ 90.00	$ 27,000.00
				TOTAL =	$ 2,296,449.50

CHANDLER HEIGHTS ROAD BRIDGE AT SONOQUI WASH

ALTERNATE 2 - 3 Span, AASHTO Type IV Girders

FINAL DESIGN CONCEPT REPORT ESTIMATE

DATE: 8/03/04

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST
107.01500	Community Relations	Allow	1	$ 15,000.00	$ 15,000.00
107.02000	N.P.D.E.S.	LS	1	$ 5,000.00	$ 5,000.00
107.02200	404 Permit Compliance	LS	1	$ 5,000.00	$ 5,000.00
109.09000	Mobilization/Demobilization	LS	1	$ 100,000.00	$ 100,000.00
111.01000	Type II Engineer's Field Office	LS	1	$ 15,000.00	$ 15,000.00
205.01150	Roadway Excavation	CY	714	$ 3.00	$ 2,142.00
211.01000	Fill Construction	CY	19,580	$ 2.50	$ 48,950.00
215.01100	Channel Excavation	CY	28,893	$ 3.50	$ 101,125.50
220.20000	Grouted Riprap	CY	3,504	$ 65.00	$ 227,760.00
301.01000	Subgrade Preparation	SY	26,204	$ 1.50	$ 39,306.00
310.03000	Aggregate Base Course	Tons	5,900	$ 10.00	$ 59,000.00
321.01200	Asphalt Concrete Pavement (12.5 mm Mix)	Tons	2,822	$ 45.00	$ 126,990.00
329.01000	Bituminous Tack Coat SS-1h, Diluted	Tons	0.93	$ 370.00	$ 344.10
340.01110	Vertical Curb & Gutter, MAG Det 220, Type A, h=6"	LF	180	$ 10.00	$ 1,800.00
345.01000	Adjust Frame & Cover to Grade, MAG Det 270	Ea	1	$ 250.00	$ 250.00
350.01000	Removal of Existing Improvements	LS	1	$ 10,000.00	$ 10,000.00
350.06000	Detour & Temporary Culvert Removal	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
401.04001	Portable Concrete Barrier	LF	600	$ 20.00	$ 12,000.00
415.03000	Thrie Beam Guardrail Transition, MCDOT Det 3012	Ea	3	$ 1,200.00	$ 3,600.00
416.02100	Guardrail Terminal (ET-2000 PLUS)	Ea	1	$ 2,000.00	$ 2,000.00
416.03000	Anchor Assembly, MCDOT Std Det 3007	Ea	2	$ 500.00	$ 1,000.00
502.01045	Drilled Shafts, 4.5' Dia.(Complete-I-P; w/ rebar)	LF	850	$ 140.00	$ 119,000.00
505.01100	Class AA Concrete	CY	1,137	$ 300.00	$ 341,100.00
505.01300	Class A Concrete	CY	144	$ 185.00	$ 26,640.00
505.01300	Reinforcing Steel	Lbs	247,971	$ 1.00	$ 247,971.00
505.03000	Restrainers, Vertical (Fixed)	Ea	24	$ 84.00	$ 2,016.00
505.03100	Restrainers, Vertical (Expansion))	Ea	24	$ 130.00	$ 3,120.00
505.04100	Bridge Deck Joint Assembly (Comp. Seal)	LF	188	$ 85.00	$ 15,980.00
505.05100	4' Bridge Deck Chain Link Fence	LF	454	$ 30.00	$ 13,620.00
505.05141	Concrete Bridge Barrier Transition, MCDOT Det	LF	80	$ 75.00	$ 6,000.00
505.05144	F-Shape Concrete Barrier for Top of Retaining Wall	LF	375	$ 45.00	$ 16,875.00
505.10120	Catch Basin, MAG Det 532, Type C	Ea	4	$ 1,000.00	$ 4,000.00
505.20000	Highway Retaining Wall	SF	3,188	$ 35.00	$ 111,580.00
506.01400	Precast/Prestressed Beams, ASSHTO Type IV	LF	2,475	$ 95.00	$ 235,125.00
506.06000	Elastomeric Bearing Pads	Ea	78	$ 200.00	$ 15,600.00
523.12118	Headwall, MAG 501-1&2, "U" Type	Ea	4	$ 2,000.00	$ 8,000.00
618.20315	15" RGRCP, Class III	LF	320	$ 50.00	$ 16,000.00
618.20318	18" RGRCP, Class III	LF	120	$ 60.00	$ 7,200.00
622.01036	36" Temporary Pipe Culvert	LF	300	$ 90.00	$ 27,000.00
				TOTAL =	$ 2,033,094.60

CHANDLER HEIGHTS ROAD BRIDGE AT SONOQUI WASH

ALTERNATE 3 - 4 Span, Cast-in-Place (C-I-P) Slab

FINAL DESIGN CONCEPT REPORT ESTIMATE

DATE: 8/03/04

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST
107.01500	Community Relations	Allow	1	$ 15,000.00	$ 15,000.00
107.02000	N.P.D.E.S.	LS	1	$ 5,000.00	$ 5,000.00
107.02200	404 Permit Compliance	LS	1	$ 5,000.00	$ 5,000.00
109.09000	Mobilization/Demobilization	LS	1	$ 100,000.00	$ 100,000.00
111.01000	Type II Engineer's Field Office	LS	1	$ 15,000.00	$ 15,000.00
205.01150	Roadway Excavation	CY	972	$ 3.00	$ 2,916.00
211.01000	Fill Construction	CY	11,190	$ 2.50	$ 27,975.00
215.01100	Channel Excavation	CY	28,893	$ 3.50	$ 101,125.50
220.20000	Grouted Riprap	CY	3,504	$ 65.00	$ 227,760.00
301.01000	Subgrade Preparation	SY	25,282	$ 1.50	$ 37,923.00
310.03000	Aggregate Base Course	Tons	5,557	$ 10.00	$ 55,570.00
321.01200	Asphalt Concrete Pavement (12.5 mm Mix)	Tons	2,679	$ 45.00	$ 120,555.00
329.01000	Bituminous Tack Coat SS-1h, Diluted	Tons	0.80	$ 370.00	$ 296.00
340.01110	Vertical Curb & Gutter, MAG Det 220, Type A, h=6"	LF	180	$ 10.00	$ 1,800.00
345.01000	Adjust Frame & Cover to Grade, MAG Det 270	Ea	1	$ 250.00	$ 250.00
350.01000	Removal of Existing Improvements	LS	1	$ 10,000.00	$ 10,000.00
350.06000	Detour & Temporary Culvert Removal	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
401.04001	Portable Concrete Barrier	LF	600	$ 20.00	$ 12,000.00
415.03000	Thrie Beam Guardrail Transition, MCDOT Det 3012	Ea	3	$ 1,200.00	$ 3,600.00
416.02100	Guardrail Terminal (ET-2000 PLUS)	Ea	1	$ 2,000.00	$ 2,000.00
416.03000	Anchor Assembly, MCDOT Std Det 3007	Ea	2	$ 500.00	$ 1,000.00
502.01045	Drilled Shafts, 4.5' Dia.(Complete-I-P; w/ rebar)	LF	1,100	$ 140.00	$ 154,000.00
505.01100	Class AA Concrete	CY	2,399	$ 300.00	$ 719,700.00
505.01300	Class A Concrete	CY	144	$ 185.00	$ 26,640.00
505.01300	Reinforcing Steel	Lbs	933,789	$ 1.00	$ 933,789.00
505.03100	Restrainers, Vertical (Expansion)	Ea	24	$ 130.00	$ 3,120.00
505.04100	Bridge Deck Joint Assembly (Comp. Seal)	LF	188	$ 85.00	$ 15,980.00
505.05100	4' Bridge Deck Chain Link Fence	LF	454	$ 30.00	$ 13,620.00
505.05141	Concrete Bridge Barrier Transition, MCDOT Det	LF	80	$ 75.00	$ 6,000.00
505.05144	F-Shape Concrete Barrier for Top of Retaining Wall	LF	375	$ 45.00	$ 16,875.00
505.10120	Catch Basin, MAG Det 532, Type C	Ea	6	$ 1,000.00	$ 6,000.00
505.20000	Highway Retaining Wall	SF	1,969	$ 35.00	$ 68,915.00
523.12118	Headwall, MAG 501-1&2, "U" Type	Ea	4	$ 2,000.00	$ 8,000.00
618.20315	15" RGRCP, Class III	LF	320	$ 50.00	$ 16,000.00
618.20318	18" RGRCP, Class III	LF	120	$ 60.00	$ 7,200.00
622.01036	36" Temporary Pipe Culvert	LF	300	$ 90.00	$ 27,000.00
				TOTAL =	$ 2,807,609.50

CHANDLER HEIGHTS ROAD BRIDGE AT SONOQUI WASH

ALTERNATE 4 - 4 Span, ASSHTO Type III Girders

FINAL DESIGN CONCEPT REPORT ESTIMATE

DATE: 8/03/04

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST
107.01500	Community Relations	Allow	1	$ 15,000.00	$ 15,000.00
107.02000	N.P.D.E.S.	LS	1	$ 5,000.00	$ 5,000.00
107.02200	404 Permit Compliance	LS	1	$ 5,000.00	$ 5,000.00
109.09000	Mobilization/Demobilization	LS	1	$ 100,000.00	$ 100,000.00
111.01000	Type II Engineer's Field Office	LS	1	$ 15,000.00	$ 15,000.00
205.01150	Roadway Excavation	CY	687	$ 3.00	$ 2,061.00
211.01000	Fill Construction	CY	16,861	$ 2.50	$ 42,152.50
215.01100	Channel Excavation	CY	28,893	$ 3.50	$ 101,125.50
220.20000	Grouted Riprap	CY	3,504	$ 65.00	$ 227,760.00
301.01000	Subgrade Preparation	SY	25,618	$ 1.50	$ 38,427.00
310.03000	Aggregate Base Course	Tons	5,682	$ 10.00	$ 56,820.00
321.01200	Asphalt Concrete Pavement (12.5 mm Mix)	Tons	2,731	$ 45.00	$ 122,895.00
329.01000	Bituminous Tack Coat SS-1h, Diluted	Tons	0.85	$ 370.00	$ 314.50
340.01110	Vertical Curb & Gutter, MAG Det 220, Type A, h=6"	LF	180	$ 10.00	$ 1,800.00
345.01000	Adjust Frame & Cover to Grade, MAG Det 270	Ea	1	$ 250.00	$ 250.00
350.01000	Removal of Existing Improvements	LS	1	$ 10,000.00	$ 10,000.00
350.06000	Detour & Temporary Culvert Removal	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
401.04001	Portable Concrete Barrier	LF	600	$ 20.00	$ 12,000.00
415.03000	Thrie Beam Guardrail Transition, MCDOT Det 3012	Ea	3	$ 1,200.00	$ 3,600.00
416.02100	Guardrail Terminal (ET-2000 PLUS)	Ea	1	$ 2,000.00	$ 2,000.00
416.03000	Anchor Assembly, MCDOT std Det 3007	Ea	2	$ 500.00	$ 1,000.00
502.01045	Drilled Shafts, 4.5' Dia.(Complete-I-P; w/ rebar)	LF	1,100	$ 140.00	$ 154,000.00
505.01100	Class AA Concrete	CY	1,235	$ 300.00	$ 370,500.00
505.01300	Class A Concrete	CY	144	$ 185.00	$ 26,640.00
505.01300	Reinforcing Steel	Lbs	263,515	$ 1.00	$ 263,515.00
505.03000	Restrainer, Vertical (Fixed)	Ea	36	$ 84.00	$ 3,024.00
505.03100	Restrainer, Vertical (Expansion)	Ea	24	$ 130.00	$ 3,120.00
505.04100	Bridge Deck Joint Assembly (Comp. Seal)	LF	188	$ 85.00	$ 15,980.00
505.05100	4' Bridge Deck Chain Link Fence	LF	454	$ 30.00	$ 13,620.00
505.05141	Concrete Bridge Barrier Transition, MCDOT Det	LF	80	$ 75.00	$ 6,000.00
505.05144	F-Shape Concrete Barrier for Top of Retaining Wall	LF	375	$ 45.00	$ 16,875.00
505.10120	Catch Basin, MAG Det 532, Type C	Ea	6	$ 1,000.00	$ 6,000.00
505.20000	Highway Retaining Wall	SF	2,813	$ 35.00	$ 98,455.00
506.01300	Precast/Prestressed Beams, ASSHTO Type III	LF	2,475	$ 90.00	$ 222,750.00
506.06000	Elastomeric Bearing Pads	Ea	104	$ 200.00	$ 20,800.00
523.12118	Headwall, MAG 501-1&2, "U" Type	Ea	4	$ 2,000.00	$ 8,000.00
618.20315	15" RGRCP, Class III	LF	320	$ 50.00	$ 16,000.00
618.20318	18" RGRCP, Class III	LF	120	$ 60.00	$ 7,200.00
622.01036	36" Temporary Pipe Culvert	LF	300	$ 90.00	$ 27,000.00
				TOTAL =	$ 2,081,684.50

CHANDLER HEIGHTS ROAD BRIDGE AT SONOQUI WASH

ALTERNATE 5 - 3 Span, C-I-P, Post-Tensioned Girder (Spans: 70'-83'-70')

FINAL DESIGN CONCEPT REPORT ESTIMATE DATE: 8/03/04

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST
107.01500	Community Relations	Allow	1	$ 15,000.00	$ 15,000.00
107.02000	N.P.D.E.S.	LS	1	$ 5,000.00	$ 5,000.00
107.02200	404 Permit Compliance	LS	1	$ 5,000.00	$ 5,000.00
109.09000	Mobilization/Demobilization	LS	1	$ 100,000.00	$ 100,000.00
111.01000	Type II Engineer's Field Office	LS	1	$ 15,000.00	$ 15,000.00
205.01150	Roadway Excavation	CY	703	$ 3.00	$ 2,109.00
211.01000	Fill Construction	CY	13,631	$ 2.50	$ 34,077.50
215.01100	Channel Excavation	CY	28,893	$ 3.50	$ 101,125.50
220.20000	Grouted Riprap	CY	3,504	$ 65.00	$ 227,760.00
301.01000	Subgrade Preparation	SY	25,138	$ 1.50	$ 37,707.00
310.03000	Aggregate Base Course	Tons	5,503	$ 10.00	$ 55,030.00
321.01200	Asphalt Concrete Pavement (12.5 mm Mix)	Tons	2,657	$ 45.00	$ 119,565.00
329.01000	Bituminous Tack Coat SS-1h, Diluted	Tons	0.78	$ 370.00	$ 288.60
340.01110	Vertical Curb & Gutter, MAG Det 220, Type A, h=6"	LF	180	$ 10.00	$ 1,800.00
345.01000	Adjust Frame & Cover to Grade, MAG Det 270	Ea	1	$ 250.00	$ 250.00
350.01000	Removal of Existing Improvements	LS	1	$ 10,000.00	$ 10,000.00
350.06000	Detour & Temporary Culvert Removal	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
401.01000	Portable Concrete Barrier	LF	600	$ 20.00	$ 12,000.00
415.03000	Thrie Beam Guardrail Transition, MCDOT Det 3012	Ea	3	$ 1,200.00	$ 3,600.00
416.02100	Guardrail Terminal (ET-2000 PLUS)	Ea	1	$ 2,000.00	$ 2,000.00
416.03000	Anchor Assembly, MCDOT Std Det 3007	Ea	2	$ 500.00	$ 1,000.00
502.01045	Drilled Shafts, 4.5' Dia.(Complete-I-P; w/ rebar)	LF	800	$ 140.00	$ 112,000.00
505.01300	Class A Concrete	CY	144	$ 185.00	$ 26,640.00
505.01300	Reinforcing Steel	Lbs	273,955	$ 1.00	$ 273,955.00
505.01531	Class S Concrete (f'c = 4500 psi)	CY	1,076	$ 325.00	$ 349,700.00
505.03100	Restrainer, Vertical (Expansion)	Ea	18	$ 130.00	$ 2,340.00
505.04100	Bridge Deck Joint Assembly (Comp. Seal)	LF	188	$ 85.00	$ 15,980.00
505.05100	4' Bridge Deck Chain Link Fence	LF	454	$ 30.00	$ 13,620.00
505.05141	Concrete Bridge Barrier Transition, MCDOT Det	LF	80	$ 75.00	$ 6,000.00
505.05144	F-Shape Concrete Barrier, Top of Retaining Wall	LF	375	$ 45.00	$ 16,875.00
505.10120	Catch Basin, MAG Det 532, Type C	Ea	6	$ 1,000.00	$ 6,000.00
505.20000	Highway Retaining Wall	SF	2,625	$ 35.00	$ 91,875.00
506.30000	Post-tensioning	Lbs	55,857	$ 2.20	$ 122,885.40
506.06000	Elastomeric Bearing Pads	Ea	18	$ 200.00	$ 3,600.00
523.12118	Headwall, MAG 501-1&2, "U" Type	Ea	4	$ 2,000.00	$ 8,000.00
618.20315	15" RGRCP, Class III	LF	320	$ 50.00	$ 16,000.00
618.20318	18" RGRCP, Class III	LF	120	$ 60.00	$ 7,200.00
622.01036	36" Temporary Pipe Culvert	LF	750	$ 90.00	$ 67,500.00
				TOTAL =	$ 1,928,483.00

APPENDIX- SECTION 11

SUMMARY OF PUBLIC MEETING

MCDOT *RightRoads* Program
Summary of Public Meeting

Chandler Heights Road at Sonoqui Wash

September 30, 2002
Design Concept

Final Report

Meeting Date: September 25, 5:00 p.m. - 7:00 p.m.

Meeting Site: Queen Creek Elementary School
23636 South 204th Street, Queen Creek

Participants: Andrzej Wojakiewicz, MCDOT Project Manager
Tom Sonnemann, MCDOT Bridge Division
Roberta Crowe, MCDOT Community and Government Relations
Mike Pavlina, MCDOT Community and Government Relations

Other Attendees:
Dick Schaner, Engineer, Town of Queen Creek
David Dobbs, Vice Mayor, Town of Queen Creek

Meeting Purpose: Public Involvement. The Maricopa County Department of Transportation (MCDOT) RightRoads program hosted this public meeting open house to gather public comment and input regarding proposed improvements to Chandler Heights Road at Sonoqui Wash.

PROJECT DESCRIPTION

This project is limited to a bridge selection report and Sonoqui Wash channel improvements within a distance of 650' upstream and 900' downstream of proposed bridge site. MCDOT is considering five different bridge types. Cost, constructabliity and community need (determining the type of structure that best meets the needs of the surrounding area and its residents) will be compared and evaluated. This project is currently funded for Design Concept only (preliminary stages of design). At this time, it is known that the proposed bridge must be at least 300' in length and the roadway elevation raised approximately 14' above the current channel bottom to accommodate an equestrian path under the bridge. To address the community's future traffic volume and be able to withstand a "100-year storm event", the bridge structure must be at least 89' wide to accommodate two travel lanes in each direction, a 14' wide median, and two 5' wide bike lanes and two 6' wide sidewalks.

Based upon information obtained to date, the approximate cost of this improvement is $3 million. A cost/benefit analysis will be performed to determine if project costs are in line with realized project benefits at this time. Project construction may be delayed until the traffic demand and motorist " inconvenience" (when the existing crossing is flooded and impassable) will justify the cost expenditure.

PURPOSE AND GOALS

- To expand the Candidate Assessment Report (CAR) completed in 1997 as requested by the Town of Queen Creek
- To identify and define bridge design criteria
- To obtain project-related public input from impacted residents To accurately assess project need
- To accurately identify project costs
- To help identify potential funding partners and determine level of partnership
- To identify Right-of-Way requirements
- To identify affected Utilities

ISSUES

- Bridge designed to accommodate a future "100-year storm event"
- Coordinate with Flood Control District of Maricopa County's (FCDMC) Sonoqui Hydraulic Master Plan that will increase the tributary area of Sonoqui Wash, resulting in an increased potential flow up to 4233 cubic feet of water per second
- Maintain connectivity of existing neighborhood trail system and incorporate equestrian design requirements to accommodate "under- bridge passage"
- Maintain existing driveways/access to homes
- Obtain required environmental clearances
- Utility relocation and coordination
- Right-of-Way Acquisition

PROJECT SCHEDULE

After the DCR is completed, MCDOT will re-evaluate the project to determine when the project should proceed to design and on to construction.

Public Comment

On September 25, 2002, approximately 20 people attended a public open house meeting at Queen Creek Elementary School to discuss, review and offer input regarding design concepts for potential improvements to Chandler Heights Road at Sonoqui Wash. Project maps and exhibits showing proposed improvements were displayed at the meeting and project team members were available to answer questions and elicit comments. The following information is a representative sampling of the respondents' comments and discussions that project team members had with the attendees during the meeting. Comment sheets were distributed to all those in attendance.

- Concerned that equestrians have access across wash under bridge.
- From what I can tell, that wash doesn't run but once every 50 years?
- Put a large pipe underneath the pavement and call it good.
- I think the bridge concept is over-kill.

- I live just south of the Sonoqui wash. I cannot find one person who has ever

heard of water running in the wash.

- I am in the construction field so know what a hundred year flood is about. It would make more sense to me as a taxpayer to put a three or four barrel concrete box culvert across the road. That way if the wash runs in the next fifteen years the water would be diverted through the boxes.
- Should the water run over the road in the event of a hundred year flood, the county could put up road closed barricades for a day thus saving me hundreds of thousands of dollars in tax money.
- I currently reside on Chandler Heights Rd. My family has lived in Queen Creek for six years. In this time I have never witnessed the road in question to flood, or be a problem in any way. I moved from Scottsdale to get away from traffic, riffraff, and the stress of the big City. I work throughout the valley and the small town atmosphere helps me to remain sane. If I wanted to live in Mesa, Gilbert or Chandler, then I would move to one of the homeowners associations and live happy ever after. As far as I am concerned, Queen Creek and the surrounding areas are expanding too rapidly. One question for you Sir, would you want the road in front of your house to go from a two-lane road to a five-lane road? (which would put the road in question on my driveway.) I will wait for your response, and see you on the 25th of this month.
- The information was very helpful and informative. Answered our questions and concerns about the equestrian use of the wash.
- I am very concerned about noise and privacy issues. My property backs up to the Sonoqui Wash. Headlights would shine into my yard and noise would be increased. Would like to see minimum amount of disruption.
- Good work on height and glad to hear 4 ft can be lowered. Any movement to lessen impact to neighbors.
- Must coordinate with trails for Town.
- Want to make sure clearance to accommodate equestrian trail. Make sure noise is addressed to adjacent residence as well as lights. Should not make long time adjacent residents unhappy to live where they do.
- Concerns about noise, lights and privacy. Request sound barriers to match height of tallest trucks across and beyond both sides of the bridge. Request the height of the bridge be as close to the level of the current road. Please provide specific height.

For more information contact Andrzej Wojakiewicz, MCDOT Project Manager at 602/506-8626 or Roberta Crowe, MCDOT RightRoads Program manager, 602/506-8003.