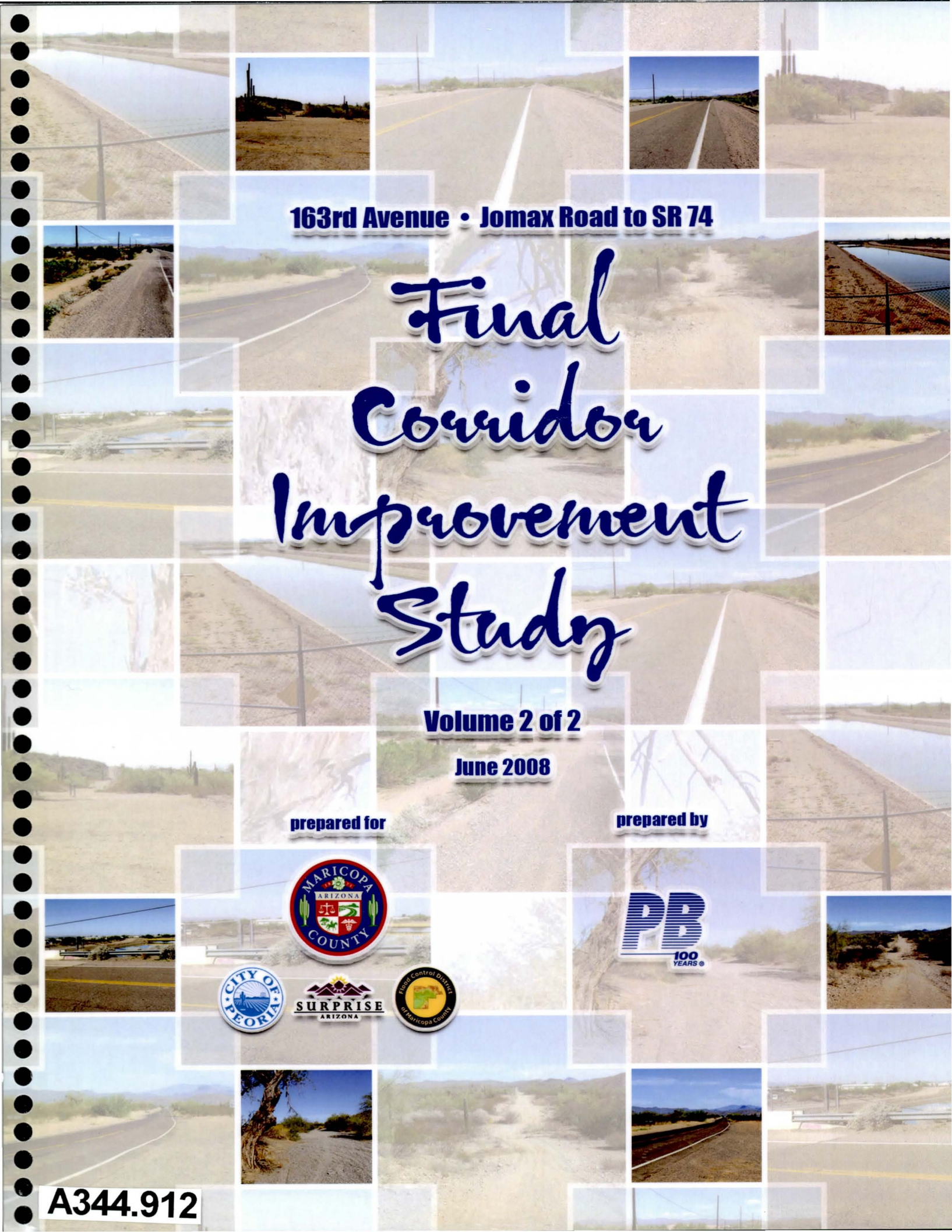

163rd Avenue • Jomax Road to SR 74

Final Corridor Improvement Study

Volume 2 of 2

June 2008

prepared for

MARICOPA COUNTY ARIZONA

CITY OF PEORIA

SURPRISE ARIZONA

Flood Control District of Maricopa County

prepared by

PB 100 YEARS

A344.912

Appendix A

Technical Memorandum No. 1

Traffic Analysis

Appendix A

Technical Memorandum No. 1

Traffic Analysis

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The findings of this memorandum will be used to assess the feasibility of the corridor alignments and determine the impacts associated with the recommended project improvements.

2.0 Existing Conditions

Development within the study area is minimal, although the southerly portion, between Jomax and Dove Valley Roads, is bounded by roadways along the section lines and criss-crossed by several small local roadways. This section summarizes the existing roadway conditions, traffic volumes, and recent accident history of the area.

2.1 Existing Roadway Configuration

The existing roadway condition along 163rd Ave between Jomax Rd and Dove Valley Rd is summarized in Table 1. The alignment of the roadway does not currently continue north of Dove Valley Rd.

Table 1: Existing 163rd Avenue Lane Configurations

INTERSECTION	CLASSIFICATION	TYPE	TRAFFIC CONTROL	APPROACH LANES			
				N	S	E	W
Jomax Rd	Major	"+"	Two-Way Stop	1	1	1	1
Dale Ln	Minor	"+"	Two-Way Stop	1	1	1	Unpaved
Peak View Rd	Minor	"+"	Two-Way Stop	1	1	1	Unpaved
Duane Ln	Minor	"T"	One-Way Stop	1	1	Unpaved	-
Dixileta Dr	Major	"+"	Two-Way Stop	1	1	Unpaved	1
Windstone Tr	Minor	"T"	One-Way Stop	1	1	-	Unpaved
Montgomery Rd	Major	"T"	One-Way Stop	1	1	-	Unpaved
White Wing Rd	Minor	"T"	One-Way Stop	1	1	-	Unpaved
Quail Run Rd	Minor	"T"	One-Way Stop	1	1	-	Unpaved
Dove Valley Rd	Major	"L"	None	-	1	-	Unpaved

The roadways are one lane in each direction with no signalized intersections. Traffic control is limited to one-way or two-way stops with stop signs. Several of the minor roadways have an unpaved leg of the intersection leading to residential development.

2.2 Traffic Volumes

Given the anticipated dramatic changes within the corridor, existing traffic volumes are irrelevant indicators of future conditions. Table 2 shows the existing traffic volumes in the area. All other facilities carry only nominal volumes.

3.0 Future Conditions

3.1 Socioeconomic Summary

Two models were utilized for interim and ultimate design of the 163rd Avenue corridor. The first, the Northwest Valley Corridor Study (NWVCS), was projected to the year 2030 and was used for the interim condition. The second, the I-10 Hassayampa Valley Transportation Framework Study, is considered build-out for the region with no associated year, although it is projected to reach build-out beyond the 2030 time frame. The I-10 Hassayampa Valley Transportation Framework Study has identified the Arizona Parkway system to be developed to meet the regional travel demand need. Approximately 82 miles of the identified regional parkway system is within the City of Surprise, four miles of which consist of the 163rd Avenue corridor in this study as well as two intersecting parkways, Lone Mountain Road and Jomax Road.

Based on a comparison to an area of the East Valley[1], this updated Northwest Area model most likely underestimates future employment in the region. Table 4 shows build-out conditions in the Northwest Valley study area and a comparison with an established area of the East Valley. Most trips generated travel outside the Northwest Valley study area for employment. As the area grows and the general plans are updated, the employment areas will most likely shift so that a more balanced housing/employment ratio occurs in the Northwest Valley study area.

Table 4: Socioeconomic Data Comparison

Analysis Area	Gross Acres	Net Acres	Population	Dwelling Units (DU)	DU/Net Acre	Employment (EMP)	EMP/DU
Northwest Valley Corridor Studies Model Influence Area (Buildout)	492,426	375,236	1,887,000	748,000	2.00	494,000	0.65
East Valley (2030)	248,000	239,000	1,512,000	552,000	2.31	899,000	1.63

Source: MAG buildout population and employment estimates for the Northwest Valley Corridor Studies Model Influence Area, September 2006; MAG 2030 population and employment estimates, July 2003 for the East Valley area.
Prepared by: Wilson & Company, November 2006

3.2 Modeling Techniques

A subregional travel demand model, NWVCS model, was created based on the MAG Regional model for use by three concurrent MCDOT studies in the Northwest Valley Corridor Studies Model Influence Area. The NWVCS 2030 travel demand model for the region was developed using the MAG 2030 model as a base, updated using housing and

[1] "Briefing Paper No. 1 Buildout Socioeconomic Data Forecast Development and Planning Level Traffic Analysis of Future Base Network", Patton Road & Jomax Rd Access Control/Area Corridor Study, Wilson & Company, February 2007

Along 163rd Avenue, current land use designations suggest access will be primarily for residential development in the near term. This affords a number of options for ensuring both good traffic flow and good land use access using signalization. Intersection operations will benefit from a signalization program that offers flexibility and minimizes interference from cross traffic and side activities. A number of options exist that will be evaluated in this context: 1) standard intersection and signal design with turn lanes and multiple phase signal cycles, 2) indirect left turns that streamline signal operation, 3) frontage road systems to distribute traffic from major roadways in to neighborhoods or business centers.

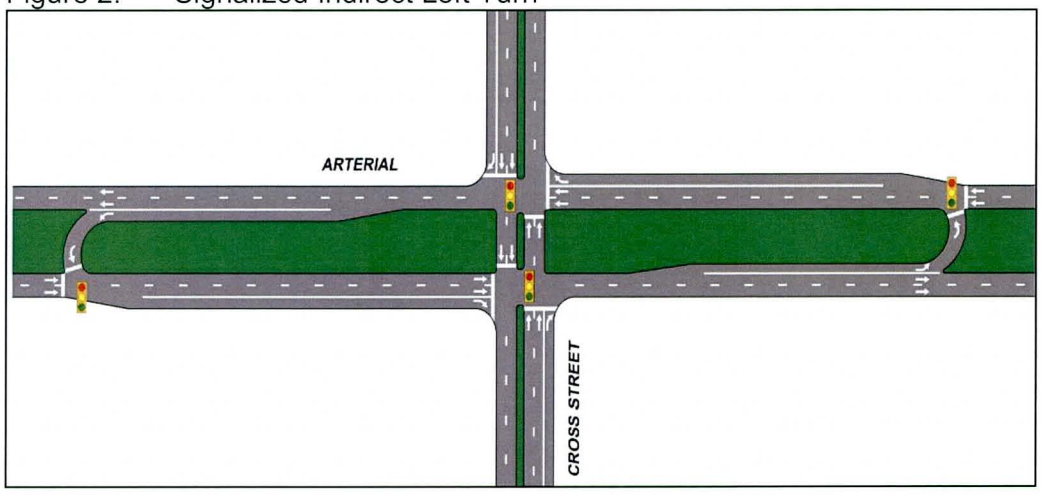
3.1.1.1 Standard Intersection and Traffic Signal Design

For the likely conditions along 163rd Avenue, one half mile spacing of traffic signals will allow good traffic movement and substantial green time bandwidth for speeds of about 40 to 45 miles per hour, but such a plan places the primary emphasis on traffic movement. These intersections offer a clear ability to address transit and pedestrian needs though sometimes at the expense of automobile traffic movement.

3.1.1.2 Indirect Lefts

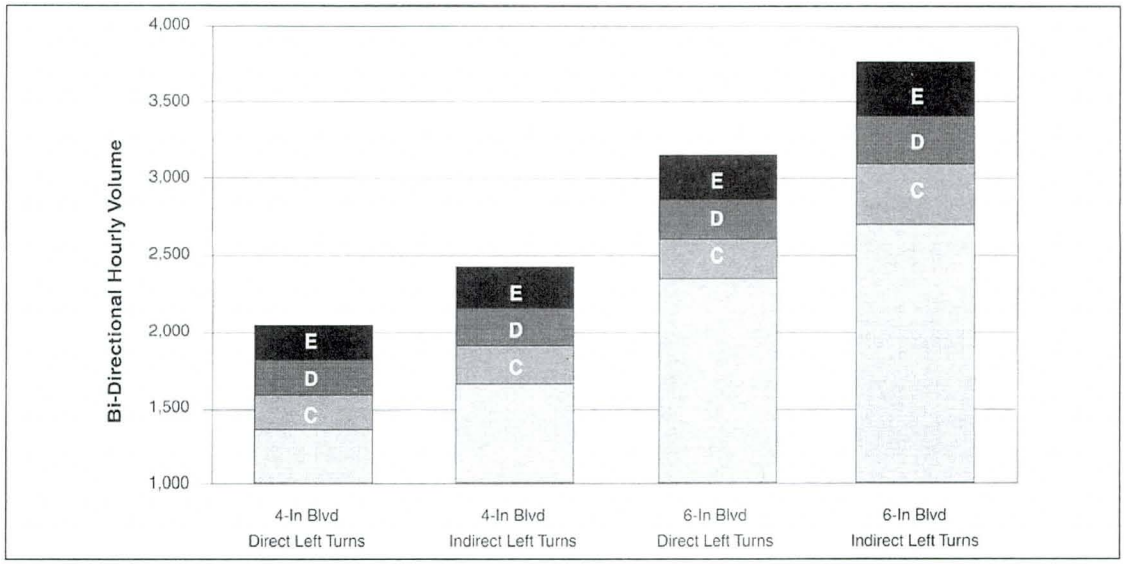
Indirect left turns, commonly used in Michigan, replace the left turn at an intersection by a u-turn beyond the intersection and then a right turn onto the cross-street, as shown in Figure 2. These types of maneuvers can be the appropriate traffic control tool depending on traffic conditions in a corridor. This is an unusual design in the west, but the conditions on 163rd Avenue may offer an opportunity to use it in a way that provides an improvement in roadway capacity over time. Because of its unusual nature, the concept is developed more completely in this technical memorandum.

Figure 2: Signalized Indirect Left Turn



Right-of-Way

The indirect left turn must occur on a divided roadway. A significant median, at least 60' wide, is necessary to accommodate the u-turn movement. This width is adequate for



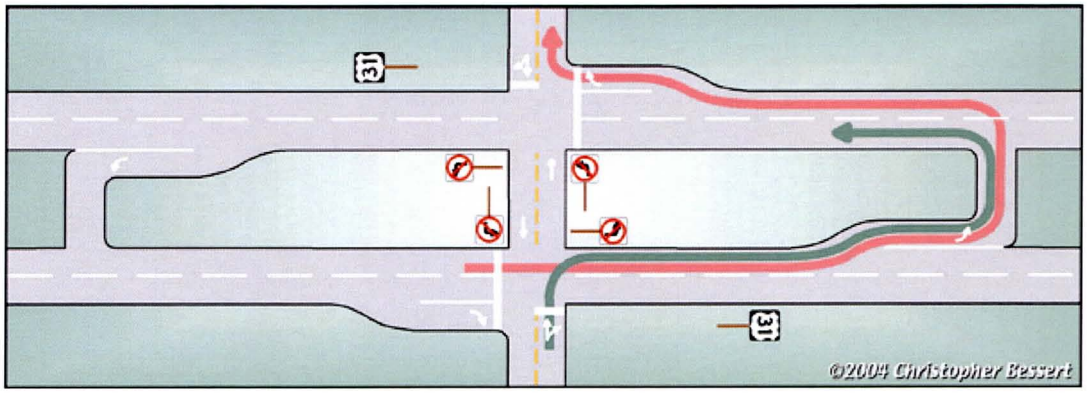
Source: Directional Crossovers: Michigan's Preferred Left Turn Strategy, MDOT

Accident Mitigation/Prevention
The Indirect Left Turn is a common accident mitigation measure at intersections suffering from a high number of left-turn accidents, since it removes the left-turn movement from the intersection.

Signalization
The traffic signal at the main intersection becomes a two-phase signal. In corridors where a series of these signals are used, as recommended, traffic progression is improved. In areas with high volumes of u-turns (< 400vph) a signal is recommended at the turn-around. This signal is short in length and does not negatively affect the signal progression of the corridor.

Driveway Access
Driveways are discouraged within 150' of the u-turn area, although a distance of 250' from the u-turn is preferred. If a driveway is needed within 150' it is acceptable to instead align the driveway with the u-turn. Figure 5 shows an aerial view of an parkway corridor with indirect left turns and commercial development with driveway access.

Figure 5: Aerial of Indirect Left Turn Corridor, 12-Mile Rd and US-24, Detroit, MI



Implementation

- On Main Roadway
  - Main roadway is divided
  - Left turns at intersection are prohibited
  - U-turn bay approximately 600 feet from intersection (no more than 1/4 mile)
  - Left-turn traffic queues in median lane
  - Ideally, no driveways
- On Minor Roadway
  - Left turns on minor cross-street must turn right and make u-turn through median
- When two parkways intersect
  - Depending on traffic volumes, the u-turn movement may occur on one or both of the parkways.

Comparison of Standard Left vs. Indirect Left

Table 5 provides a brief summary comparison of standard and indirect left turn key characteristics.

Table 5: Standard vs. Indirect Left Turn

Standard Left	Indirect Left
• 6,000vph thru volume	• 9,000 vph thru volume
• Median 16-24 feet	• Median 60+ feet
• Multi-phase signals	• 2-phase signals
• Capacity: 45-55K vpd	• Capacity: 65-85K vpd
	• U-turn signal at 400 vph
• Narrow right-of-way	• Wide right-of-way

3.4 Future Volumes

Using the NWVCS model, as described in sections 3.1 and 3.2, predicted traffic volumes were generated in this study corridor area for the build-out condition (per current adopted General Plans). These traffic volumes are shown in Figure 7 and summarized in Tables 6 and 7.

Table 6: Daily Traffic Volumes per NW Area Model, North-South

Roadway	Two-Way Daily Volume
163rd Ave- SR 74 to Black Mountain Rd	40,400
163rd Ave- Black Mountain Rd to Dove Valley Rd	40,000
163rd Ave- Dove Valley Rd to Lone Mountain Rd	26,700
163rd Ave- Lone Mountain Rd to Dixileta Dr	19,600
163rd Ave- Dixileta Dr to Dynamite Rd	22,300
163rd- Dynamite Rd to Jomax Rd	13,000

Table 7: Daily Traffic Volumes per NW Area Model, East-West

Roadway	Two-Way Daily Volume
SR 74- west of 163rd Ave	137,400
SR 74- east of 163rd Ave	132,900
Black Mountain Rd	20,600
Dove Valley Rd- west of 163rd Ave	20,800
Dove Valley Rd- east of 163rd Ave	26,600
Lone Mountain Rd- west of 163rd Ave	37,600
Lone Mountain Rd- west of 163rd Ave	42,900
Dixileta Dr- west of 163rd Ave	21,600
Dixileta Dr- east of 163rd Ave	26,900
Dynamite Rd- west of 163rd Ave	22,300
Dynamite Rd- east of 163rd Ave	26,900
Jomax Rd- west of 163rd Ave	39,800
Jomax Rd- east of 163rd Ave	40,400

- **Level of Service E** represents operating conditions at or near the capacity level. All speed is reduced to a low but relatively uniform value
- **Level of Service F** is used to define forced or stop and go travel. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse that point.

In this study, an acceptable level of service (LOS) was considered to be level of service D. Tables 10 and 11 show the capacity at LOS D, the predicted volume, and if the roadway will be over or under capacity.

Appendix B

Technical Memorandum No. 2

Environmental Overview

Appendix B

Technical Memorandum No. 2

Environmental Overview

Final

Technical Memorandum No. 2
Environmental Overview

163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd CIS
Dove Valley Rd to SR 74 DCR

October 2007

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1.0 Introduction

This technical memorandum documents the results of the initial environmental review of conditions associated with the 163rd Avenue – Jomax Road to SR 74 Corridor Improvement Study and Design Concept Report. The information provides the basis for future evaluation of potential environmental impacts that may be associated with roadway improvement alternatives.

1.1 Purpose of Environmental Overview

The purpose of the Environmental Overview is to generally describe the social, economic, and environmental character of the area in the vicinity of the 163rd Avenue Improvement Project. This description can then be used to identify any "fatal flaws" and associated issues that pertain to the project and to assist in the evaluation of alternatives for future roadway improvements. This general description of environmental conditions is not intended to meet the requirements of the National Environmental Policy Act (NEPA). Additional environmental study and documentation will be required at future stages of project development.

1.2 Study Area

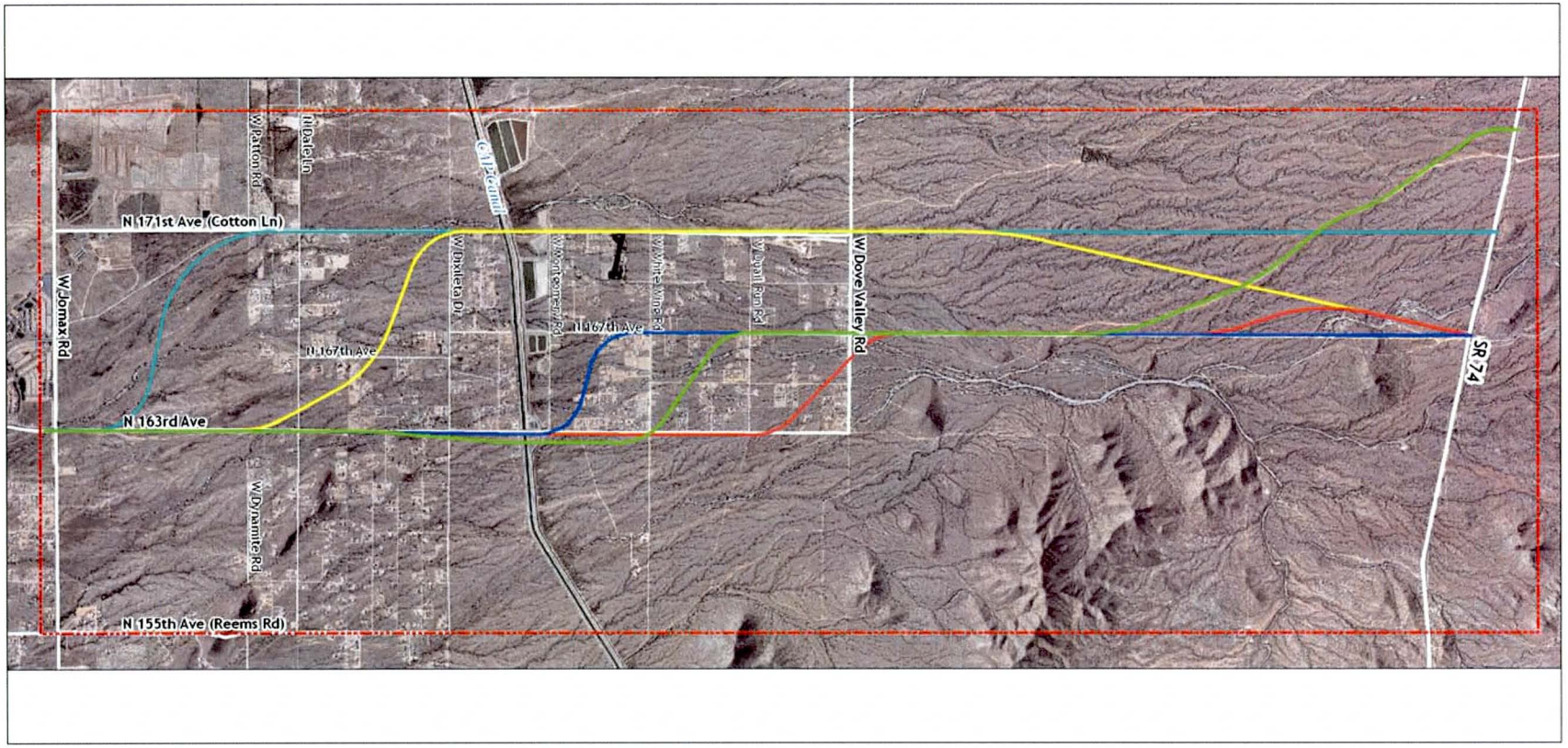
The study area for the Environmental Overview is bounded on the south by Jomax Road and on the north by State Route 74. The area extends one mile east of 163rd Avenue to the 155th Avenue alignment. The western boundary is one and one-half miles west of 163rd Avenue. The limits of the study area are illustrated on Figure 1. As shown on Figure 1, the study corridor passes through the jurisdictions of the City of Peoria, the City of Surprise, and Maricopa County.

2.0 Physical and Natural Environment

2.1 General Physiography/Topography

The project area is located within the Basin and Range physiographic province, which is characterized by northwest-southeast trending mountain ranges divided by broad alluvial valleys. Topography is defined primarily by the Hieroglyphic Mountains to the north and northeast and by slopes from the low hills in the north to the generally flat areas south of Dove Valley Road. The profile rises from approximately 1,425 feet elevation near Jomax Road to 1,840 feet elevation near SR 74.

The majority of the project area geology is young alluvium from the numerous small alluvial fans originating in the foothills of the Hieroglyphic Mountains. Padelford Wash runs north-south from near SR 74 to the Central Arizona Project (CAP) canal north of Dixileta Drive.



163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 1
Study Area

Legend

Study Area

Preliminary Corridor Alignments

- 1A *West*
- 2D *CAR*
- 3B *East*
- 4C *Marisol*
- 7C *171st Ave*

0 0.25 0.5 1 Miles

Note. This map is provided by Parsons Brinckerhoff (PB) solely for display and reference purposes and is subject to change without notice. No claims, either real or assumed, as to the absolute accuracy or precision of any data contained herein are made by PB, nor will PB be held responsible for any use of this document for purposes other than which it has been intended.

2.2 Biological Resources

2.2.1 Vegetative Communities

The study area is within the Arizona upland subdivision of the Sonoran desertscrub biotic community, with elements of the Lower Colorado River subdivision near the southern extent. The southern portion of the project area (south of Dove Valley Road) is characterized primarily by creosotebush *(Larrea tridentata)* with triangleleaf bursage (*Ambrosia deltoidea*) and scattered desertbroom *(Baccharis sarothroides)*.

The density and diversity of plant species increase northward from Dove Valley Road. The predominant plant community transitions to the Arizona upland subdivision community. In this portion of the project area, yellow paloverde (*Parkinsonia microphylla*), and buckhorn cholla (*Cylindropuntia acanthocarpa*) become predominant, with compass barrel cactus *(Ferocactus wislizenii)*, teddy bear cholla *(Cylindropuntia bigelovii)*, and prickly pear (*Opuntia* spp.). Scattered saguaro *(Carnegia gigantea)* and ocotillo *(Fouquieria splendens)* also occur in this area.

Several small washes and dirt two-track trails dissect the project area. Padelford Wash runs through the study area from north of SR 74 to near Dove Valley Road, where it widens into an alluvial fan. In these areas, ironwood *(Olneya tesota)* and canyon ragweed *(Ambrosia ambrosioides)* occur primarily with yellow paloverde.

2.2.2 Species Identification

The United States Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AGFD) species lists for Maricopa County were reviewed by a qualified biologist to determine species that may be present in the study area. Only one state sensitive species, the Sonoran desert tortoise (Gopherus agassazii) has the potential to occur within the project vicinity. No federally listed species have the potential to occur within the project vicinity.

Species included in the USFWS and/or AGFD lists but excluded from further evaluation are addressed in Table 1. This project will have no effect on or impacts to the species listed in Table 1.

Table 1 Species Excluded from Evaluation

Species	Status	Habitat Requirements	Exclusion Justification
Arizona cliffrose *(Purshia subintegra)*	E	Characteristic white soils of tertiary limestone lakebed deposits; Tonto and Verde Basins. Elevation: <4,000 ft. amsl (Arizona Game and Fish Department [AGFD] 2001a).	Suitable soils do not exist within the project area. No Arizona cliffrose was documented during a general survey of the project area. The nearest known population occurs in the vicinity of Horseshoe Reservoir, approximately 45 miles to the east (USFWS 1995).
Bald eagle *(Haliaeetus leucocephalus)*	T	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey. Elevation: Variable.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east (Jacobson et al. 2005).

Table 1 Species Excluded from Evaluation (Continued)

Species	Status	Habitat Requirements	Exclusion Justification
California brown pelican *(Pelecanus occidentales californicus)*	E	In coastal areas; on rocky shores and cliffs, in sloughs, and coastal river deltas. Occasionally occur on inland lakes and rivers in Arizona. Elevation: Variable.	Suitable habitat does not exist within the project area. Species is a transient within Arizona; no occurrence records are known from the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Chiricahua leopard frog *(Rana chiricahuensis)*	T	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs. Elevation: 3,300-8,900 ft amsl.	Suitable habitat does not exist within the project area; project area is below species' elevation range. The nearest potential habitat occurs along the Verde River, more than 50 miles northeast of the project area.
Desert pupfish *(Cyprinodon macularius)*	E	Shallow springs, small streams, and marshes. Tolerates saline and warm water. Elevation: <5,000 ft. amsl.	Suitable habitat does not exist within the project area. No natural populations remain in Arizona. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Gila chub *(Gila intermedia)*	E	Pools, springs, cienegas and streams. Elevation: 2,000-3,500 ft. amsl.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Gila topminnow *(Poeciliopsis occidentalis occidentalis)*	E	Small streams, springs, and cienegas, vegetated shallows. Elevation: <4,500 ft. amsl.	Suitable habitat does not exist within the project area; all remaining natural populations occur in the Gila River basin. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Lesser long-nosed bat *(Leptonycteris curasoae yerbabuenae)*	E	Desertscrub habitat with agave and columnar cacti (e.g., saguaro) present as food plants. Elevation: <6,000 ft.	Species is a seasonal (summer) resident in Arizona. The nearest potential roost sites occur in the Hieroglyphic Mountains, north of SR 74, and within 1 mile of the project area to the east. However, no potential or known roost sites are known from the project vicinity; the nearest known roost site is located in southwestern Pinal county (USFWS 1994). Although this species is unlikely to occur within the project area, the protection and avoidance of columnar cacti (e.g., saguaro) wherever possible is recommended to minimize potential impacts to the lesser long-nosed bat and its habitat.
Mexican spotted owl (MSO) *(Strix occidentalis lucida)*	T	Nests in canyons and dense forests with multi-layered foliage structure. Prefers older mixed-conifer or pine-oak forests with cool microclimates. Elevation: 4,100–9,000 ft. amsl.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs in the Bradshaw Mountains, more than 20 miles to the north.
Razorback sucker *(Xyrauchen texanus)*	E	Riverine and lacustrine areas, generally not in fast moving water. May use backwaters. Elevation: <6,000 ft amsl.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.

Table 1 Species Excluded from Evaluation (Continued)

Species	Status	Habitat Requirements	Exclusion Justification
Sonoran pronghorn *(Antilocapra americana sonoriensis)*	E	Broad intermountain alluvial valleys with creosote-bursage and paloverde-mixed cacti associations. Prefers bajadas for fawning areas and sandy dune areas for seasonal foraging. Elevation: 2,000-4,000 ft amsl.	Although creosotebush-bursage habitat exists in the project area, the species' known range is more than 60 miles southwest of the project area. No pronghorn have been documented north of Interstate 8 since 1990 (USFWS 1998).
Southwestern willow flycatcher *(Empidonax traillii extimus)*	E	Cottonwood/willow and tamarisk vegetation communities along rivers and streams. Elevation: <8,500 ft amsl.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Yellow-billed cuckoo *(Coccyzus americanus)*	C	Large blocks of riparian woodlands (cottonwood, willow or tamarisk galleries). Elevation: <6,500 ft amsl.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.
Yuma clapper rail *(Rallus longirostris yumanensis)*	E	Fresh water and brackish marshes. Elevation: <4,500 ft.	Suitable habitat does not exist within the project area. The nearest potential habitat occurs along the Agua Fria River and at Lake Pleasant, less than 10 miles to the east.

Key:
E = Federally listed as Endangered under the Endangered Species Act (ESA)
T = Federally listed as Threatened under the ESA
C = Federally listed as Candidate under the ESA

2.2.3 Species Evaluation - Sonoran Desert Tortoise (Gopherus agassizii)

Life History Information

The genus *Gopherus* is comprised of four species that occur throughout the southern United States and Mexico. The desert tortoise (*G. agassizii*) is a resident of southwestern low deserts, mainly the Mojave and Sonoran deserts. It occurs from southeastern California, southern Nevada, extreme southwestern Utah, western Arizona, southward through Sonora and into northern Sinaloa, Mexico. In the United States, tortoises west and north of the Colorado River are considered a distinct population (Mojave Population). Tortoises east and south of the Colorado River are included in the Sonoran Population. These two populations are not distinct taxa, although they differ genetically and morphologically and are treated separately under the Endangered Species Act (ESA).

The desert tortoise inhabits well-drained sandy loam soils in plains, alluvial fans and bajadas, although they occasionally occur in dunes, edges of basaltic flow and other rock outcrops, and in well-drained and vegetated alkali flat. However, since the hot, dry, low valleys of the lower Sonoran Desert typically have annual precipitation of less than two inches, tortoises may be less likely to occur in these flats. Sonoran desert tortoises are found predominantly on rocky slopes and in bajadas within the Sonoran desertscrub biotic community, particularly in caliche cut banks of washes.

The Mojave Population of desert tortoises was listed under the ESA in April 1990 as a threatened species. The Mojave Population has most likely declined in many locations due to direct loss of individuals and habitat degradation and fragmentation. Individual losses were associated with collection for pets, poaching, vehicular impacts, military activities, livestock trampling, disease, and increased predation by ravens. Urban sprawl and livestock grazing are considered the main causes of tortoise habitat loss. However, in a similar petition to list the Sonoran Population of the desert tortoise, the USFWS determined that the Sonoran Population was relatively stable and did not warrant listing under the ESA. Any tortoises occurring in the project area would belong to the Sonoran Population.

Survey History

Current survey data is not available for this species. Occurrence data is taken primarily from the AGFD HDMS Website. According to the AGFD, numerous records for the Sonoran desert tortoise exist within the project vicinity.

Habitat Evaluation and Suitability

Potential habitat for the Sonoran desert tortoise occurs throughout the Hieroglyphic Mountains and surrounding foothills. The majority of habitat within the project area is only marginally suitable for desert tortoises. Tortoises may utilize well-vegetated plains and alluvial fans, particularly during high-activity periods such as the monsoon season. South of Dove Valley Road, creosote-bursage habitat is interspersed with paved roads, dirt residential roads, and residential development. However, Padelford Wash provides an alluvial fan for potential use by desert tortoises. In addition, the portion of the project area north of Dove Valley Road becomes relatively more hilly and dissected by more washes than the portion south of Dove Valley Road. These hills and washes may provide shelter sites for tortoise burrows. The majority of potential habitat within the study area occurs in this location.

Project actions may result in disturbance to potential habitat for Sonoran desert tortoises. Therefore, mitigation measures should be implemented in order to alleviate any potential impacts to Sonoran desert tortoises occurring in the project area. Mitigation measures are outlined in Section 6.

Analysis and Determination of Effects

In summary, the following situations exist with regard to this species in the study area:

a) Occurrence records for Sonoran desert tortoises exist within the project vicinity;
b) Potential habitat for Sonoran desert tortoises exist within the project area;
c) Project activities will result in ground-disturbing activities;
d) Mitigation measures will be required.

Therefore, this project may impact Sonoran desert tortoise individuals, but is not likely to result in a trend toward federal listing or loss of viability.

2.2.4 State Sensitive Species

As part of the NEPA scoping process, a letter describing the project was sent to the AGFD to inform them of the project and to solicit comments. Specifically, the letter requested any specific

concerns, suggestions or recommendations the agency may have related to the project as well as a list of sensitive species that may occur within the project area.

The following sensitive species were identified by AGFD as occurring within the project vicinity:

- Bat Colony (unspecified species);
- Sonoran desert tortoise *(Gopherus agassizii)*;
- California leaf-nosed bat *(Macrotus californicus)*.

Impacts to the Sonoran desert tortoise are discussed in Sections 2.2.3. Suitable roost sites for the bat colony and California leaf-nosed bat do not occur within the project area. Although bat species may forage within the project area, they are more likely to utilize the hills and washes within the Hieroglyphic Mountains; therefore, this project will have no impacts on those species.

2.2.5 Protected Native Plants

The project area was surveyed for the presence of protected native plants. The following protected plant species were found within the project area: ironwood *(Olneya tesota),* mesquite (*Prosopis* spp.), yellow paloverde (*Parkinsonia microphylla*), buckhorn cholla (*Cylindropuntia [Opuntia] acanthocarpa*), compass barrel cactus *(Ferocactus wislizenii)*, teddy bear cholla *(C. bigelovii)*, prickly pear (*Opuntia* spp.), saguaro *(Carnegia gigantea)*. Protected native plants within the project limits may be impacted by construction activities. Therefore, the Arizona Department of Agriculture should be notified at least 60 days prior to the start of construction to afford commercial salvagers the opportunity to remove and salvage these plants.

2.3 Water Resources

2.3.1 Drainage

The study area is comprised of desert rangeland with scattered buildings that for the most part have not altered historical drainage patterns. Padelford Wash is the most significant natural drainage feature of the area, traversing it in a north-south direction. Several other washes follow the general direction of Padelford Wash. The CAP Canal and its protection levees cut across the study area, intersecting all drainage ways.

The main channel of Padelford Wash is well defined and incised from its origin north of SR 74 to a point approximately 0.25 miles north of the Dove Valley Road alignment, where it opens onto an alluvial fan. The floodplain of the alluvial fan is about one mile wide at the intersection with the CAP Canal, continuing its expansion to the south. Flood Insurance Study Reports and sections of the Wittmann Area Drainage Master Study address the hydrologic characteristics of the wash and delineate its floodplain.

The protection levees on the north side of the CAP Canal intercept flows from the Padelford Wash alluvial fan and other drainage ways into a flood pool that extends approximately 500 to 1,000 feet to the north. Overchutes spaced along the length of the levees serve as outfall structures that allow flows from the flood pool to cross over the CAP Canal and discharge into downstream channels to the south.

The CAP Canal structures and a box culvert at the intersection of 163rd Avenue and Jomax Road are the only significant man-made drainage features in the study area. Existing roads south of Dove Valley Road have rolling alignments that allow free passage of storm flows. Flooding of the roadways occurs during rainfall events. The area between Dove Valley Road and SR 74 is mostly undisturbed.

2.3.2 Waters of the United States

Section 404 of the Clean Water Act establishes a permit program for activities that will discharge dredged or fill material into "waters of the United States". Such waters include the following: (1) waters, lakes, rivers, and streams that are navigable waters of the United States, including adjacent wetlands; (2) tributaries to navigable water of the United States, including adjacent wetlands; and (3) other waters, such as isolated wetlands and intermittent streams, the degradation of which could affect interstate commerce. The delineation of waters of the United States is the responsibility of the U.S. Army Corps of Engineers.

Most natural channels in the study area may be considered to fit the criteria for designation as jurisdictional waters of the United States and would therefore be regulated by the U.S. Army Corps of Engineers. In recent times, streams that are tributaries to waterways of regional significance, such as the Agua Fria River, have been given jurisdictional waters designation. Construction of roadway improvements within the delineated jurisdictional waters will require permits issued by the Corps.

2.4 Floodplains

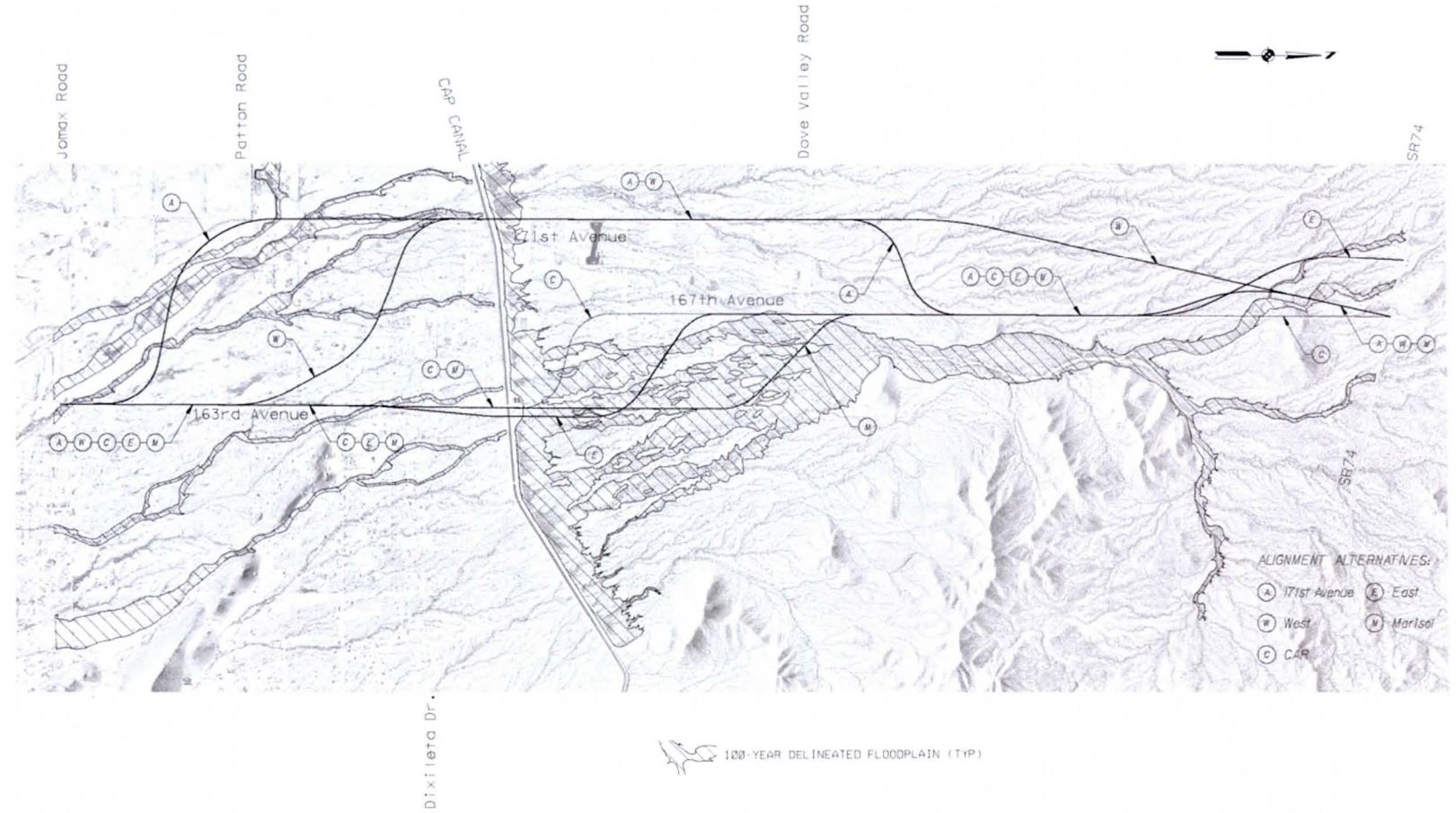
The 100-year floodplains have been delineated in the study area for Padelford Wash and are shown on Figure 2. Base flood elevation lines have been developed for the inactive alluvial fan. All alternative alignments conflict in varying degrees with delineated 100-year floodplains, especially those crossing the CAP canal near the existing 163rd Avenue alignment.

2.5 Air Quality

This project is located in the Phoenix Metropolitan Non-Attainment Area, which means that air quality in the region does not meet National Ambient Air Quality Standards (NAAQS) for ozone (O_3) and particulates (PM_{10}).

The proposed project will add lanes to the existing road and construct a new road in parts of the study area where no road presently exits. Through travel lanes of greater than one-half mile in length will be added. Therefore the project will require conformity analysis by the Maricopa Association of Governments to ensure that the additional roadway does not cause or contribute to new violations of the air quality standards, and conforms to the existing air quality improvement plans.

Roadway construction activities may result in some deterioration of the existing air quality on a temporary basis. Such impacts are expected to be localized and temporary. Dust generated by construction activities will be controlled in accordance with County Air Pollution Regulations and as stipulated in the required County Earthmoving Permit.



163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 2
Major Waterways and Floodplains

Source: Federal Emergency Management Agency

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2.6 Noise

Sound from highway traffic is generated primarily from a vehicle's tires, engine, and exhaust. It is commonly measured in decibels and is expressed as "dB." Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear. Therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dBA.". Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

MCDOT adopted a Noise Abatement Policy in April 2001 to set guidelines to determine the need, feasibility, and reasonableness of noise abatement measures for all roadway projects. The noise abatement criteria are shown in Table 2.

Table 2: Noise Abatement Criteria

Activity Category	dBA Leq	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (exterior)	Developed lands, properties or activities not included in categories A or B above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.
Note: Primary consideration is given to exterior areas (Category A, B or C) where frequent human activity occurs. However, interior areas (Category E) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.		

Activity categories B, C, and D exist within the study area. The portion of the study area north of Dove Valley Road is currently undeveloped. Scattered residential areas exist in the southern portion of the study area between Jomax Road and Dove Valley Road. These residences represent the existence of sensitive noise receptors. As the area develops, the creation of additional receptors is expected. The potential noise impacts that would be created by the proposed roadway will need to be evaluated.

If it is likely that the predicted noise levels will eventually approach or exceed the noise abatement criterion, or cause a substantial increase over the existing traffic noise level, MCDOT will evaluate the impacted properties for possible abatement. Noise abatement measures must be reasonable and feasible. Feasibility deals primarily with engineering considerations (e.g., whether a barrier can be built given the topography of the location; whether a substantial noise reduction can be achieved given certain access, drainage, safety, or maintenance requirements; whether other noise sources are present in the area). The reasonableness of any noise abatement

measure will be discussed with the affected property owners and mutual agreement is required for construction of a barrier.

2.7 Hazardous Materials

A preliminary investigation was conducted by Archaeological Consulting Services, Ltd. (ACS) to identify sites in the project area that may contain hazardous wastes and substances. This investigation consisted of a review of available federal and state environmental databases and the performance of site visit to confirm information from the databases and to note additional field observations.

The database review did not identify the presence of any hazardous materials. The site visit observed wildcat dumping of household wastes at various locations along the 167th Avenue alignment between Dove Valley Road and State Route 74.

No hazardous materials concerns were identified other than the household waste dumping. ACS concluded that no further investigation of hazardous materials is required at this time. Once the project design is completed, concrete structures that will be affected by the project construction will require asbestos and/or lead-based paint sampling. If suspected hazardous materials are encountered during project work, activities should cease and the project engineer notified so that arrangements can be made to properly assess the material.

2.8 Prime and Unique Farmland

The Farmland Protection Act of 1981 (FPPA) requires the identification and consideration of adverse effects on the preservation of farmland. Identification is made of farmland that is prime, unique, or of statewide or local importance.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, without intolerable soil erosion, as determined by the Secretary of Agriculture.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce high quality or high yields of specific crops.

Farmland that is of statewide or local importance is land in addition to prime or unique farmland that is important to the production of important crops. Designation of this farmland is made by state or local agencies.

Land in the study area consists of scattered residential developments and vacant land. Therefore, impacts on prime or unique farmland or other farmland of statewide or local importance are not expected to be created by the proposed project.

2.9 Section 4(f) Resources

Section 4(f) of the U.S. Department of Transportation Act states that FHWA "may approve a transportation program or project requiring publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if there is no prudent or feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife refuge, or historic site resulting from the use." (49 U.S.C 303)

The "use" of a Section 4(f) resource, as defined by 23 CFR 771.135(p), occurs when (1) land is permanently incorporated into a transportation facility; (2) there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes; or (3) there is a constructive use of the land. A constructive use of a Section 4(f) resource occurs when the transportation project results in an indirect impact to Section 4(f) resources. In such cases, the project does not physically incorporate the resource but is close enough to severely impact associated activities.

The Central Arizona Project (CAP) Trail is a Section 4(f) property. This recreational trail is planned on the unfenced strip of land, approximately 20 feet wide, between the CAP canal security fence and the canal property boundary line. The general trail location is on the downhill side of the canal. Multiple recreation uses of the trail are planned. These uses include walking, jogging, equestrian use, bicycling, and in-line skating if paved. This facility was designated as a National Recreation Trail by the Secretary of the Interior on June 3, 2003.

This property will require the completion of a Section 4(f) evaluation in accordance with NEPA and the procedures specified by the Department of Interior.

3.0 Socioeconomic Environment

3.1 Land Jurisdiction and Ownership

The 163rd Avenue corridor is located in an area of projected change and development within Maricopa County. It lies in the northwest portion of the Phoenix urban area. The area was once completely within the jurisdiction of Maricopa County. Subsequent annexations have brought part of the area into the cities of Peoria and Surprise. The two cities have also identified planning areas that extend beyond their corporate limits. Figure 3 illustrates the jurisdictional areas.

Land ownership is a combination of private land, State Trust land administered by the Arizona State Land Department, federal land administered by the U.S. Bureau of Land Management, and the right-of-way for the Central Arizona Project (CAP) canal, which is administered by the U.S. Bureau of Reclamation. The ownership patterns are illustrated on Figure 4.

The approximate percentages of the ownership categories are:

- Private - 50.2%
- State Trust - 43.1%
- Bureau of Land Management - 4.3%
- Bureau of Reclamation - 2.4%

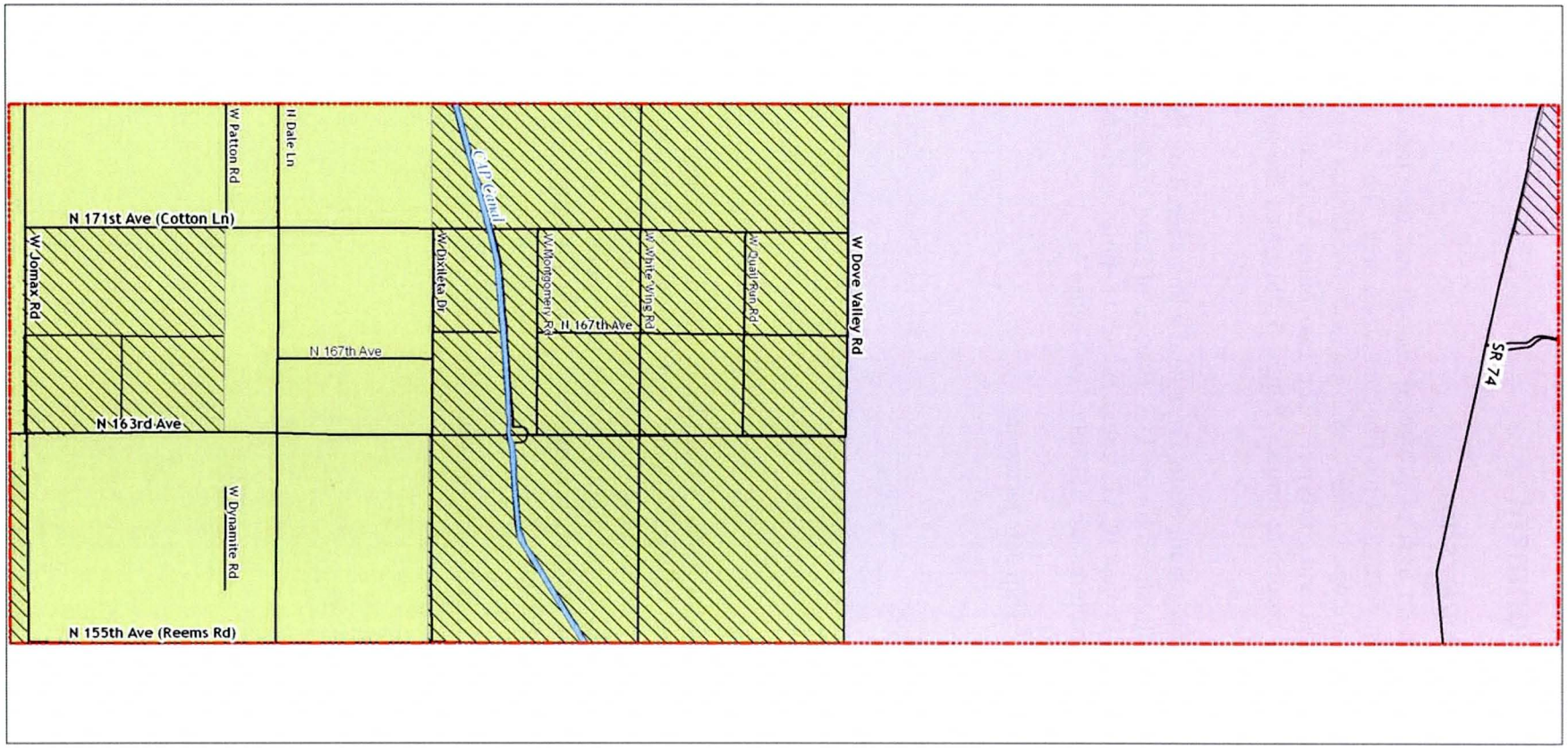
3.2 Land Use

3.2.1 Existing Land Use

The major portion of the study area is undeveloped vacant land. No development exists in the northern portion of the area between Dove Valley Road and State Route 74. Limited residential development has occurred in the southern portion between Jomax Road and Dove Valley Road. This development consists of rural/estate single family homes interspersed with vacant land. Other uses, which comprise small areas, include commercial, public facilities, and the CAP canal. Existing land uses are illustrated on Figure 5.

The approximate percentages of existing land uses in the study area are:

- Vacant – 80.9%
- Residential – 18.5%
- Other – 0.6%



163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 3
Existing Jurisdictions

Legend

- Study Area

Jurisdiction

- Surprise
- County/Surprise Planning Area
- Peoria
- County/Peoria Planning Area

0 0.25 0.5 1 Miles

Sources: City of Surprise, City of Peoria, and Maricopa Association of Governments

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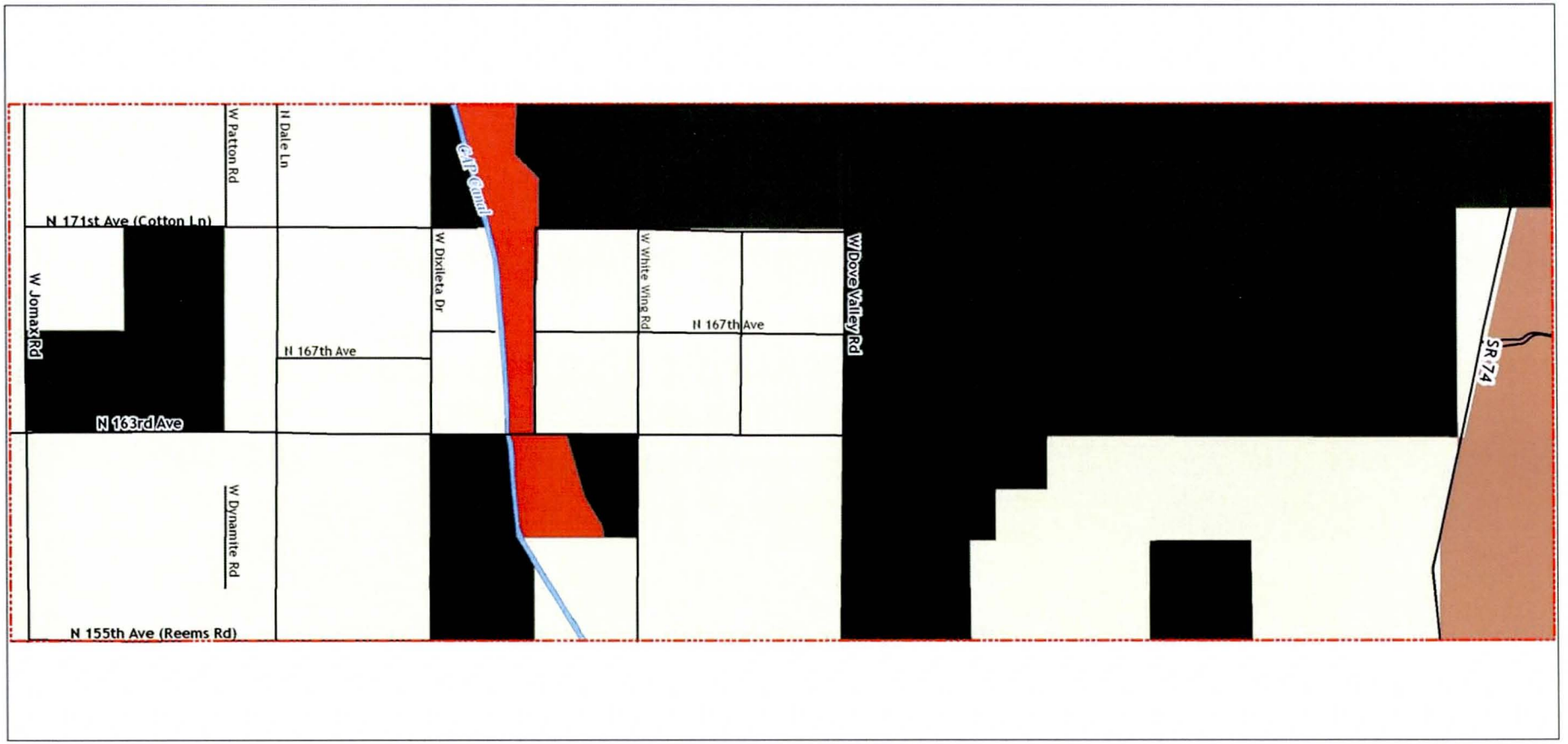

163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 4
Land Ownership

Land Ownership

- State Trust Land
- Bureau of Land Management
- Bureau of Reclamation
- Private

0 0.25 0.5 1 Miles

Source: Arizona State Land Department, Arizona Land Resources Information System (ALRIS), 2005

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163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 5
Existing Land Uses

Land Uses

- Residential
- Commercial
- Agriculture
- Public/Quasi-Public
- Vacant
- Water

0 0.25 0.5 1 Miles

Source: Maricopa Association of Governments

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3.2.2 *Planned Future Land Use/Planned Developments*

The cities of Surprise and Peoria have approved General Plans that identify the planned land uses within their respective planning areas. These planning areas are illustrated on Figure 3.

The City of Surprise planning area occupies the southern portion of the study area between Jomax Road and Dove Valley Road. The Surprise General Plan specifies the following land use categories.

Commercial (C): Denotes retail areas larger than 25 acres. These sites are typically considered community or regional commercial and may include major tenants and smaller stores or services.

Low Density Residential (LDR): Intended for predominantly single-family detached residential development with densities of up to five dwelling units per acre (gross). Provides for a mix of single-family, duplexes, townhouses, and low rise apartments would also be suitable. May also include such supporting land uses as neighborhood shops and services, parks and recreation areas, religious institutions, and schools.

Open Space (OS): Denotes areas that are to be precluded from development except for public recreational facilities or nature preserves.

The City of Peoria planning area occupies the northern portion of the study area between Dove Valley Road and SR 74.. The Peoria General Plan specifies the following land use categories.

Rural Residential (RR): Intended for predominantly large-lot single-family housing in a rural setting. Provides for homes on one acre lots (gross) or larger, ranging up to ten acres in more remote, unincorporated areas in the county.

Suburban Residential (1-3 DU/AC): Intended for large-lot, single-family housing. Density ranges from one to three dwelling units per acre.

Approximate percentages of the planned land uses in the Surprise portion of the study area are:

- Commercial – 1.15%
- Low Density Residential – 54.4%
- Open Space – 0.36%
- Rural Residential – 28.76%
- Suburban Residential – 15.33%

The City of Peoria planning area occupies the northern portion of the study area between Dove Valley Road and SR 74. The Peoria General Plan specifies the following land use categories.

Business Park/Industrial: Denotes areas where major employment centers and uses may take place. Provides for professional offices, research and development, wholesale and storage warehouses, utility centers, the manufacturing, processing, repairing and packaging of goods and ancillary eating and retail establishments.

Community Commercial: Denotes areas where intense commercial development may take place in the form of large-scale retail buildings and shopping centers having less than 500,000 square feet total indoor commercial shopping or office space.

Mixed Use: Denotes areas where developments combining a mix of land use types (residential, commercial, employment and business park) integrated with both active and passive open spaces may take place.

Park/Open Space: Denotes areas that are to be precluded from development except for open space and recreational facilities. Provides for areas in a relatively natural state (or be restored to such) due to topographic or other natural conditions.

Public/Quasi-public: Denotes a use that is owned or operated by a governmental, nonprofit, religious, or philanthropic institution and provides governmental, educational, cultural, recreation, religious, or similar services.

Residential/Estate (0-2 du/ac), Target density=1 du/ac: Denotes areas where large-lot single-family residential development is desirable. Provides for sufficient open space and lots that create an open environment.

Residential/Low (2-5 du/ac), Target density=3 du/ac: Denotes areas where detached moderate-sized lot, single-family residential development is desirable. Provides for areas of increased density while maintaining a detached single family residential character.

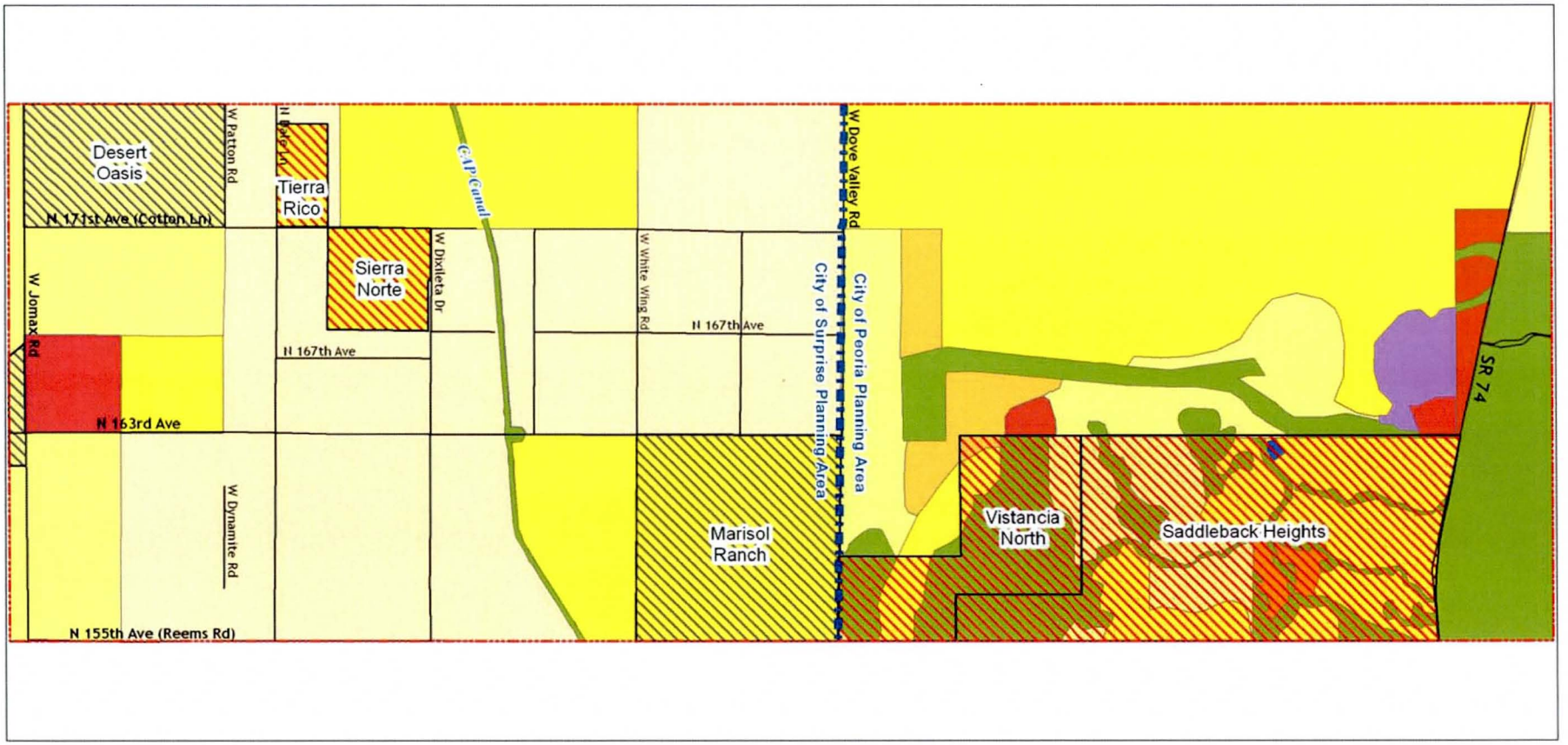
Residential/Medium (5-8 du/ac), Target density=6 du/ac: Denotes areas where single family detached and attached residential homes are desirable. Provides for areas suitable for single family, townhome, patio home and multi-family type units.

Residential/Medium High (8-15 du/ac), Target density=12 du/ac: Denotes areas where multi-family residential development is appropriate. Provides for areas of attached single-family homes, apartments, condominiums and townhouses.

Approximate percentages of the planned land uses in the Peoria portion of the study area are:

- Business Park/Industrial – 2.18%
- Community Commercial – 0.96%
- Mixed Use – 1.74%
- Public/Open Space – 14.79%
- Public/Quasi-Public – 0.07%
- Residential/Estate – 19.00%
- Residential/Low – 56.14%
- Residential/Medium – 4.07%
- Residential/Medium High – 1.05%

Planned land use for the two cities is shown on Figure 6



163rd Ave CIS & DCR
Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 6
Future Land Use and Major Developments

General Plan Land Use

Surprise Land Use	Peoria Land Use	
Rural Residential	Residential/Estate	Major Development (Approved)
Low Density Residential	Residential/Low	Major Development (Not Approved)
Suburban Residential	Residential/Medium	Study Area
Commercial	Residential/Medium High	Planning Area
Open Space	Mixed Use	
	Business Park/Industrial	
	Community Commercial	
	Park/Open Space	
	Public/Quasi-Public	

0 0.25 0.5 1 Miles

Source: City of Peoria; City of Surprise

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3.2.3 Zoning

The zoning ordinances of the City of Surprise, the City of Peoria, and Maricopa County designate zoning in the study area. The zoning categories that are present in the study area for each jurisdiction are described below.

Surprise Zoning Categories

Planned Area Development (PAD): Intended to encourage innovations in residential, commercial and industrial development that create greater opportunities for better housing, recreation, shopping and employment. May include any development having one or more principal uses or structures on a single parcel of ground or contiguous parcels.

R1-43: Provides for the development of single-family detached dwellings and directly related complementary uses at a very low density. Intended to be strictly residential in character with a minimum of disturbances due to traffic or overcrowding.

Peoria Zoning Categories

General Agricultural District (AG): This district serves two purposes. It is intended to comprise lands devoted to agriculture related activities and other open field uses, and is intended to constitute a 'holding' district to retain land in less intensive use until the time is appropriate for more intensive development. Provides for agricultural uses; general uses, which include guest ranches, veterinary clinics, or single-family dwellings; public and quasi-public uses, which include water pumping plants and storage tanks, places of worship, public recreational uses, and golf courses; group homes; and public/charter and private schools.

Planned Community District (PCD): The district accommodates large-scale development and offers an alternative development process while conforming to the policies and programs contained within the Peoria General Plan. Provides for residential, commercial professional, industrial or other activities, including combinations of uses.

SR-43: Suburban Ranch District: The principal purpose of this zoning is to provide for and conserve existing rural and low-density residential uses. Provides for rural and low-density residential uses, raising of soil crops, public parks, group homes, churches and places of worship, and public utility facilities.

Maricopa County Zoning Categories

Rural-43: Rural District: The principal purpose of this zoning district is to conserve and protect farms and other open land uses. Provides for both farm and non-farm residential uses and recreational and institutional uses.

R1-6, R1-7, R1-8, R1-10, R1-18: Single-Family Residential District. This zoning district is intended to conserve and protect single-family residential development of varying lot sizes. Provides for single-family dwellings, churches, schools, parks, playgrounds, and other community facilities.

R-2: Multiple Family Residential Zoning Districts: Intended for single-family attached or

detached dwellings and limited multiple-family residential projects. Provides single-family, two-family, and limited multiple-family dwellings and other uses permitted in the single-family residential zoning district.

The percentages of zoning in the three jurisdictions within the study area are as follows:

Peoria

- SR-43 – 44.67%
- Ag – 29.84%
- PCD – 25.79%

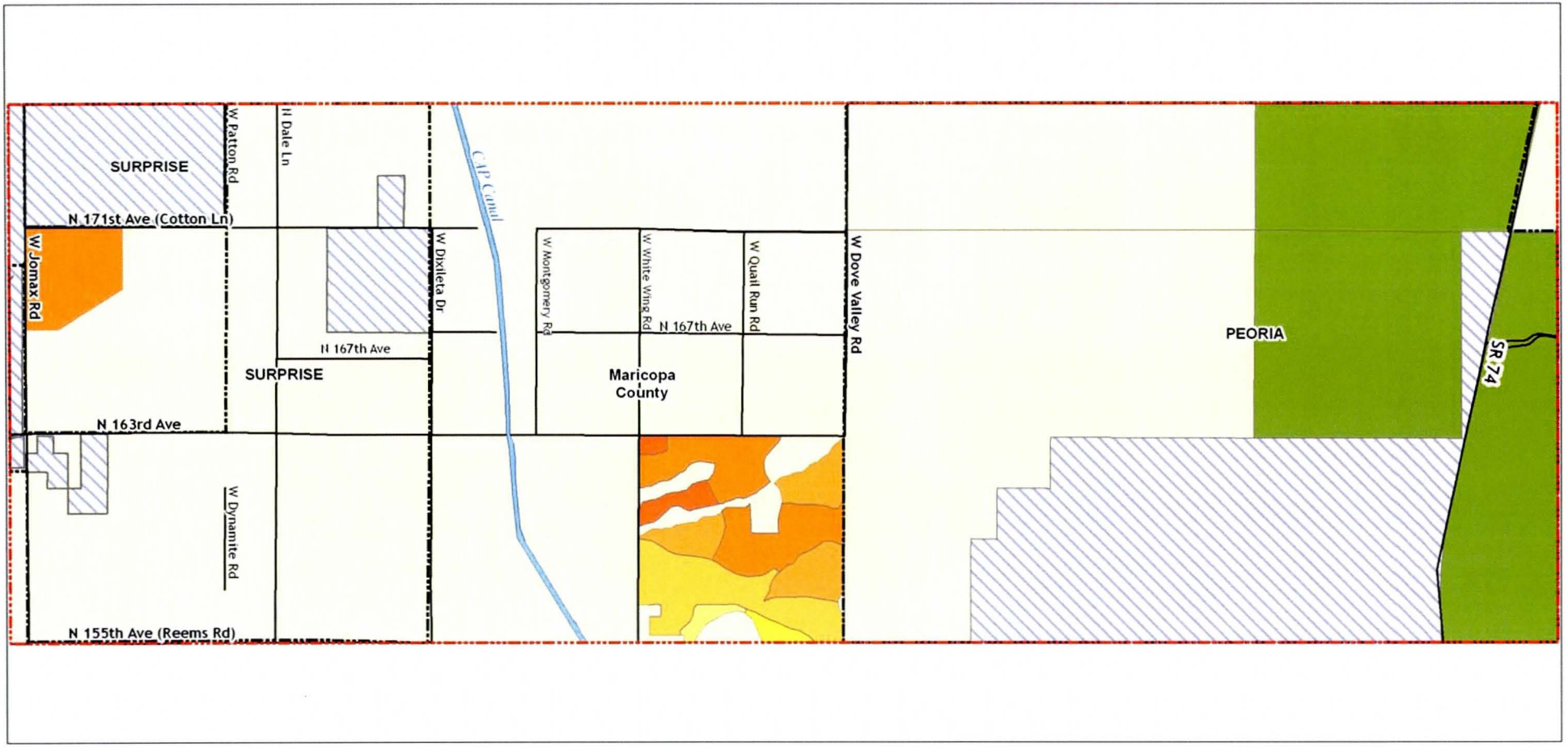
Surprise

- PAD – 24.90%
    - Desert Oasis – 16.16%
    - Legacy Village – 2.08%
    - Sierra Norte – 0.73%
    - Asante – 0.01%
- R1-43 – 75.1%

Maricopa County

- R1-10 – 0.37%
- R1-18 – 0.36%
- R1-6 – 7.57%
- R1-7 – 3.02%
- R1-8 – 3.62%
- R-2 – 0.78%
- Rural-190 – 1.64%
- Rural-43 – 82.64%

The existing zoning is illustrated on Figure 7.



163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 7
Existing Zoning

Legend

- Study Area
- Jurisdictional Boundary

Surprise	Maricopa County		Peoria
R1-43	R-2	R1-10	SR-43
PAD	R1-6	R1-18	PCD
	R1-7	RURAL-43	AG
	R1-8	RURAL-190	

0 0.25 0.5 1 Miles

Source: City of Surprise; City of Peoria; and Maricopa Association of Governments

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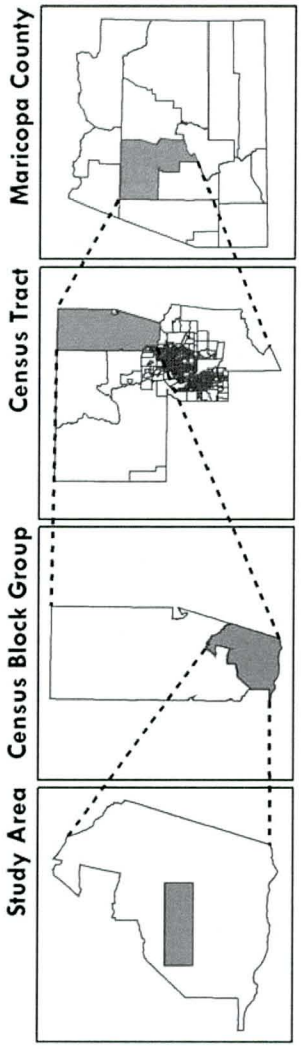
3.3 Demographic Characteristics

3.3.1 Population and Employment

As a basis for describing the population characteristics and employment conditions, data from the 2000 U. S. Census and the 2005 Special Census were compiled for Maricopa County, the City of Peoria, and the City of Surprise.

The population characteristics of the three jurisdictions for the two census years are shown in Tables 3 and 4. Between 2000 and 2005, the two cities and Maricopa County experienced high population growth. Surprise grew over 200% during this period and Peoria grew by 50%. The rates are higher than Maricopa County, which grew by 17% during this same period.

Figure 8 Census Areas



In 2000, the population in all three jurisdictions was primarily white, with 77.4% in Maricopa County, 84.9% in the City of Peoria, and 86.0% in Surprise. The largest minority group in all three jurisdictions was Hispanic (any race). Hispanics made up 24.8% in Maricopa County, 15.4% in Peoria, and 23.3% in Surprise. As shown in Table 4, these percentages remained similar in 2005. The largest change was in Surprise, where the white percentage decreased from 86.0% to 82.1% and the Hispanic percentage decreased from 23.3% to 18.7%.

In 2000, the percentage of the population over 65 was substantially higher in Surprise (25.4%) than in Peoria (14.4%) and Maricopa County (11.7%). By 2005, these percentages were lower for all three jurisdictions, with Surprise remaining the highest at 17.3%. The poverty status in all three jurisdictions remained relatively stable between 2000 and 2005.

In the subject area, the smallest unit for which U.S. Census data are reported in the study area is the block group. The study area is located within a block group that covers a much larger area. Thus, exact data for the study area are not available. Figure 8 illustrates a comparison of the areas covered by Maricopa County, the census tract, the block groups, and the study area.

Table 3 exhibits data from the 2000 census for total population, sex, age, and race characteristics for the block group within which the study area is located. Poverty status and employment data are reported only for the census tract level. Table 3 shows these data for the census tract within which the study area is located. The 2005 special census did not include block group data.

Table 3: Demographic Characteristics (2000)

	Maricopa County		Peoria		Surprise		Study Area	
Population Characteristics	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Population	3,072,149	100.0%	108,364	100.0%	30,848	100.0%	6,370	100.0%
Sex and Age								
Male	1,536,473	50.0%	52,058	48.0%	15,158	49.1%	3,055	48.0%
Female	1,535,676	50.0%	56,306	52.0%	15,690	50.9%	3,315	52.0%
Over 65	358,979	11.7%	15,652	14.4%	7,843	25.4%	3,805	59.7%
Race								
White Alone	2,376,359	77.4%	92,050	84.9%	26,521	86.0%	6,144	96.5%
Black/African American	114,551	3.7%	3,012	2.8%	806	2.6%	37	0.6%
American Indian	56,706	1.8%	734	0.7%	134	0.4%	24	0.4%
Asian	66,445	2.2%	2,077	1.9%	329	1.1%	43	0.7%
Native Hawaiian/Pacific Islander	4,406	0.1%	120	0.1%	16	0.1%	2	0.0%
Other	364,213	11.9%	7,686	7.1%	2,427	7.9%	81	1.3%
2 or more races	89,469	2.9%	2,685	2.5%	615	2.0%	39	0.6%
Hispanic (any race)	763,341	24.8%	16,699	15.4%	7,184	23.3%	183	2.9%
Total Families	763,110	100.0%	29,299	100.0%	9,723	100.0%	2,582	100.0%
Poverty Status								
Families	61,519	8.1%	968	3.3%	550	5.7%	168	6.5%
Individuals	355,668	11.6%	5,627	5.2%	2,689	8.7%	752	11.8%
Employment Characteristics	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Civilian Labor Force	1,498,223	100.0%	51,838	100.0%	11,080	100.0%	1,921	100.0%
Employed	1,427,292	95.3%	49,793	96.1%	10,443	94.3%	5,080	94.7%
Unemployed	70,931	4.7%	2,045	3.9%	637	5.7%	285	5.3%

Table 4: Demographic Characteristics (2005)

	Maricopa County		Peoria		Surprise	
Population Characteristics	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Population	3,590,804	100.0%	141,941	100.0%	91,411	100.0%
Sex and Age						
Male	1,803,398	50.2%	68,390	48.2%	45,478	49.8%
Female	1,787,406	49.8%	73,551	51.8%	45,933	50.2%
Over 65	390,265	10.9%	16,077	11.3%	15,826	17.3%
Race						
White Alone	2,812,857	78.3%	118,889	83.8%	75,043	82.1%
Black/African American	138,052	3.8%	6,486	4.6%	3,003	3.3%
American Indian	66,930	1.9%	521	0.4%	47	0.1%
Asian	96,828	2.7%	5,600	3.9%	1,490	1.6%
Native Hawaiian/Pacific Islander	3,842	0.1%	50	0.0%	0	0.0%
Other	390,229	10.9%	8,001	5.6%	9,275	10.1%
2 or more races	82,066	2.3%	2,394	1.7%	2,553	2.8%
Hispanic (any race)	1,047,360	29.2%	26,410	18.6%	17,136	18.7%
Total Families	871,240	100.0%	36,837	100.0%	25,586	100.0%
Poverty Status						
Families	82,768	9.5%	0	0.0%	0	0.0%
Individuals	448,851	12.5%	7,665	5.4%	6,764	7.4%
Employment Characteristics	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Civilian Labor Force	1,803,695	100.0%	68,655	100.0%	37,382	100.0%
Employed	1,704,848	94.5%	63,760	92.9%	35,519	95.0%
Unemployed	98,847	5.5%	4,895	7.1%	1,863	5.0%

The racial composition in the relevant block group was overwhelmingly white at 96.5 %, which is higher than any of the three jurisdictions. The largest minority group was Hispanic (of any race) with 2.9%, which is substantially lower than the three jurisdictions. The poverty status in the block group was similar to that of the county but higher than the two cities. The percentage of persons over 65 was substantially higher (59.7%) in the block group than in any of the jurisdictions. This condition is due to the large portion of the block group that contains retirement communities. While it is not possible to determine the portion of this percentage that is within the study area, it is thought to be much lower.

3.3.2 Title VI/Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statues seeks to assure that individuals are not subjected to discrimination on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued in February 1994. The executive order requires federal agencies to identify and avoid "disproportionately high and adverse effects of its programs, policies, and activities on minority populations and low-income populations".

The United States Department of Transportation (USDOT) issued its final order to implement these provisions on April 15, 1997. This final order requires that information be obtained concerning the race, color or national origin, and income level of populations served or affected by the proposed action. It further requires that steps be taken to avoid disproportionately high and adverse effects on these populations.

As described in Section 3.3.1, minority populations are present in the study area, but represent a very small portion of the total. The percentage of low-income persons, while higher than in the cities of Peoria and Surprise, is almost identical to that of Maricopa County. These percentages are well below the general guidelines for the definition of a substantial population. It is unlikely that the project would cause disproportionate impacts on these populations.

The percentage of persons over age 65 in the study area, as it is defined by the Census block group, is much higher than the surrounding jurisdictions due to the presence of large retirement communities in the area. The portion of this population that is actually within the defined study area cannot be determined from available data. However, the future definition and evaluation of impacts should clearly document the potential effects on this group. Care should be taken to ensure their participation in future public involvement activities.

4.0 Cultural Resources

Available archaeological and historic records were reviewed to identify previous studies and the number and types of previously identified cultural resources in the area. Sources examined for this overview included site and project files at the State Historic Preservation Office (SHPO) and the AZSITE Cultural Resources Database (AZSITE). Historic General Land Office (GLO) maps were also reviewed at the Bureau of Land Management (BLM) Arizona State Office.

4.1 Results of the Literature Review

The results of the literature review indicate that 12 cultural resource projects have been conducted and that 27 previously recorded prehistoric and historic cultural resource sites are present within the boundaries of the review area. A summary of the previous research is provided in Table 5. Table 6 lists the previously recorded sites and specifies their eligibility for the National Register of Historic Places. (NRHP). The GLO plats are summarized in Table 7.

Table 5: Summary of Previous Archaeological Research

Location	Agency No./Project Description	Reference(s)
T5N/R1W/§19, 20 T5N/R2W/§23, 24, 26	1972-5.ASM/Granite Reef Aqueduct	Kemrer et al. 1972
T5N/R1W/§19, 20 T5N/R2W/§23–26	1976-40.ASM/76-029.ASU/Granite Reef Aqueduct Reach 9	Brown 1977
T5N/R2W/§36	1987-189.ASM/MT STATE SO620	Roth 1987
T5N/R1W/§6 T6N/R1W/§31 T6N/R2W/§25, 26	1988-243.ASM/Hieroglyphics Survey	Greenwald and Keller 1988
T5N/R2W/§36	1998-291.ASM/Jomax & 163rd Avenue	Shepard 1998
T5N/R1W/§19	1999-525.ASM/White Wing Road Survey	Spalding 1999
T5N/R1W/§18	2000-54.ASM/Marisol Ranch Survey	Schroeder 2000
T6N/R1W/§30, 31 T6N/R2W/§25, 26	2000-127.ASM/SR 74/US 60 Lake Pleasant	Shepard 2000
T5N/R1W/§18	2001-235.ASM/Surprise 640 Survey	Yunker and Foster 2001
T5N/R1W/§19, 30 T5N/R1W/§24, 25	2001-775.ASM/Phase 2 PM 10 Roads	Rogge et al. 2001
T5N/R2W/§22	2002-291.ASM/Recharge Well Field Survey	Condrey 2002
T4N/R1W/§1	2003-597.ASM/260 Acres at 163rd Ave & Jomax Rd	Hart 2002

Table 6: Summary of Previously Recorded Cultural Resources

Site Number	Location	Site Type	NRHP Eligibility	Reference(s)
AZ T:3:14(ASU)	T5N/R2W/§23	Sherd/lithic scatter	Eligible	AZSITE
AZ T:3:15(ASU)	T5N/R1W/§19	Sherd/lithic scatter w/ rock platform	Eligible	AZSITE
AZ T:3:19(BLM)	T6N/R1W/§31	Hohokam artifact scatter	Not eligible	AZSITE
AZ T:3:49(ASM)	T6N/R1W/§31	Hohokam artifact scatter	No data	Greenwald and Keller 1988
AZ T:3:50(ASM)	T5N/R1W/§6	Historic mine	No data	Greenwald and Keller 1988
AZ T:3:180(ASM)	T5N/R1W/§18	Late Archaic chipping station	Eligible	Schroeder 2000
AZ T:3:181(ASM)	T5N/R1W/§18	Historic trash scatter	Eligible	Schroeder 2000
AZ T:3:182(ASM)	T5N/R1W/§18	Late Archaic chipping station	Eligible	Schroeder 2000
AZ T:3:183(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:184(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:185(ASM)	T5N/R1W/§18	Late Archaic chipping station	Eligible	Schroeder 2000
AZ T:3:186(ASM)	T5N/R1W/§18	Late Archaic structure	Eligible	Schroeder 2000
AZ T:3:187(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:188(ASM)	T5N/R1W/§18	Late Archaic chipping station w/ rock ring	Eligible	Schroeder 2000

Table 6 Summary of Previously Recorded Cultural Resources (Continued)

Site Number	Location	Site Type	Eligibility	Reference(s)
AZ T:3:189(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:190(ASM)	T5N/R1W/§18	Late Archaic chipping station	Eligible	Schroeder 2000
AZ T:3:191(ASM)	T5N/R1W/§18	Historic trash scatter	Eligible	Schroeder 2000
AZ T:3:192(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:193(ASM)	T5N/R1W/§18	Late Archaic rock ring	Eligible	Schroeder 2000
AZ T:3:194(ASM)	T5N/R1W/§18	Historic trash scatter	Eligible	Schroeder 2000
AZ T:3:195(ASM)	T5N/R1W/§18	Late Archaic chipping station w/ rock cluster	Eligible	Schroeder 2000
AZ T:3:196(ASM)	T5N/R1W/§18	Middle–Late Archaic chipping station	Eligible	Schroeder 2000
AZ T:3:197(ASM)	T5N/R1W/§18	Late Archaic rock ring w/ possible tabular knife	Eligible	Schroeder 2000
AZ T:3:200(ASM)	T6N/R2W/§26	Historic GLO road	Not eligible	Shepard 2000
AZ T:3:201(ASM)	T6N/R2W/§25	Historic GLO road	Not eligible	Shepard 2000
AZ T:3:276(ASM)	T5N/R1W/§7	Historic mine	Not eligible	Hasbargen 2003
AZ T:7:272(ASM)	T4N/R2W/§1	Historic trash scatter	Not eligible	Hart 2002

Table 7: Summary of GLO Plats

Township/Range	Year	Comments
T4N/R1W	1894	Nothing depicted within review area
T4N/R2W	1994	Nothing depicted within review area
T5N/R1W	1922	Several unnamed local access roads, J.A. Dewar property in §31 (SE¼SW¼)
T5N/R2W	1916	Castle Hot Springs to Beardsley Road, several unnamed local access roads, field in §26 (NE¼NW¼)
T6N/R1W	1940	Two local access roads in §30 and 31
T6N/R2W	1924	Several local access roads

4.2 Cultural Sensitivity Evaluation

As described above, numerous cultural resources have been documented in the review area. In addition, many Native American groups have a long history of use and/or settlement either within or in the vicinity of the review area. Over time, the territories recognized by the various groups have shifted under pressures of population movements, conflict among neighbors, the advent of Spanish, Mexican, and Anglo competition for land and resources, and the more recent resettlement policies of the federal government; however, many groups still maintain traditional ties to the larger region.

Although large portions of the review area have yet to be surveyed for the presence of cultural materials, the review area has the potential to be of high cultural sensitivity. Of particular importance are often indistinct or obscure surface features such as rock rings, rock alignments, and rock piles, present at several of the prehistoric sites within the review area; quarries; geoglyphs and petroglyphs; trails; and shrines associated with the area's prehistoric and protohistoric occupation. These sites have the potential to inform on land use and subsistence activities, settlement patterns, and trade and exchange networks. Rock art, intaglios, and "earth figure" sites may reveal aspects of tribal organization and integration as well as provide insights regarding possible links between mythology, oral histories, and cultural practices. All of these site types may be considered eligible under Criterion D. In addition to the known archaeological

sites that have been documented along the proposed 163rd Avenue corridor, any future undertaking needs to take into consideration the area's potential for containing TCPs and other significant cultural landscapes.

Historic properties are likely to occur in the review area. Evidence of historic trails and wagon roads, many of which are shown on GLO maps dating to the late nineteenth and early twentieth centuries, are present in the review area. Some of these sites played an important role in the region's history of transportation and settlement, while others may be related to important persons; therefore, they may be eligible under Criteria A, B, and/or D.

4.3 Summary of Results and Recommendations

The literature review and culture-historical overview for the 163rd Avenue Corridor Improvement Project illustrates the potentially complex interrelationship between current Native American concerns regarding the area, and by extension, the complexity of sorting out the potential archaeological resources that may occur within the review area boundaries. Thus, as previously stated, this document should be considered a preliminary study designed to evaluate the cultural sensitivity of the proposed alignments; additional research will be necessary in future stages of the project.

The results of the literature review indicate that at least 27 previously recorded cultural resource sites are within the 1.0-mi radius review area. Of these, 20 are considered eligible for listing on the NRHP, five are considered not eligible, and two require further research to decide eligibility or were otherwise not evaluated. Only one known site, AZ T:3:201(ASM), a historic road recommended as not eligible, overlaps with any of the proposed alignments.

In addition to the previously recorded sites, GLO plats indicate that numerous historic roads cross the review area. Once a preferred alignment is selected, a pedestrian survey should be conducted to ascertain their location, document any potential disturbance by the current undertaking, and provide eligibility and treatment recommendations.

Although 12 previous cultural resource projects have been conducted within the review area, large sections of the review area have yet to be surveyed, and very little of the proposed alignments have been examined. Given the number and type of archaeological sites known to be present within the review area, there is a high potential for the presence of additional cultural resources in those areas not previously surveyed. It is recommended, therefore, that previously uninvestigated areas selected as potential routes for the 163rd Avenue alignment receive a Class III cultural resources survey, as well as any areas that were surveyed for cultural resources ten or more years ago. In addition, future phases of the project will need to examine original site documentation and maps of the previously recorded sites; supplementary ground survey may be required to confirm their location and surface extent, and assess their present condition.

Future phases of this project also will need to consult other important sources of relevant information. At a minimum, a comprehensive archival records search should be completed that includes examination of written sources and historic maps from various agencies and repositories, including cultural resource inventory files at the BLM Phoenix Field Office, ASLD, and Arizona State Archives.

Other sources of information of possible relevance to the review area include cultural resource files at the Arizona State Library, university and local libraries, and other local museums and historical societies. Historic accounts and Sanborn Fire Insurance maps should be consulted where available to determine where historic properties might occur and the types of buildings, industrial sites, and services that were in existence during the area's historic occupation.

The information gathered by this research should be oriented towards addressing general research questions that might be developed for this project, including prehistoric, protohistoric, and historic Native American land use and occupation; historic Anglo settlement and industry; transportation and communication; government undertakings; and cultural ecology, geography, and historic land use. The results of such an endeavor will enhance our understanding of the area's prehistory and history, and will ensure adequate documentation and protection of its cultural resources.

Appendix C

Technical Memorandum No. 3

Concept Drainage Report

Appendix C

Technical Memorandum No. 3

Concept Drainage Report

TECHNICAL MEMORANDUM #3
FINAL CONCEPTUAL DRAINAGE REPORT

163rd Ave Access Control and Corridor Improvement Study

Jomax Rd to SR 74

FEBRUARY 2008

Prepared by:

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Expires 03/31/2010

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Expires 03/31/2010

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Expires 03/31/2010

1 INTRODUCTION

1.1 Project Description

The existing 163rd Avenue from Jomax Road to approximately 380 feet south of Dove Valley Road is a two-lane paved rural roadway in north-western Maricopa County, currently classified as a Principal Arterial in the Maricopa County Department of Transportation (MCDOT) Major Streets and Routes Plan. North of Dove Valley Road the roadway alignment is undefined. The corridor traverses through sparsely developed and undeveloped desert rangeland under the jurisdiction of the City of Surprise, the City of Peoria and Maricopa County, ultimately serving as a link between Grand Avenue (US 60) and SR 74. See the location map in Figure 1.

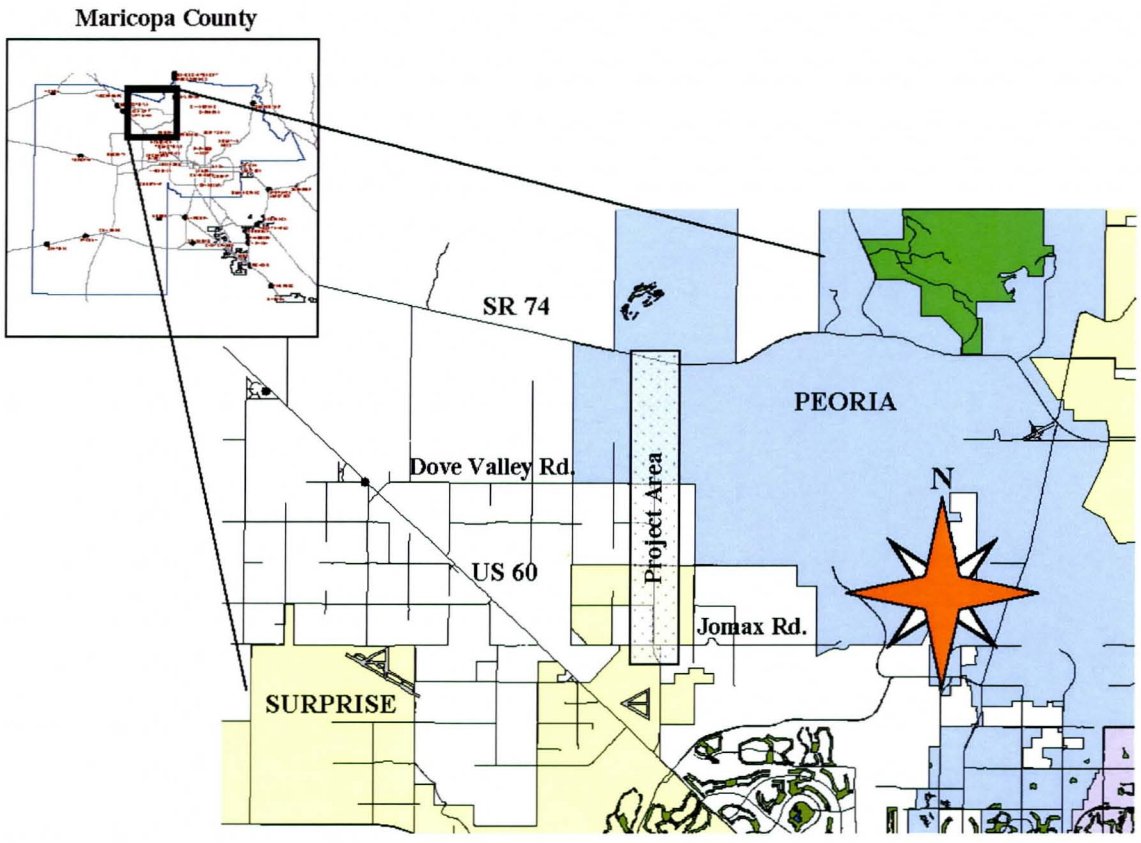


Figure 1 - Location Map

The project has been divided in two segments: the south segment between Jomax Road and Dove Valley Road (approximately 4 miles-long), and the north segment between Dove Valley Road and SR 74 (approximately 3 miles-long).

The Access Control and Corridor Improvement Study (CIS) covers the entire project area with the purpose of establishing a study centerline for the preferred corridor alignment. The Final Conceptual Drainage Report addresses the five alignment alternatives previously considered and the preferred alternative that resulted from analyses and stakeholder's meetings. A Design Concept Report (DCR) is being prepared separately for the south segment of 163rd Avenue, using the preferred alternative of the CIS as the basis. The purpose of the DCR is to define the roadway centerline and major design features to guide impending future development.

1.2 Purpose

This report summarizes data collected from a previously completed Candidate Assessment Report, studies by the Flood Control District of Maricopa County (FCDMC), and field reviews. The data includes points of concentration, peak flows and field conditions. Evaluation of the data is the basis for identification of drainage impacts of proposed roadway improvement alternatives and the planning of future enhancements.

The project scope requires the identification of major points of concentration and estimation of 100-year and 50-year peak flow data based upon existing drainage reports. Hydrologic data will be used in the hydraulic evaluation of proposed culverts.

1.3 Available Data

1.3.1 163rd Avenue Candidate Assessment Report

The "163rd Avenue Candidate Assessment Report" was completed by MCDOT in 2004. The purpose of the report was to identify a regional arterial street plan and to identify a preferred alignment for the development of 163rd Avenue between US 60 (Grand Avenue) and SR 74.

Drainage improvements for the preferred alternative (referred in this report as the CAR Alternative) were identified by using a factor of 800 cfs per square mile of contributing watershed at major wash crossings. Pages of the report addressing drainage are attached in Appendix A, including a table of proposed culvert crossings. Drainage data from the CAR is not used in this report, as new data has been developed based on studies completed by the FCDMC.

1.3.2 Padelford Wash Floodplain Delineation Study (FDS)

The FCDMC completed the "Padelford Wash Floodplain Delineation Study" (FDS) in 2002. Subsequently, a Letter of Map Revision was issued with an effective date of October 12, 2005, by which FEMA accepted the proposed floodplain delineation for the reach of Padelford Wash between the CAP Canal and SR 74. Flow data from the Padelford Wash FDS is used in this report in the estimation of peak flows at potential roadway wash crossings. Original data from the FDS used in this report is included in Appendix A.

1.3.3 Wittmann Area Drainage Master Study (ADMS) Update

The Wittmann ADMS Update was completed in 2004. The study covered the area bounded by the Hieroglyphic Mountains to the north and northeast, the White Tank Mountains and McMicken Dam and its outlet channel to the south, the Agua Fria River to the east, and the Hassayampa River basin to the west. The 163rd Avenue DCR/CIS project area is a subset of the ADMS' area. Basin delineation and flow data from the ADMS are used in this report to estimate peak flows at potential roadway wash crossings. Original data is included in Appendix A.

Preparation of the Wittmann Area Drainage Master Plan (ADMP) is underway. As of December of 2006, work on the Wittmann ADMP has been focused on data collection and review of the hydrology. Alternatives for improvements and recommendations are not yet available to be included in this report.

2 HYDROLOGY

2.1 Contributing Basins and Existing Drainage Systems

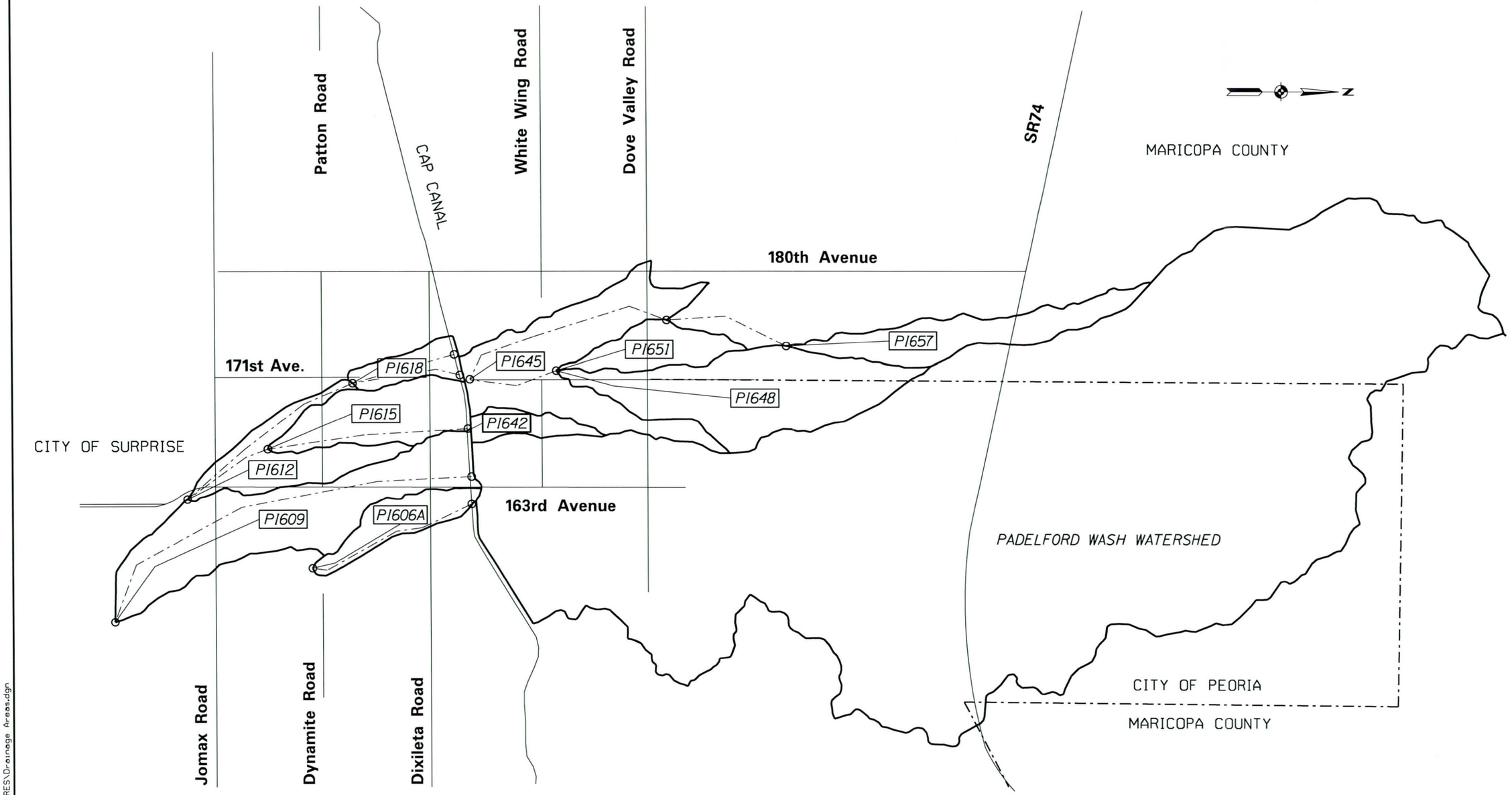
The delineation of major contributing basins was completed in the Wittmann ADMS Update. A map of the watersheds that contribute flows to the project area is included in Figure 2. The basin delineation was taken from the ADMS, as well as flow data for basin runoff, points of concentration and routing segments.

The study area is comprised of desert rangeland with scattered buildings in the area south of Dove Valley Road that for the most part have not altered historical drainage patterns. Padelford Wash is the most significant natural drainage feature of the area, traversing it in a north-south direction. Several other washes follow the general direction of Padelford Wash.

The CAP Canal and its protection levees cut across the study area, intersecting all drainage ways. The CAP levees create impoundment pools that store flood waters and meter their outfall through overchutes (pipes under the levees and crossing over the CAP Canal). Storage capacity behind the CAP levees is sufficient to store the 100-year storm without overtopping for the section within this project's limits.

CAP Canal at the intersection with 163rd Avenue

The main channel of Padelford Wash is well defined and incised from its origin north of SR 74 to a point approximately 0.5 miles north of the Dove Valley Road alignment, where it opens onto an alluvial fan. The fan splits into several channels that have shallow banks that are overtopped during events of significance. The base of the alluvial fan is about 1 mile wide at the intersection with the CAP Canal, continuing its expansion to the south. The CAP levees make the alluvial fan inactive downstream of the canal, given the controlled release of flows through overchutes.



CONTRIBUTING WATERSHEDS

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163rd Avenue, Jomax Road to SR 74
Corridor Improvement Study

FIGURE 2

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Padelford Wash - Typical shallow alluvial fan channel

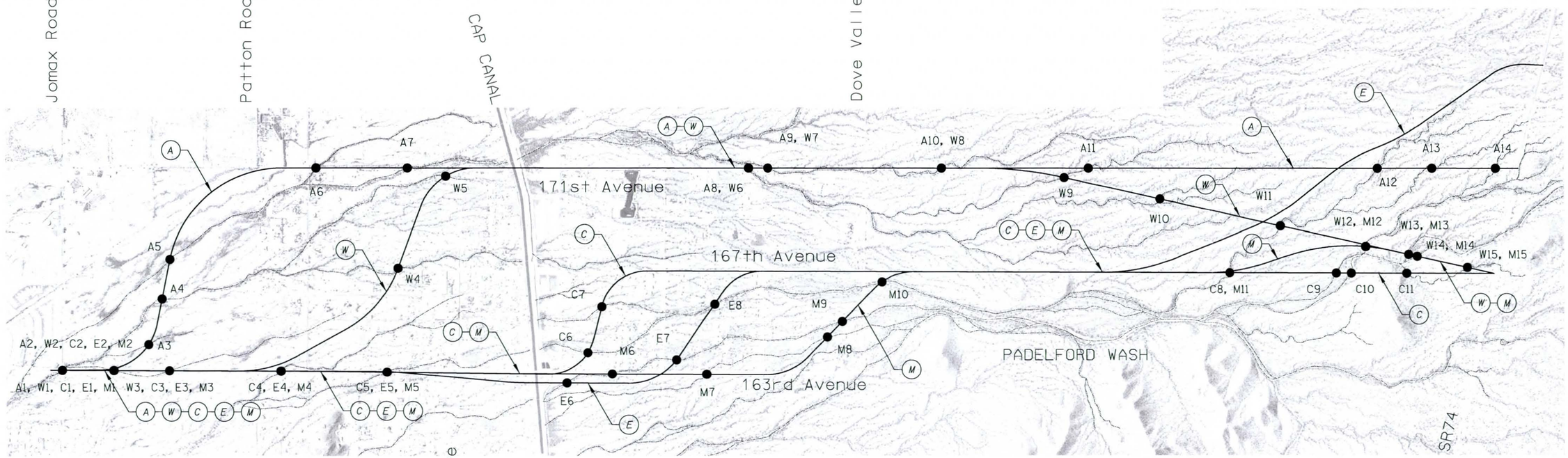
The CAP Canal structures and a box culvert at the intersection of 163rd Avenue and Jomax Road are the only significant man-made drainage features in the study area. Existing roads south of Dove Valley Road have rolling alignments that allow at grade passage of storm flows. Flooding of the roadways occurs during rainfall events at dip wash crossings and in sections of the road where washes flow along the pavement.

2.2 Points of Concentration and Peak Flows – Preliminary Alternatives

2.2.1 Methodology

Points of concentration for five proposed alignment alternatives were identified by plotting the proposed corridors on the basin areas taken from the Wittmann ADMS Update. The five alignment alternatives considered in this report are:

- 171st Avenue Alignment: follows the 171st Avenue alignment from Patton Road to SR 74, staying clear of the Padelford Wash floodplain.
- West Alignment: also follows the 171st Avenue alignment, from just south of the CAP Canal to north of Dove Valley Road, then north-east to the intersection of the 167th Avenue and SR 74 intersection. It also stays clear of Padelford Wash.
- CAR Alignment: as proposed in the CAR. On the 163rd Avenue alignment to just north of the CAP Canal, then turning north-west to the 167th Avenue alignment.
- East Alignment: similar to the CAR Alignment, but crossing the CAP Canal to the east of the existing crossing and turning north-west to the 167th Avenue alignment further to the north than the CAR Alignment. It turns north-west along the ridge line for the final 2 miles before the intersection with SR 74.
- 163rd Avenue Alignment: It stays on the 163rd Avenue alignment to just south of Dove Valley Road, then turning north-west to the 167th Avenue alignment.



ALIGNMENT ALTERNATIVES:

- (A) *171st Avenue*
- (E) *East*
- (W) *West*
- (M) *163rd Avenue*
- (C) *CAR*

SCALE IN FEET
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0 0.5 1
SCALE IN MILES

POINTS OF CONCENTRATION
Along Alignment Alternatives

163rd Avenue, Jomax Road to SR 74
Access Control and Corridor Improvement Study

FIGURE 3

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J:\ANDES\CADD\PROJECTS\0503 163rd Avenue\FIGURES\Alternatives Crossings.dgn

Intersections between the corridor alignments and main channels were designated as points of concentration (see Figure 3). The 100-year 6-hour future-condition peak flow from the ADMS model was taken for each concentration point. Sub basin areas were calculated for points within an ADMS basin and the flow consequently prorated.

50-year flows were taken from the Padelford Wash FDS where available, or calculated using a factor of 0.80 times the 100-year peak flow, based on the average of 50-year to 100-year peak flow ratios calculated in the Padelford Wash FDS. Use of indirect methods for computation of the 50-year peak flows was attempted, but results were not in agreement with the HEC-1 results of the ADMS. The 50-year flows calculated with indirect methods were significantly higher than the 100-year flows of the ADMS, in part because the sub-basin sizes are typically smaller than those used in the development of regression equations. Calculations are included in Appendix B.

2.2.2 Peak Flows

Table 1 shows the summary of original (100-year) and calculated (50-year) peak flows for concentration points along all alternative alignments. A preliminary approach to the possible size of cross drainage structures was to quantify the number of 6'x5' concrete box culvert (CBC) barrels needed to pass the 100-year flow. 6'x5' is the size of the existing Padelford Wash CBC at SR 74. Each CBC barrel is assumed to have a capacity of 200 cfs, using an inlet control calculation with headwater equal to barrel height (hw depth=5'). For comparison purposes, a bridged crossing (vs. a culvert crossing) is assumed at any concentration point requiring more than 15 6'x5' CBC barrels. Also, for simplicity of comparison, 1 barrel is minimum culvert size (some concentration points have flows lower than 200 cfs).

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163rd Ave DCR & CIS
Jomax Road to SR 74
Table 1 - Peak Flow Data Summary
Alignment Alternatives

12/17/2007

	Crossing ID	100-year Flow (cfs)	Source	50-year Flow (cfs)	Source	Number of 6'x5' CBC Barrels	Possible Bridge?
171st Avenue Alt.	A 1	1,080	Wittmann ADMSU Cross Section - Wash 8E (0.426)	864	80% of Q100	6	
	A 2	157	Sub basin table	125	80% of Q100	1	
	A 3	166	Sub basin table	132	80% of Q100	1	
	A 4	710	Wittmann ADMSU Cross Section - Wash 8E (1.063)	568	80% of Q100	4	
	A 5	700	Wittmann ADMSU Cross Section - Wash 6E (2.895)	560	80% of Q100	4	
	A 6	700	Wittmann ADMSU Cross Section - Wash 6E (3.949)	560	80% of Q100	4	
	A 7	410	Wittmann ADMSU Cross Section - Wash 7E West Split (1.458)	328	80% of Q100	3	
	A 8	1,290	Wittmann ADMSU Cross Section - Wash 7E (1.290)	1,032	80% of Q100	7	
	A 9	1,300	Wittmann ADMSU Cross Section - T5N-R2W-S14S (0.278)	1,040	80% of Q100	7	
	A 10	1,300	Wittmann ADMSU Cross Section - T5N-R2W-S14S (0.663)	1,040	80% of Q100	7	
	A 11	125	Sub basin table	100	80% of Q100	1	
	A 12	89	Sub basin table	71	80% of Q100	1	
	A 13	45	Sub basin table	36	80% of Q100	1	
	A 14	45	Sub basin table	36	80% of Q100	1	
West Alt.	W 1	1,080	Wittmann ADMSU Cross Section - Wash 8E (0.426)	864	80% of Q100	6	
	W 2	157	Sub basin table	125	80% of Q100	1	
	W 3	148	Sub basin table	118	80% of Q100	1	
	W 4	490	Wittmann ADMSU Cross Section - Wash 8E (2.403)	392	80% of Q100	3	
	W 5	410	Wittmann ADMSU Cross Section - Wash 7E East Split (1.306)	328	80% of Q100	3	
	W 6	1,290	Wittmann ADMSU Cross Section - Wash 7E (1.290)	1,032	80% of Q100	7	
	W 7	1,300	Wittmann ADMSU Cross Section - T5N-R2W-S14S (0.278)	1,040	80% of Q100	7	
	W 8	1,300	Wittmann ADMSU Cross Section - T5N-R2W-S14S (0.663)	1,040	80% of Q100	7	
	W 9	125	Sub basin table	100	80% of Q100	1	
	W 10	107	Sub basin table	86	80% of Q100	1	
	W 11	238	Sub basin table	190	80% of Q100	2	
	W 12	1,215	Tributary A at SR 74	964	Tributary A at SR 74	7	
	W 13	2,253	Tributary B - Half	1,720	Tributary B - Half	12	
	W 14	2,253	Tributary B - Half	1,720	Tributary B - Half	12	
	W 15	200	Inlet Control at SR 74 6'x5' CBC	160	80% of Q100	1	
CAR Alt.	C 1	1,080	Wittmann ADMSU Cross Section - Wash 8E (0.426)	864	80% of Q100	6	
	C 2	157	Sub basin table	125	80% of Q100	1	
	C 3	148	Sub basin table	118	80% of Q100	1	
	C 4	197	Sub basin table	158	80% of Q100	1	
	C 5	390	Wittmann ADMSU Cross Section - Wash 9E (3.998)	312	80% of Q100	2	
	C 6	3,781	Split 3, D/S Split 4	3,248	Split 3, D/S Split 4	19	yes
	C 7	704	Split 4	585	Split 4	4	
	C 8	62	Sub basin table	49	80% of Q100	1	
	C 9	2,861	Tributary A at Trib. B - Half	2,246	Tributary A at Trib. B - Half	15	
	C 10	2,861	Tributary A at Trib. B - Half	2,246	Tributary A at Trib. B - Half	15	
	C 11	200	Inlet Control at SR 74 6'x5' CBC	160	80% of Q100	1	
	E 1	1,080	Wittmann ADMSU Cross Section - Wash 8E (0.426)	864	80% of Q100	6	
	E 2	157	Sub basin table	125	80% of Q100	1	

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163rd Ave DCR & CIS
Jomax Road to SR 74
Table 1 - Peak Flow Data Summary
Alignment Alternatives

12/17/2007

	Crossing ID	100-year Flow (cfs)	Source	50-year Flow (cfs)	Source	Number of 6'x5' CBC Barrels	Possible Bridge?
East Alt.	E 3	148	Sub basin table	118	80% of Q100	1	
	E 4	197	Sub basin table	158	80% of Q100	1	
	E 5	390	Wittmann ADMSU Cross Section - Wash 9E (3.998)	312	80% of Q100	2	
	E 6	1,323	Split 2 D/S of Weir Flow to Main Padelford Wash - Half	1,058	80% of Q100	7	
	E 7	1,323	Split 2 D/S of Weir Flow to Main Padelford Wash - Half	1,058	80% of Q100	7	
	E 8	4,660	Split 3, U/S Split 4	3,931	Split 3, U/S Split 4	24	yes
163rd Avenue Alt.	M 1	1,080	Wittmann ADMSU Cross Section - Wash 8E (0.426)	864	80% of Q100	6	
	M 2	157	Sub basin table	125	80% of Q100	1	
	M 3	148	Sub basin table	118	80% of Q100	1	
	M 4	197	Sub basin table	158	80% of Q100	1	
	M 5	390	Wittmann ADMSU Cross Section - Wash 9E (3.998)	312	80% of Q100	2	
	M 6	1,323	Split 2 D/S of Weir Flow to Main Padelford Wash - Half	1,058	80% of Q100	7	
	M 7	1,323	Split 2 D/S of Weir Flow to Main Padelford Wash - Half	1,058	80% of Q100	7	
	M 8	1,575	Split 2 D/S of Split with main Padelford Wash - Half	1,090	Split 2 D/S of Split with main Padelford Wash - Half	8	
	M 9	1,575	Split 2 D/S of Split with main Padelford Wash - Half	1,090	Split 2 D/S of Split with main Padelford Wash - Half	8	
	M 10	4,660	Split 3 D/S of Split with with main Padelford Wash	3,931	Split 3 D/S of Split with with main Padelford Wash	24	yes
	M 11	62	Sub basin table	49	80% of Q100	1	
	M 12	1,215	Tributary A at SR 74	972	80% of Q100	7	
	M 13	2,253	Tributary B - Half	1,802	80% of Q100	12	
	M 14	2,253	Tributary B - Half	1,802	80% of Q100	12	
	M 15	200	Inlet Control at SR 74 6'x5' CBC	160	80% of Q100	1	

Notes:

1. 100-year peak flows for washes outside of the Padelford Wash Basin correspond to 6-hour storm duration. Padelford Wash channel flows correspond to 24-hour storm duration.
2. Future land use flows used for washes outside of the Padelford Wash Basin, existing for channels inside.
3. The data source for washes outside the Padelford Wash Basin is the Wittmann ADMSU.
4. The data source for Padelford Wash channels is the Padelford Wash FDS.
5. Barrel quantity assumes 200 cfs of capacity per barrel.
6. Threshold for possibility of bridge is 15-6'x5' CBC barrels.

3 DELINEATED FLOODPLAINS AND WATERS OF THE US

The delineation of 100-year floodplains shown on Figure 4 has been reproduced from electronic files provided by the FCDMC. In the Padelford Wash Flood Insurance Study the FCDMC has identified base flood elevation contour lines for the inactive alluvial fan. All alternative alignments conflict (in varying degree) with delineated 100-year floodplains, especially those crossing the CAP canal near the existing 163rd Avenue alignment.

Regulations related to construction within floodplains should be considered during design of roadway improvements; Conditional Letters of Map Revision may be required for the construction of proposed improvements.

Most natural channels in the study area may be considered to fit the criteria for designation as jurisdictional waters of the United States, and would therefore be regulated by the United States Army Corps of Engineers (USACOE). In recent times, streams that are tributaries to waterways of regional significance, such as the Agua Fria River, have been given "Jurisdictional Waters of the US" (jurisdictional waters) designation. Construction of roadway improvements within delineated jurisdictional waters will require permits issued by the USACOE. A summary of requirements for nationwide permits is included in Appendix C.

100-YEAR DELINEATED FLOODPLAIN (TYP)

DELINEATED FEMA FLOODPLAINS

163rd Avenue, Jomax Road to SR 74
Access Control and Corridor Improvement Study

FIGURE 4

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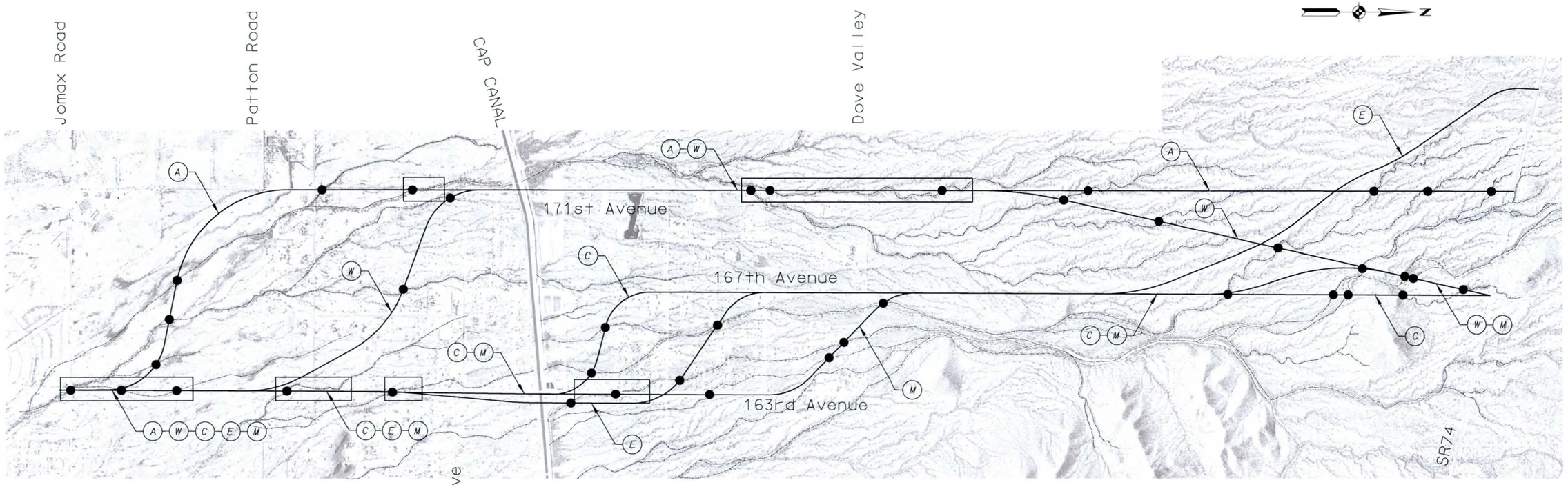
4 DRAINAGE IMPACTS OF ALTERNATIVE ALIGNMENTS

All proposed alternatives require considerable drainage improvements given the mostly undisturbed character of the project area. The timing of construction of roadway improvements in relation to urban development of the area will define the need of structural requirements. Urban development is expected to maintain major drainage patterns and to obliterate minor channels as the land is regraded and structures are built, thus reducing roadway improvements to major culvert crossings and disposal of pavement runoff. Collector channels would otherwise be needed along the upstream side of the roadway should the roadway be constructed prior to urban development of the area.

A new bridge crossing over the Central Arizona Project (CAP) Canal will be required for all alternatives. Crossing of the Canal and associated facilities must be designed and constructed following CAP guidelines. The guidelines address horizontal and vertical clearance requirements for the Canal and maintenance roads. Crossing of the Canal protection levees shall also follow Bureau of Reclamation (BOR) and Federal Emergency Management Agency (FEMA) guidelines and standards.

Some washes may need to be realigned at several locations given the proximity of the roadway to the channel and the very shallow angle of approach to the intersection. An approximation of wash realignment needs is depicted on Figure 5. The segment immediately north of Jomax Road is an existing problem area common to all alternatives. More than 300 cfs are calculated to flow immediately along the roadway for nearly half-a-mile during the 100-year event. It should be noted that wash realignments have regulatory implications that pertain to environmental permits, generally require right-of-way or easements in addition to what is dedicated to the roadway cross section, and tend to increase life-cycle operation and maintenance costs.

A summary of impacts for each alignment alternative is included in Table 2.



Reach of Wash Realignment

ALIGNMENT ALTERNATIVES:

- (A) 171st Avenue
- (E) East
- (W) West
- (M) 163rd Avenue
- (C) CAR

SCALE IN FEET
0 2400 4800
0 0.5 1
SCALE IN MILES

WASH REALIGNMENT REQUIREMENTS

Along Alignment Alternatives

163rd Avenue, Jomax Road to SR 74
Access Control and Corridor Improvement Study

FIGURE 5

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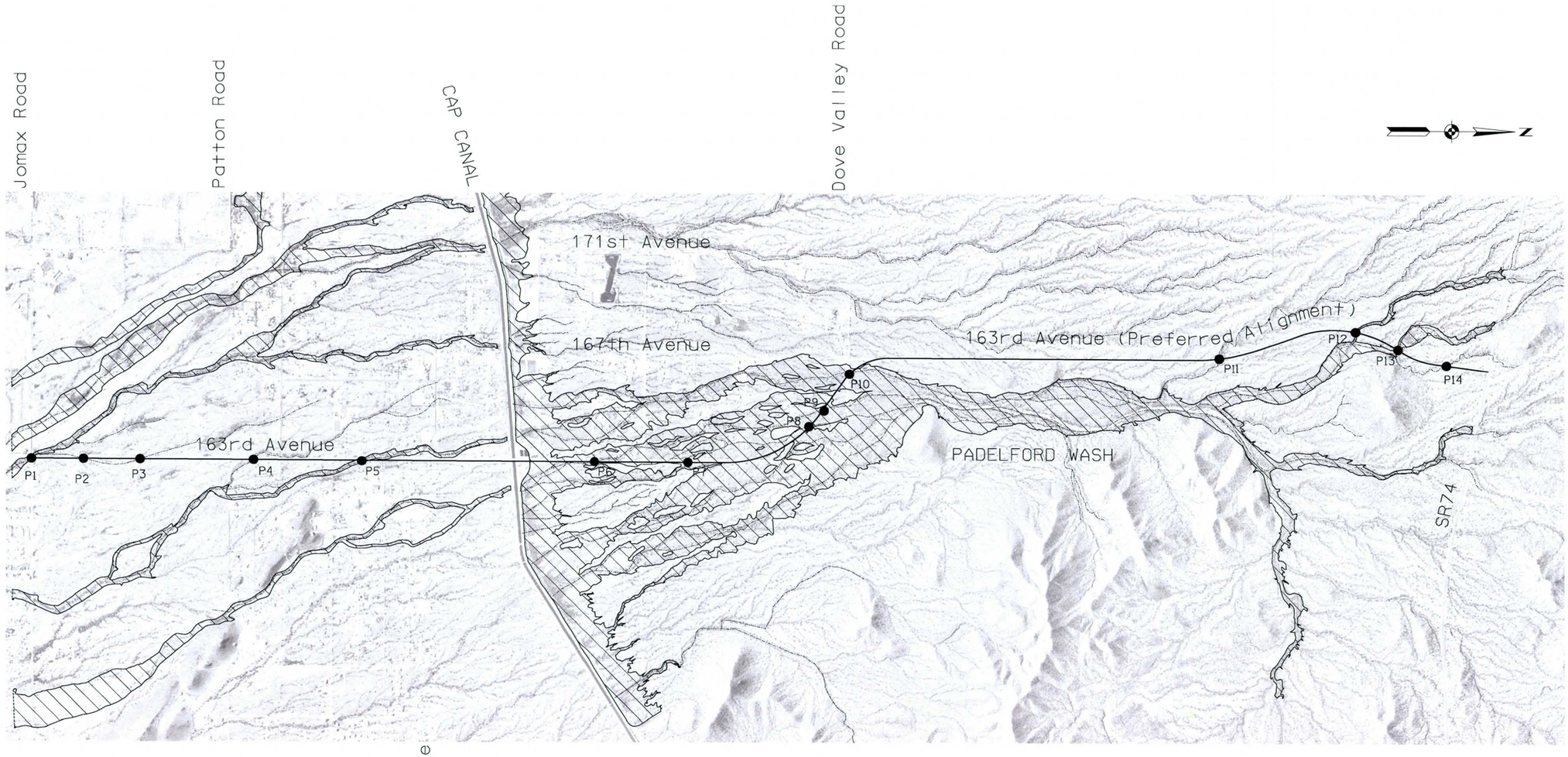
Table 2 – Summary of Drainage Impacts of Preliminary Alternatives

Criteria	Alignment Alternative				
	171st Ave.	West	CAR	East	163rd Ave.
Wash Crossings	14 wash crossings for a total of 48 6'x5' barrels. By turning to the west near the southern termini of the project it avoids crossings of Padelford Wash.	15 wash crossings for a total of 71 6'x5' barrels. Similar to the 171st Ave. alternative it avoids crossings of Padelford Wash. By turning west closer to the CAP canal it crosses fewer and smaller washes than the 171st Ave. alternative.	11 wash crossings for a total of 66 6'x5' barrels, 19 of which are at a single crossing of Split 3 of Padelford Wash; a bridge may be needed at that location. It stays clear of any major crossings from the CAP to 1.5 miles south of SR 74 as is the case with all alternatives on the 167th Ave. alignment	8 wash crossings for a total of 49 6'x5' barrels, 24 of which are at a single crossing of split 3 of Padelford Wash. Otherwise same as the CAR alternative. Increasing skew angles from the CAR to the 163rd Ave. alternative mean increasing structure lengths.	15 wash crossings for a total of 98 6'x5' barrels, 24 of which are at a single crossing of split 3 of Padelford Wash. By crossing Padelford Wash closest to the alluvial fan apex is sees larger flows and intersects more splits than the other alternatives. Same as the CAR alternative once on the 167th Ave alignment.
Floodplain Impacts	Moderate. It crosses floodplains south of the CAP but stays clear of the Padelford Wash floodplains.	Minor. It crosses floodplains south of the CAP but stays clear of the Padelford Wash floodplains.	Significant along the 3 miles south of White Wing Road.	Significant along 3.5 miles south of Dove Valley Road.	Significant along more than 4 miles.
Need for Wash Realignment	Significant in the vicinity of Dove Valley Road.	Similar to 171st alternative but misses reach south of the CAP Canal.	Several locations along the existing 163rd Ave. alignment.	Same as CAR alternative plus a reach south of White Wing Road.	Same as East alternative.



SCALE IN FEET
0 2400 4800
0 0.5 1
SCALE IN MILES

POINTS OF CONCENTRATION
Along Preferred Alternative

163rd Avenue, Jomax Road to SR 74
Access Control and Corridor Improvement Study

FIGURE 6

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5 PREFERRED ALTERNATIVE

A preferred alternative has been identified as a result of a multi-disciplinary analysis and a series of public and stakeholder meetings. The preferred alternative is a slightly modified version of the "163rd Ave." alternative, which follows the existing 163rd Avenue from Jomax Road to a point about one-half-mile south of Dove Valley Road, turning northwest across the Padelford Wash floodplain, then following a northerly direction along the general alignment of 167th Avenue from Dove Valley Road to SR 74. A long curve is introduced at the northernmost mile of the corridor to cross the Padelford Wash tributaries at narrow channel sections (see Figure 6).

5.1 Drainage Structures and Design Flows

Figure 6 shows 14 major drainage crossings along the preferred alternative corridor. According to Maricopa County Policy all culverts and bridges shall be designed with capacity for the 50-year event and a maximum of 6" of depth over the paved road for the 100-year event, given the principal arterial designation of 163rd Avenue. Guidelines also state that the base flood water surface elevation in a FEMA delineated floodplain should not be increased as a result of the construction of roadway improvements.

Table 3 is a summary of flows and conceptual type and size of drainage structures at the waterway crossings shown in Figure 6. The 6'x5' barrel size criteria used for the preliminary alternatives is also used in Table 3 to determine the number of barrels at box culverts, although different rise/span configurations may be more efficient.

Table 3 – Preliminary Drainage Structure Summary

Crossing ID	50-year Flow (cfs)	100-year Flow (cfs)	6'x5' CBC (# of Barrels)	Bridge Span (ft)
P1	864	1,080	6	
P2	125	157	1	
P3	118	148	1	
P4	158	197	1	
P5	312	390	2	
P6	1,058	1,323	7	
P7	1,058	1,323	7	
P8	1,090	1,575	8	
P9	1,090	1,575	8	
P10	3,931	4,660	-	150
P11	49	62	1	
P12	964	1,215	7	
P13	3,439	4,506	-	150
P14	160	200	1	

The bridge span at crossing P10 was estimated by running a single section normal depth calculation assuming a depth of flow of 4' for the 100-year flow, equal to the depth shown in the profile sheet for Padelford Wash Split 3 at Dove Valley Road (see Appendix A) in the Padelford Wash FDS. It is assumed that the bridge opening would be graded to a trapezoidal section of 3:1 side slopes and 3' of freeboard for the 50-year event. Guide banks may be required in order to direct and align flows with the bridge opening.

The span for the proposed P13 bridge is controlled by the top width of flow shown in the HEC-RAS cross-section taken from the Padelford Wash FDS. Channel banks (especially the left, looking upstream) of the Padelford Wash Tributary B are well defined and stable in the vicinity of the proposed structure, minimizing the potential need for channel work.

5.2 Floodplain Impacts

The Preferred Alternative traverses the Padelford Wash floodplain between the CAP Canal and Dove Valley Road. As stated above, construction of roadway improvements should not adversely impact the base flood water surface elevation, and for that purpose it may be necessary to provide 100-year capacity at culvert crossings, construction of guide banks or levees, roadway embankment protection, and sections of wash realignment to minimize changes to the distribution of split flows across the floodplain.

6 REFERENCES

Drainage Design Manual for Maricopa County, Arizona – Volume I, Hydrology
Engineering Division, Flood Control District of Maricopa County
January 1, 1995 (3rd Edition)
November 2003 (Draft – 4th Edition)

Drainage Policies and Standards for Maricopa County, Arizona
Maricopa County / Flood Control District of Maricopa County
July 26, 2006 (Draft)

Hydraulic Design of Highway Culverts
Hydraulic Design Series No. 5
Federal Highway Administration
September, 2001

Padelford Wash Floodplain Delineation Study – Technical Data Notebook
Volumes 1 through 4
Flood Control District of Maricopa County
A-N West consulting Engineers
September, 2002

Wittmann Area Drainage Master Study Update - Technical Data Notebook
Hydrology Report - Volume HY
Flood Control District of Maricopa County
Entellus
July, 2004 -Revised October, 2004

163rd Avenue Candidate Assessment Report (Final)
Maricopa County Department of Transportation
Parsons
January, 2004

APPENDIX A

EXISTING DATA

163RD AVENUE CAR

Drainage Summary

5.0 DRAINAGE INFORMATION

The scope of this project is to provide a qualitative analysis to approximate the number and size of the cross drainage features of the project. As roadway plans are further defined, detailed hydrologic and hydraulic analyses will be needed to quantify the discharge of the major crossings of the proposed roadway.

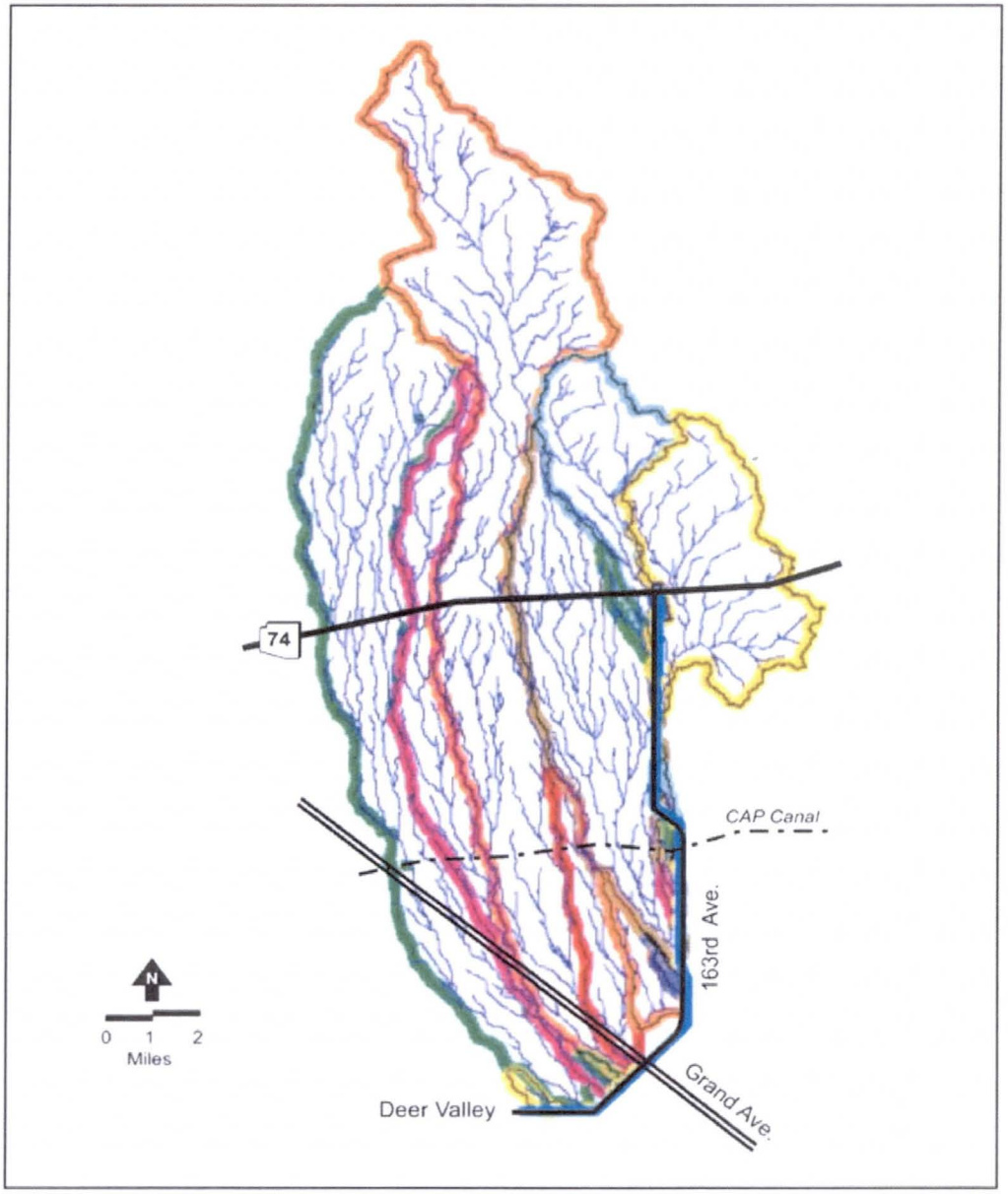
Basic hydrology was analyzed using the WMS computer program to determine the drainage areas and cross culvert locations using USGS's 10-meter digital elevation data. The program was used to determine the drainage boundaries at the roadway crossing. Flow through the cross culverts was then established for each cross culvert by using 800 cfs per square mile of watershed. This is a very simplified hydrologic method, intended to identify order of magnitude facility requirements and costs. These approximations will need to be confirmed/modified with more detailed hydrologic methods as roadway design progresses. These refinements would include use of more precise topographic data, evaluation of soil losses, determination of routing parameters and consideration of the effect of the CAP Canal basins on the lower watershed.

5.1 Existing Drainage Conditions

Offsite drainage that passes through the project site comes from predominantly undeveloped desert. The upstream watershed impacting the 163rd Avenue project extends into the mountains to the north and runs through an alluvial fan that is on an approximate 2% to 3% grade and flows for several miles before coming to the project boundary. Drainage on an alluvial fan has numerous small channels that parallel each other that can combine and diverge with other adjacent streams. Sediment transport rates are typically high due to the step gradients and sandy soils common to the area. Drainage flows generally from the north toward the south to about the CAP Canal where it turns toward the southeast. At the CAP Canal berms collect and detain stormwater flows. Flow is released through large diameter flumes over the CAP Canal. South of the CAP Canal, the existing area is more residential with less defined waterways. See drainage basin and flow pattern in Figure 5.1.

Immediately to the east of the project, a flood plain and floodway exist that was defined in the Maricopa County Flood Control Districts 2002 "*Paddleford Wash Flood Plain Delineation Study.*" The peak discharges near the project limits exceed 10,000 cfs. Except for crossing small tributary streams, this project does not cross the main branches of this flood plain. To the west there exists several other washes that also have a large contributory drainage water shed. These washes probably generate similar discharge rates as Paddleford Wash.

Figure 5.1 - Drainage Basins



5.2 Proposed Drainage Conditions

CROSS DRAINAGE

Cross drainage along the new roadway will be provided by culverts sized to carry the 100-year storm. The culverts will be located at existing drainage crossing locations and/or along significant existing washes or drainage swales. The culvert locations are shown on the conceptual plans in the Appendix. A summary table of culverts is provided in Table 5-1. The culvert sizes were determined by assuming that each culvert will be designed for a 10 fps velocity. The cross sectional area of the culvert was then sized to approximate the required flow area. When the roadway profile is developed culvert analysis will be performed to determine the appropriate size. The largest culvert proposed is a 5 barrel 10-foot wide by 10-foot high box. Above this size of culvert, it was assumed that a bridge would be required. So, for the culvert crossing at Station 120+70, a bridge has been identified instead of a 12-cell box culvert.

Table 5.1 - Drainage Culvert Summary

Station	Culvert ID	Culvert Type	Length (ft)	Q_{100} (cfs)
45+50	XC20	60"RCP	115	160
72+00	XC10+XC15	3-7'X6' Box Culvert	125	1,340
120+70	XC02	Bridge	335	11,430*
167+00	XC17	48" RCP	145	104
180+00	n/a	72" RCP	240	TBD
207+50	XC11	72" RCP	215	336
261+75	XC13	48" RCP	140	112
267+00	n/a	36" RCP	130	TBD
274+00	XC14	60" RCP	150	136
380+00	XC03a	24" RCP	150	16
442+00	XC04	8'x6' Box Culvert	150	456
472+00	XC05	5-10'x10' Box Culvert	160	5,000
490+00	XC06	48" RCP	160	96

*Does not consider the effect of CAP Retention Basins north of the CAP Canal; TBD – To Be Determined.

PAVEMENT DRAINAGE

Pavement drainage will be provided by curb opening catch basins and short segments of collector pipe which will outlet into existing washes. In some areas it may be possible to utilize curb opening inlets (scuppers) to drain directly into roadside swales particularly where the proposed roadway alignment profile does not offer a reasonable amount of clearance for a collection system.

WITTMANN ADMSU

HEC-1 Schematic Plats
Summary of Peak Discharges Tables
Routing Table
Cross-section Data

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211TH AVE. ALIGNMENT
203RD AVE. ALIGNMENT
195TH AVE. ALIGNMENT
PERRYVILLE ROAD (187TH AVE.) ALIGNMENT
CITRUS ROAD (179TH AVE.) ALIGNMENT
COTTON LANE (171ST AVE.) ALIGNMENT
SARIVAL AVE. (163RD AVE.) ALIGNMENT
REEMS ROAD (155TH AVE.) ALIGNMENT
BULLARD AVE. (147TH AVE.) ALIGNMENT
LITCHFIELD ROAD (139TH AVE.) ALIGNMENT
DYSART ROAD (131ST AVE.) ALIGNMENT
EL MIRAGE ROAD (123RD AVE.) ALIGNMENT

NOTE: THE PADELFORD AREA NORTH OF THE CAP CANAL WAS MODELED BY A-N WEST, INC. UNDER (FCDMC) CONTRACT No. 99-12. THIS AREA WAS IMPORTED INTO THE ENTELLUS HEC-1 MODEL . A COPY OF THE PADELFORD SCHEMATIC IS INCLUDED AS PLATE HY-1E.

MATCH LINE (SEE SHEET HY-1D)
MATCH LINE (SEE SHEET HY-1B)

WITTMANN WASH
PADELFORD WASH
PICACHO WASH
TRILBY WASH
IONA WASH
SUN VALLEY PARKWAY

BNSF RR
U.S. 60
S.R. 303
CAP CANAL
McMICKEN DAM
ALL FLOW DIVERTED TO CPI603 THIS FLOW IS ZERO ASSOCIATED AREA IS ZERO.

DOVE VALLEY ROAD ALIGNMENT
STUDY BOUNDARY
LONE MOUNTAIN ROAD ALIGNMENT
DIXILETA DRIVE ALIGNMENT
PATTON ROAD ALIGNMENT
JOMAX ROAD ALIGNMENT
HAPPY VALLEY ROAD ALIGNMENT
CHANNEL
OUTLET
PINNACLE PEAK ROAD ALIGNMENT
DAM
DEER VALLEY ROAD ALIGNMENT
STUDY BOUNDARY
BEARDSLEY ROAD ALIGNMENT
UNION HILLS DRIVE ALIGNMENT
SUN VALLEY PARKWAY
BELL ROAD ALIGNMENT
GREENWAY ROAD ALIGNMENT
WADDELL ROAD ALIGNMENT
CACTUS ROAD ALIGNMENT
PEORIA AVE. ALIGNMENT
DUNLAP AVE. ALIGNMENT
STUDY BOUNDARY

T5N T4N R1W R2W
T4N T3N R1W R2W

CACTUS ROAD ALIGNMENT
3000 2000 1000 0 1500 3000

LEGEND
BASIN — WT100
CONCENTRATION POINT — WT 100
DIVERSION POINT — DO 100
DIVERSION RECOVERY POINT — WT 100
ROUTING REACH — RWT100
STORAGE ROUTING — SSR 100
BASIN BOUNDARY
STUDY BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMIT
TOWNSHIP RANGE LINE
STATE HIGHWAY
RAILROAD TRACK

SUB-AREA KEY

WHITE TANKS	WT	= 100
SUN VALLEY PARKWAY	SV	= 200
IONA WASH	IW	= 300
TRILBY WASH	TW	= 400
WITTMANN WASH	WI	= 500
PICACHO WASH	PI	= 600
PADELFORD	PD	= 700
AGUA FRIA	AF	= 800

KEY MAP
HY-1A HY-1D HY-1B HY-1C

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Tel. 602.506.1501

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AREA DRAINAGE MASTER STUDY UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT FCD 2002C029

PLATE HY-1C
HEC-1 SCHEMATIC

(3 of 4)

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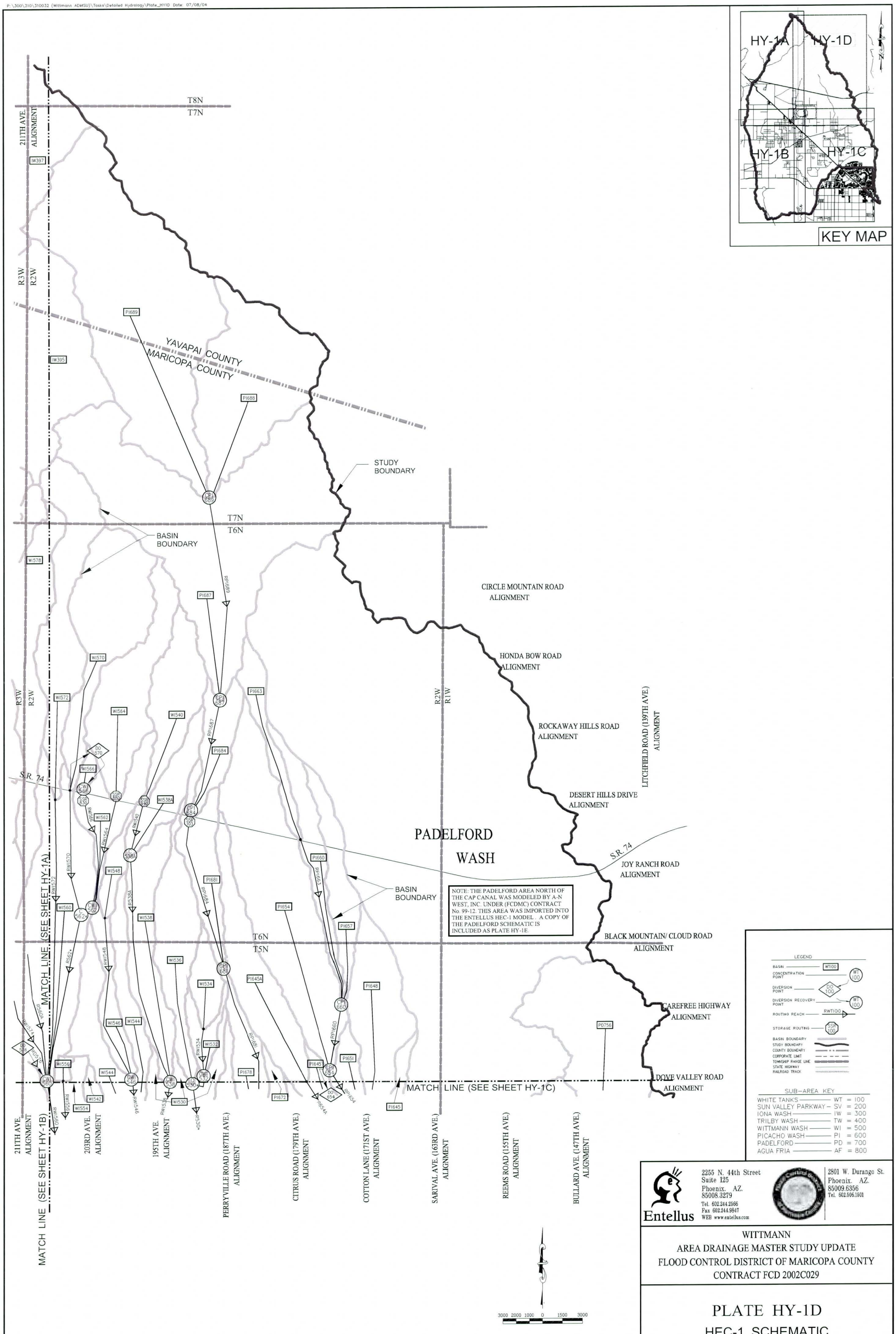

LEGEND

- BASIN — WT100
- CONCENTRATION POINT — WT 100
- DIVERSION POINT — DO 100
- DIVERSION RECOVERY POINT — WT 100
- ROUTING REACH — RWT100
- STORAGE ROUTING — SSA 100
- BASIN BOUNDARY
- STUDY BOUNDARY
- COUNTY BOUNDARY
- CORPORATE LIMIT
- TOWNSHIP RANGE LINE
- STATE HIGHWAY
- RAILROAD TRACK

SUB-AREA KEY

WHITE TANKS	WT	= 100
SUN VALLEY PARKWAY	SV	= 200
IONA WASH	IW	= 300
TRILBY WASH	TW	= 400
WITTMANN WASH	WI	= 500
PICACHO WASH	PI	= 600
PADELFORD	PD	= 700
AGUA FRIA	AF	= 800

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT FCD 2002C029

PLATE HY-1D

HEC-1 SCHEMATIC

(4 of 4)

Table D.6: Summary of Peak Discharges

Model ID	100-yr 24-hr Storm			100-yr 6-hr Storm			Controlling Storm			
	Drainage Area	Exst. Cond.	Fut. Cond.	Drainage Area	Exst. Cond.	Fut. Cond.	Exst. Cond.		Fut Cond.	
	[mi^2]	Q [cfs]	Q [cfs]	[mi^2]	Q [cfs]	Q [cfs]	Storm	Q [cfs]	Storm	Q [cfs]
CIW357	8.60	3,504	3,311	8.60	3,583	3,404	6-hour	3,583	6-hour	3,404
CIW359	5.97	3,105	2,625	5.97	3,423	3,009	6-hour	3,423	6-hour	3,009
CIW360	1.54	666	668	1.62	771	775	6-hour	771	6-hour	775
CIW361	4.82	1,600	1,588	4.76	1,886	1,854	6-hour	1,886	6-hour	1,854
CIW362	14.77	5,141	5,227	14.82	5,316	5,506	6-hour	5,316	6-hour	5,506
CIW363	4.38	1,640	1,570	4.26	1,903	1,805	6-hour	1,903	6-hour	1,805
CIW364	2.13	1,337	1,273	2.13	1,456	1,433	6-hour	1,456	6-hour	1,433
CIW365	0.63	353	330	0.74	583	557	6-hour	583	6-hour	557
CIW366	1.08	881	785	1.07	1,105	989	6-hour	1,105	6-hour	989
CIW367	0.17	80	75	0.43	320	301	6-hour	320	6-hour	301
CIW368	0.71	296	301	0.79	479	498	6-hour	479	6-hour	498
CIW370	12.05	5,663	5,761	12.02	5,750	5,961	6-hour	5,750	6-hour	5,961
CIW374	0.53	558	526	0.54	784	757	6-hour	784	6-hour	757
CIW375	0.82	306	329	0.85	446	493	6-hour	446	6-hour	493
CIW380	15.11	7,968	8,319	15.11	7,995	8,664	6-hour	7,995	6-hour	8,664
CIW381	0.72	493	477	0.64	619	599	6-hour	619	6-hour	599
CIW382	0.99	525	539	0.99	685	708	6-hour	685	6-hour	708
CIW384	0.23	164	157	0.41	390	394	6-hour	390	6-hour	394
CIW388	7.85	3,436	3,268	7.85	3,532	3,396	6-hour	3,532	6-hour	3,396
CIW390	6.50	3,038	2,945	6.50	3,093	3,091	6-hour	3,093	6-hour	3,091
CIW395	12.68	7,572	8,032	12.68	7,766	8,463	6-hour	7,766	6-hour	8,463
CIW396	14.61	7,924	8,342	14.61	8,001	8,699	6-hour	8,001	6-hour	8,699
CPD700	313.12	7,100	9,061	313.12	4,067	5,673	24-hour	7,100	24-hour	9,061
CPD704	8.84	3,060	3,449	8.84	3,265	3,804	6-hour	3,265	6-hour	3,804
CPD708	7.76	2,728	3,185	7.76	2,957	3,529	6-hour	2,957	6-hour	3,529
CPD720	293.30	5,912	7,507	296.13	4,039	5,207	24-hour	5,912	24-hour	7,507
CPD726	44.29	2,998	3,378	39.20	2,581	3,146	24-hour	2,998	24-hour	3,378
CPD732	15.04	1,200	1,349	13.11	1,085	1,319	24-hour	1,200	24-hour	1,349
CPD736	5.27	451	476	4.64	441	489	24-hour	451	6-hour	489
CPD740	18.84	1,273	1,652	16.31	1,249	1,698	24-hour	1,273	6-hour	1,698
CPD748	0.47	605	614	0.47	910	914	6-hour	910	6-hour	914
CPI600	258.01	4,378	5,384	263.07	2,575	3,219	24-hour	4,378	24-hour	5,384
CPI603	15.46	2,450	2,711	15.98	2,202	2,506	24-hour	2,450	24-hour	2,711
CPI604	2.03	321	382	1.82	469	496	6-hour	469	6-hour	496
CPI606	3.49	701	785	3.17	753	881	6-hour	753	6-hour	881
CPI609	8.10	1,187	1,387	9.15	1,110	1,291	24-hour	1,187	24-hour	1,387
CPI612	12.43	1,362	1,584	14.40	1,279	1,431	24-hour	1,362	24-hour	1,584

* Drainage areas may differ between the 24-hour and 6-hour storms: the HEC-1 hard coding was performed separately for the 24-hour and 6-hour storms.

Table D.6: Summary of Peak Discharges

Model ID	100-yr 24-hr Storm			100-yr 6-hr Storm			Controlling Storm			
	Drainage Area	Exst. Cond.	Fut. Cond.	Drainage Area	Exst. Cond.	Fut. Cond.	Exst. Cond.		Fut Cond.	
	[mi^2]	Q [cfs]	Q [cfs]	[mi^2]	Q [cfs]	Q [cfs]	Storm	Q [cfs]	Storm	Q [cfs]
C576B	1.69	687	619	1.69	919	837	6-hour	919	6-hour	837
C580A	3.13	2,218	1,878	3.13	2,424	2,129	6-hour	2,424	6-hour	2,129
C600A	8.62	1,287	1,485	9.67	1,222	1,403	24-hour	1,287	24-hour	1,485
C606A	4.08	363	375	3.55	368	396	6-hour	368	6-hour	396
C624A	6.92	2,060	2,199	7.56	1,746	2,115	24-hour	2,060	24-hour	2,199
C700*	302.88	6,356	8,139	302.88	4,037	5,569	24-hour	6,356	24-hour	8,139
C708*	3.70	1,563	1,750	3.70	1,685	2,010	6-hour	1,685	6-hour	2,010
C726*	41.19	3,037	3,389	36.10	2,672	3,211	24-hour	3,037	24-hour	3,389
C726A	21.41	1,812	1,971	18.85	1,657	1,909	24-hour	1,812	24-hour	1,971
C726B	19.77	1,298	1,654	17.24	1,229	1,695	24-hour	1,298	6-hour	1,695
C802*	313.51	7,101	9,072	313.51	4,066	5,672	24-hour	7,101	24-hour	9,072
CAF807	4.49	2,508	2,600	4.49	2,926	2,905	6-hour	2,926	6-hour	2,905
CAF810	320.12	7,224	9,287	320.12	4,057	5,664	24-hour	7,224	24-hour	9,287
CAF820	320.81	7,221	9,272	320.81	4,046	5,648	24-hour	7,221	24-hour	9,272
CAF850	0.72	1,140	1,184	0.72	1,545	1,596	6-hour	1,545	6-hour	1,596
CAF852	0.51	812	817	0.51	1,174	1,179	6-hour	1,174	6-hour	1,179
CAF860	1.08	860	914	1.08	1,151	1,226	6-hour	1,151	6-hour	1,226
CAF862	0.26	373	364	0.26	555	543	6-hour	555	6-hour	543
CAP1*	53.75	14,390	15,575	53.76	13,205	14,655	24-hour	14,390	24-hour	15,575
CAP2*	39.36	8,461	10,018	33.74	6,672	8,797	24-hour	8,461	24-hour	10,018
CIW300	30.57	6,941	7,056	30.55	6,611	6,819	24-hour	6,941	24-hour	7,056
CIW302	24.18	5,078	5,239	24.24	5,042	5,220	24-hour	5,078	24-hour	5,239
CIW310	1.75	708	686	1.75	885	891	6-hour	885	6-hour	891
CIW314	29.09	7,496	7,416	29.07	7,566	7,448	6-hour	7,566	6-hour	7,448
CIW322	25.16	7,021	6,791	25.14	7,314	7,020	6-hour	7,314	6-hour	7,020
CIW330	23.27	6,608	6,392	23.25	6,979	6,677	6-hour	6,979	6-hour	6,677
CIW334	22.85	5,156	5,266	22.91	5,175	5,351	6-hour	5,175	6-hour	5,351
CIW338	21.26	5,213	5,289	21.32	5,248	5,425	6-hour	5,248	6-hour	5,425
CIW342	17.25	5,157	5,226	17.30	5,302	5,474	6-hour	5,302	6-hour	5,474
CIW346	20.92	5,247	5,319	20.98	5,297	5,470	6-hour	5,297	6-hour	5,470
CIW349	12.30	5,399	5,508	12.27	5,506	5,721	6-hour	5,506	6-hour	5,721
CIW350	17.41	5,647	5,297	17.45	6,037	5,645	6-hour	6,037	6-hour	5,645
CIW351	1.71	559	568	1.67	697	711	6-hour	697	6-hour	711
CIW352	6.31	2,192	2,204	6.39	2,291	2,355	6-hour	2,291	6-hour	2,355
CIW353	15.24	5,023	4,662	15.28	5,494	5,051	6-hour	5,494	6-hour	5,051
CIW354	14.59	5,244	5,334	14.64	5,405	5,595	6-hour	5,405	6-hour	5,595
CIW356	14.23	5,308	5,397	14.28	5,452	5,643	6-hour	5,452	6-hour	5,643

* Drainage areas may differ between the 24-hour and 6-hour storms: the HEC-1 hard coding was performed separately for the 24-hour and 6-hour storms.

Table D.6: Summary of Peak Discharges

Model ID	100-yr 24-hr Storm			100-yr 6-hr Storm			Controlling Storm			
	Drainage Area	Exst. Cond.	Fut. Cond.	Drainage Area	Exst. Cond.	Fut. Cond.	Exst. Cond.		Fut Cond.	
	[mi^2]	Q [cfs]	Q [cfs]	[mi^2]	Q [cfs]	Q [cfs]	Storm	Q [cfs]	Storm	Q [cfs]
CPI615	8.26	882	1,006	9.61	904	1,148	6-hour	904	6-hour	1,148
CPI618	7.31	850	876	8.63	876	1,064	6-hour	876	6-hour	1,064
CPI621	10.22	1,179	1,387	11.70	1,013	1,272	24-hour	1,179	24-hour	1,387
CPI624	8.94	1,945	2,484	9.64	1,662	2,369	24-hour	1,945	24-hour	2,484
CPI628	4.11	750	763	4.75	594	1,057	24-hour	750	6-hour	1,057
CPI633	241.94	3,871	4,794	246.48	2,169	2,833	24-hour	3,871	24-hour	4,794
CPI635	223.43	2,901	3,734	224.79	1,521	2,117	24-hour	2,901	24-hour	3,734
CPI636	0.80	400	409	0.86	546	566	6-hour	546	6-hour	566
CPI639	0.37	173	184	0.43	288	310	6-hour	288	6-hour	310
CPI645	11.72	4,921	4,890	11.72	5,320	5,404	6-hour	5,320	6-hour	5,404
CPI651	7.26	3,455	3,308	7.26	3,894	3,811	6-hour	3,894	6-hour	3,811
CPI654	6.34	3,103	2,831	6.34	3,587	3,352	6-hour	3,587	6-hour	3,352
CPI660	2.31	986	906	2.31	1,270	1,172	6-hour	1,270	6-hour	1,172
CPI672	6.98	2,266	2,407	6.98	2,483	2,753	6-hour	2,483	6-hour	2,753
CPI675	14.77	6,454	6,800	14.77	6,471	7,156	6-hour	6,471	6-hour	7,156
CPI678	19.55	9,081	9,528	19.55	8,723	9,652	24-hour	9,081	6-hour	9,652
CPI681	18.72	9,687	10,027	18.72	9,152	10,009	24-hour	9,687	24-hour	10,027
CPI684	17.73	10,128	10,632	17.73	9,384	10,270	24-hour	10,128	24-hour	10,632
CPI687	16.99	10,065	10,688	16.99	9,390	10,250	24-hour	10,065	24-hour	10,688
CPI689	9.98	6,934	7,340	9.98	6,591	7,228	24-hour	6,934	24-hour	7,340
CPI690	14.71	6,673	7,007	14.71	6,659	7,346	24-hour	6,673	6-hour	7,346
CSV200	99.52	14,084	14,856	99.49	11,885	12,735	24-hour	14,084	24-hour	14,856
CSV212	38.68	7,363	8,859	38.68	6,822	8,643	24-hour	7,363	24-hour	8,859
CSV216	6.82	2,345	2,364	6.82	2,621	2,753	6-hour	2,621	6-hour	2,753
CSV218	2.82	1,692	1,668	2.82	1,767	1,834	6-hour	1,767	6-hour	1,834
CSV219	1.14	1,104	1,112	1.14	1,122	1,150	6-hour	1,122	6-hour	1,150
CSV220	30.63	6,753	7,844	30.63	6,403	7,777	24-hour	6,753	24-hour	7,844
CSV244	1.62	720	804	1.62	917	1,053	6-hour	917	6-hour	1,053
CSV246	0.76	395	421	0.76	514	555	6-hour	514	6-hour	555
CSV256	0.44	340	391	0.44	484	564	6-hour	484	6-hour	564
CSV260	16.99	5,765	6,663	16.99	6,422	7,564	6-hour	6,422	6-hour	7,564
CSV264	4.82	2,264	2,474	4.82	2,714	3,000	6-hour	2,714	6-hour	3,000
CSV272	3.84	1,566	1,843	3.84	1,966	2,342	6-hour	1,966	6-hour	2,342
CSV276	7.41	3,247	3,634	7.41	3,738	4,303	6-hour	3,738	6-hour	4,303
CSV280	9.54	3,723	4,203	9.54	4,248	4,905	6-hour	4,248	6-hour	4,905
CSV284	1.82	1,157	1,270	1.82	1,449	1,635	6-hour	1,449	6-hour	1,635
CTW400	173.14	17,687	21,552	174.27	11,386	14,449	24-hour	17,687	24-hour	21,552

* Drainage areas may differ between the 24-hour and 6-hour storms: the HEC-1 hard coding was performed separately for the 24-hour and 6-hour storms.

Table D.6: Summary of Peak Discharges

Model ID	100-yr 24-hr Storm			100-yr 6-hr Storm			Controlling Storm			
	Drainage Area	Exst. Cond.	Fut. Cond.	Drainage Area	Exst. Cond.	Fut. Cond.	Exst. Cond.		Fut Cond.	
	[mi^2]	Q [cfs]	Q [cfs]	[mi^2]	Q [cfs]	Q [cfs]	Storm	Q [cfs]	Storm	Q [cfs]
IW392	1.11	1,713	1,572	1.11	1,985	1,811	6-hour	1,985	6-hour	1,811
IW394	4.17	2,569	2,624	4.17	2,700	2,805	6-hour	2,700	6-hour	2,805
IW395	7.86	6,223	6,506	7.86	5,796	6,231	24-hour	6,223	24-hour	6,506
IW396	0.59	260	256	0.59	390	389	6-hour	390	6-hour	389
IW397	4.81	3,716	3,909	4.81	3,845	4,160	6-hour	3,845	6-hour	4,160
PD700	1.40	1,491	1,451	1.40	1,703	1,683	6-hour	1,703	6-hour	1,683
PD704	0.36	337	342	0.36	480	491	6-hour	480	6-hour	491
PD708	2.40	1,690	1,596	2.40	1,840	1,829	6-hour	1,840	6-hour	1,829
PD712	0.89	755	742	0.89	1,003	987	6-hour	1,003	6-hour	987
PD712A	0.77	407	382	0.77	570	546	6-hour	570	6-hour	546
PD716	1.75	2,751	2,662	1.75	2,644	2,642	24-hour	2,751	24-hour	2,662
PD720	0.59	668	664	0.59	942	944	6-hour	942	6-hour	944
PD726	1.35	843	797	1.35	1,071	1,051	6-hour	1,071	6-hour	1,051
PD726A	1.10	457	431	1.10	605	579	6-hour	605	6-hour	579
PD726B	0.93	642	654	0.93	832	849	6-hour	832	6-hour	849
PD732	0.48	461	462	0.48	681	687	6-hour	681	6-hour	687
PD736	0.78	269	256	0.78	373	358	6-hour	373	6-hour	358
PD740	1.28	798	809	1.28	991	1,005	6-hour	991	6-hour	1,005
PD744	0.80	531	508	0.80	732	709	6-hour	732	6-hour	709
PD748	0.28	374	381	0.28	557	559	6-hour	557	6-hour	559
PD752	0.19	236	239	0.19	354	356	6-hour	354	6-hour	356
PD756	3.23	1,528	1,554	3.23	1,655	1,791	6-hour	1,655	6-hour	1,791
PD760	0.87	1,161	1,168	0.87	1,444	1,464	6-hour	1,444	6-hour	1,464
PDEAST	16.44	8,461	10,018	16.44	6,672	8,797	24-hour	8,461	24-hour	10,018
PDWEST	7.08	4,394	5,033	7.08	3,720	4,407	24-hour	4,394	24-hour	5,033
PI600	0.61	731	718	0.61	1,023	1,007	6-hour	1,023	6-hour	1,007
PI600A	0.52	822	817	0.52	1,191	1,179	6-hour	1,191	6-hour	1,179
PI603	0.52	418	423	0.52	623	633	6-hour	623	6-hour	633
PI604	0.36	312	329	0.36	469	494	6-hour	469	6-hour	494
PI606	1.08	708	790	1.08	921	1,033	6-hour	921	6-hour	1,033
PI606A	0.46	374	353	0.46	575	546	6-hour	575	6-hour	546
PI609	1.94	960	1,030	1.94	1,135	1,233	6-hour	1,135	6-hour	1,233
PI612	0.74	458	492	0.74	656	701	6-hour	656	6-hour	701
PI615	0.84	625	628	0.84	852	855	6-hour	852	6-hour	855
PI618	0.29	323	300	0.29	470	448	6-hour	470	6-hour	448
PI621	0.90	645	667	0.90	865	907	6-hour	865	6-hour	907
PI624	1.23	847	879	1.23	1,112	1,157	6-hour	1,112	6-hour	1,157

* Drainage areas may differ between the 24-hour and 6-hour storms: the HEC-1 hard coding was performed separately for the 24-hour and 6-hour storms.

Table D.6: Summary of Peak Discharges

Model ID	100-yr 24-hr Storm			100-yr 6-hr Storm			Controlling Storm			
	Drainage Area	Exst. Cond.	Fut. Cond.	Drainage Area	Exst. Cond.	Fut. Cond.	Exst. Cond.		Fut Cond.	
	[mi^2]	Q [cfs]	Q [cfs]	[mi^2]	Q [cfs]	Q [cfs]	Storm	Q [cfs]	Storm	Q [cfs]
PI624A	2.81	1,630	1,827	2.81	1,577	1,953	24-hour	1,630	6-hour	1,953
PI628	0.57	695	655	0.57	1,004	953	6-hour	1,004	6-hour	953
PI633	0.34	280	297	0.34	383	411	6-hour	383	6-hour	411
PI635	0.61	622	565	0.61	889	807	6-hour	889	6-hour	807
PI636	0.43	384	373	0.43	576	566	6-hour	576	6-hour	566
PI639	0.34	169	178	0.34	261	273	6-hour	261	6-hour	273
PI642	0.24	162	184	0.24	247	278	6-hour	247	6-hour	278
PI645	1.56	1,160	1,143	1.56	1,292	1,316	6-hour	1,292	6-hour	1,316
PI645A	1.63	912	893	1.63	1,162	1,175	6-hour	1,162	6-hour	1,175
PI648	1.73	1,035	969	1.73	1,286	1,246	6-hour	1,286	6-hour	1,246
PI651	0.46	308	290	0.46	459	436	6-hour	459	6-hour	436
PI654	4.03	2,372	2,194	4.03	2,695	2,599	6-hour	2,695	6-hour	2,599
PI657	0.87	456	432	0.87	607	583	6-hour	607	6-hour	583
PI660	0.84	339	320	0.84	455	432	6-hour	455	6-hour	432
PI663	0.60	329	324	0.60	468	468	6-hour	468	6-hour	468
PI669	0.29	144	145	0.29	219	223	6-hour	219	6-hour	223
PI672	1.51	1,172	1,128	1.51	1,342	1,306	6-hour	1,342	6-hour	1,306
PI675	0.06	72	72	0.06	106	106	6-hour	106	6-hour	106
PI678	0.83	406	514	0.83	556	708	6-hour	556	6-hour	708
PI681	0.99	598	585	0.99	792	798	6-hour	792	6-hour	798
PI684	0.74	637	632	0.74	864	871	6-hour	864	6-hour	871
PI687	7.01	4,139	4,342	7.01	4,123	4,438	24-hour	4,139	6-hour	4,438
PI688	3.20	2,507	2,636	3.20	2,650	2,857	6-hour	2,650	6-hour	2,857
PI689	6.78	4,688	4,972	6.78	4,695	5,150	6-hour	4,695	6-hour	5,150
PI690	0.63	315	334	0.63	447	478	6-hour	447	6-hour	478
PI693	0.84	756	732	0.84	1,003	980	6-hour	1,003	6-hour	980
SV200	2.29	1,931	2,114	2.29	2,003	2,363	6-hour	2,003	6-hour	2,363
SV202	1.44	1,078	1,032	1.44	1,323	1,314	6-hour	1,323	6-hour	1,314
SV203	0.08	120	111	0.08	182	170	6-hour	182	6-hour	170
SV205	0.50	747	739	0.50	1,102	1,095	6-hour	1,102	6-hour	1,095
SV208	1.07	638	676	1.07	831	889	6-hour	831	6-hour	889
SV210	0.72	1,189	1,216	0.72	1,553	1,606	6-hour	1,553	6-hour	1,606
SV212	4.14	3,325	3,361	4.14	3,072	3,358	24-hour	3,325	24-hour	3,361
SV214	1.87	1,910	1,944	1.87	2,019	2,185	6-hour	2,019	6-hour	2,185
SV216	1.63	1,613	1,551	1.63	1,787	1,781	6-hour	1,787	6-hour	1,781
SV218	1.29	1,039	986	1.29	1,258	1,225	6-hour	1,258	6-hour	1,225
SV219	0.90	1,105	1,105	0.90	1,167	1,179	6-hour	1,167	6-hour	1,179

* Drainage areas may differ between the 24-hour and 6-hour storms: the HEC-1 hard coding was performed separately for the 24-hour and 6-hour storms.

Entellus

Appendix D.3

BY _____ DATE _____

CHECK _____ DATE _____

CLIENT: FCDMC **JOB NO.** 310.032

JOB: Wittmann Area Drainage Master Study Update

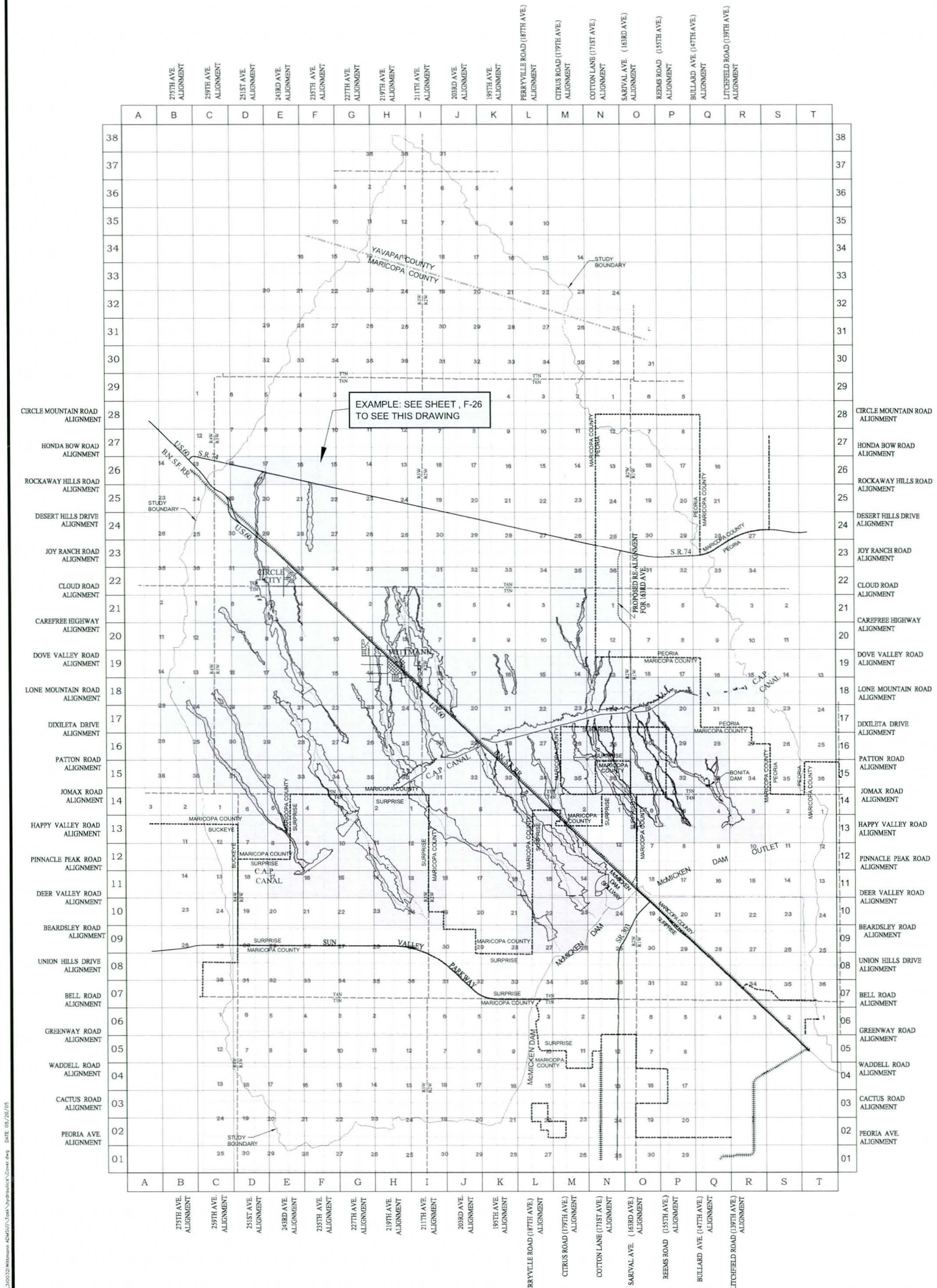
Storm: 100-yr, 24-hr Existing Conditions **Route N-Step vs Velocity**

Route (Model Order)	Previous Time to Peak [hr]	Route Time to Peak [hr]	Difference in Time to peak [hr]	Route Length [ft]	HEC-1 Velocity [fps]	Normal Depth Velocity [fps]	HEC-1 Flow [cfs]	Normal Depth Flow [cfs]	Typical Cross Section	Route Slope [ft/ft]	Manning's "n" Value	HEC-1 N-step
RWI524	12.58	13.00	0.42	4526	2.99	2.78	577	586	WITS130	0.006	0.035	2
RWI506	13.17	13.42	0.25	5235	5.82	2.76	2134	2142	WITS70	0.004	0.04	3
RD508	16.92	17.17	0.25	5200	5.78	2.59	972	979	WITS70	0.007	0.04	2
RWI500	27.00	27.58	0.58	5659	2.71	4.36	2901	2910	Channel	0.001	0.035	3
RPI635	27.58	28.33	0.75	7557	2.80	4.36	2900	2909	Channel	0.001	0.035	6
RDCP11	16.08	16.33	0.25	6377	7.09	3.71	424	433	PITS10_2	0.009	0.035	5
RDCP12	16.08	16.42	0.34	6159	5.03	3.14	410	419	PITS30	0.009	0.035	2
RPI618	16.17	16.67	0.50	10443	5.80	3.09	399	408	PITS20	0.008	0.035	5
RDCP13	16.08	16.67	0.59	11034	5.20	3.10	420	429	PITS30	0.009	0.035	6
RD618	16.17	16.42	0.25	4541	5.05	3.39	450	459	PITS20	0.009	0.035	2
RPI615	16.42	16.75	0.33	5109	4.30	3.85	882	890	PITS20	0.008	0.035	2
RPI612	12.67	13.00	0.33	5754	4.84	2.71	327	336	PITS20	0.006	0.035	3
RDCP14	16.08	17.25	1.17	20386	4.84	2.95	362	371	PITS30	0.009	0.035	12
RPI609	12.75	12.92	0.17	4513	7.37	6.04	1171	1180	PITS40	0.006	0.035	2
RD612	12.67	17.33	4.66	11125	0.66	3.66	960	968	PITS20	0.007	0.035	8
RPI621	13.33	13.42	0.09	2775	8.56	3.73	1159	1167	TSR621	0.008	0.035	1
RDCP10	16.08	16.50	0.42	6701	4.43	2.87	420	429	WITS120	0.008	0.035	4
RPI628	12.33	13.08	0.75	14427	5.34	3.15	507	516	PITS20	0.007	0.035	6
R624A	12.83	13.83	1.00	11809	3.28	2.84	1528	1536	PDTS40_1	0.004	0.035	6
RD524	12.58	12.83	0.25	2235	2.48	0.10	3	0	WITS130	0.003	0.035	1
RPI639	12.75	13.58	0.83	5380	1.80	1.66	115	124	WITS130	0.005	0.035	2
RPI636	12.50	12.58	0.08	728	2.53	3.36	393	402	WITS130	0.014	0.035	1
RPI624 **	13.83	14.17	0.34	5060	4.13	3.35	1848	1856	TSR621	0.004	0.035	3
RPI633	24.75	25.42	0.67	5834	2.42	4.73	3867	3876	Channel	0.001	0.035	4
RDCP15	14.00	14.42	0.42	9602	6.35	2.90	248	257	PITS30	0.011	0.035	6
R606A	12.50	17.92	5.42	12583	0.64	2.49	166	175	PDTS30	0.008	0.035	7

+ Time lapse less than time step of 5 minutes, so 1 time step was assumed for HEC-1 Velocity Calculation

** Modified Typical X-Section

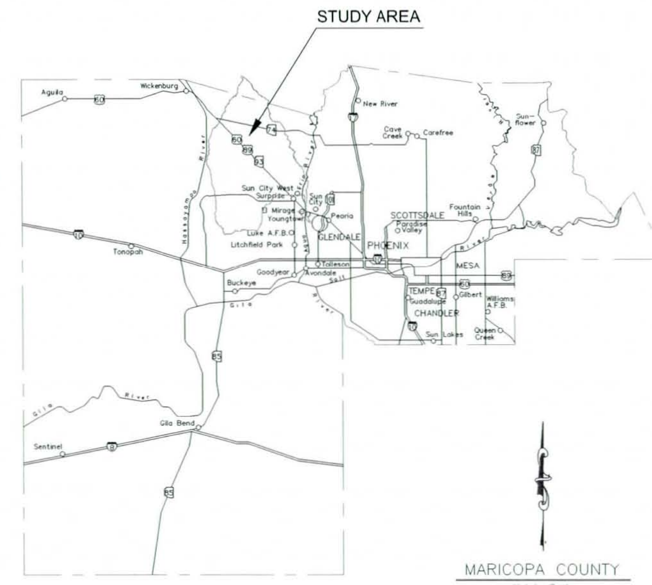
x Modified Time To Peak Used



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT F.C.D. 2002C029



LOCATION MAP

AERIAL MAPPING

NOT A PART OF THIS CONTRACT.
SUPPLIED BY THE FLOOD CONTROL DISTRICT.

HYDROLOGY

Entellus, Inc.
2255 North 44th Street, Suite 125
Phoenix, Az. 85008-3279

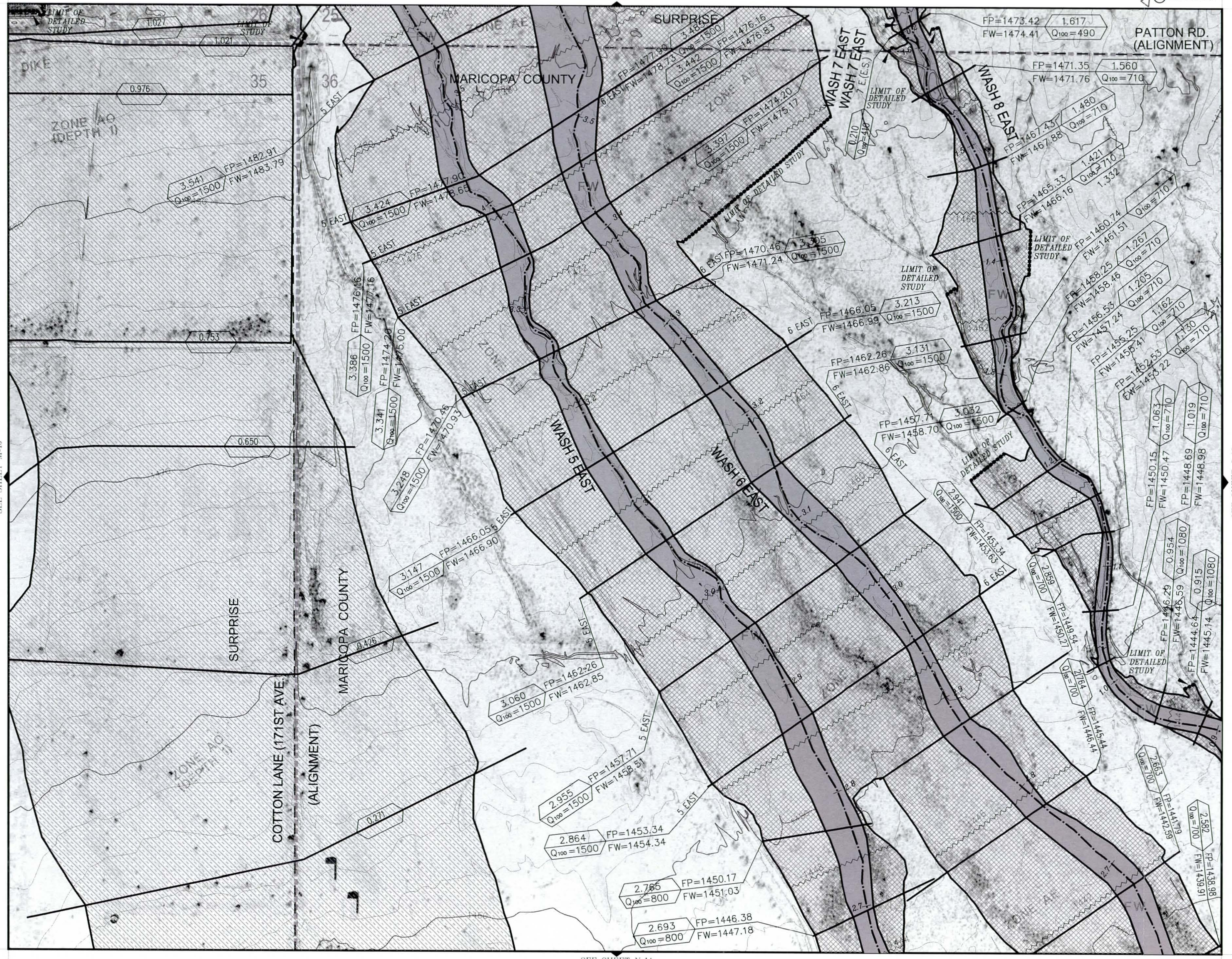
HYDRAULICS

Entellus, Inc.
2255 North 44th Street, Suite 125
Phoenix, Az. 85008-3279

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008-3279
Tel 602.244.2566
Fax 602.244.8947
WEB www.entellus.com

	BY	DATE	
DESIGN	AMB	07/2005	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	07/2005	RECOMMENDED BY: DATE
PLANS	KAB	07/2005	APPROVED BY: DATE
PLANS CHK.	HAA/AMB	07/2005	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY:	DATE:		SHEET 1 OF 153

SEE SHEET N-16



SEE SHEET M-15
SEE SHEET O-15
SEE SHEET N-14

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE
CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A — ZONE A
EFFECTIVE ZONE AE — ZONE AH
EFFECTIVE ZONE AH — ZONE AE
EFFECTIVE FLOODWAY — FLOODWAY (FW)
ZONE AO

HYDRAULIC BASE LINE
ZONE DESIGNATION — ZONE A
WASH I.D. LABEL — WASH 9 EAST
ELEVATION REFERENCE MARK — ERM AJ3866
CROSS SECTION — 2.199 Q100=1270 FP=1400.55 FW=1400.56
BASE FLOOD ELEVATION — 1320
DIKE / LEVEE — DIKE
COUNTY BOUNDARY
CORPORATE LIMIT
LIMIT OF STUDY
LIMIT OF DETAILED STUDY
TOWNSHIP/RANGE LINE
SECTION LINE
SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3867		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 1.90 FEET = NAVD 88

HERNAN A. ARISTIZABAL

INDEX MAP

SCALE: 1"= 200'

Entellus
2255 N. 44th Street Suite 125
Phoenix AZ 85008-3279
Tel 602.244.2566
Fax 602.244.8947
WEB www.entellus.com

	BY	DATE
DESIGN	AMG/RAS	07/2005
DESIGN CHK.	HAA	07/2005
PLANS	KAB	07/2005
PLANS CHK.	AMG/HAA	07/2005
SUBMITTED BY:		DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET N-15 OF FLOODPLAIN DELINEATION

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

SEE SHEET N-17

ERM AJ3867

LIMIT OF DETAILED STUDY
ZONE AE
FW
WASH 6 EAST
WASH 7 EAST (WEST SPLIT)
WASH 7 EAST (EAST SPLIT)
WASH 8 EAST
WASH 5 EAST
COTTON LN (171ST AVE) (ALIGNMENT)
Dale Ln.
ZONE A
LIMIT OF STUDY
5 EAST
6 EAST

FP=1521.33 4.476 FW=1521.61 Q100=440
0.447 Q100=280 FP=1520.39 FW=1521.12
0.380 Q100=280 FP=1516.89 FW=1517.71
0.319 Q100=280 FP=1513.76 FW=1514.19
4.408 Q100=440 FP=1518.29 FW=1518.76
4.374 Q100=440 FP=1516.83 FW=1517.25
4.348 Q100=440 FP=1515.69 FW=1516.06
4.293 Q100=440 FP=1513.70 FW=1514.00
4.214 Q100=440 FP=1510.22 FW=1510.74
4.157 Q100=440 FP=1507.86 FW=1508.36
4.105 Q100=440 FP=1505.47 FW=1506.37
3.938 Q100=750 FP=1496.21 FW=1496.97
3.853 Q100=750 FP=1495.98 FW=1496.44
3.734 Q100=800 FP=1491.50 FW=1492.28
3.785 Q100=800 FP=1493.03 FW=1493.09
3.721 Q100=800 FP=1491.09 FW=1491.72

ZE(WS) FP=1523.63 0.517 FW=1524.53 Q100=280
FP=1520.11 1.187 FW=1520.65 Q100=410
FP=1517.58 1.128 FW=1518.04 Q100=410
FP=1515.21 1.064 FW=1515.40 Q100=410
FP=1512.27 1.001 FW=1512.23 Q100=410
FP=1508.13 0.947 FW=1508.24 Q100=410
FP=1505.21 0.884 FW=1505.38 Q100=410
FP=1510.67 0.255 FW=1511.49 Q100=280
FP=1508.26 0.205 FW=1508.71 Q100=280
FP=1500.61 0.872 FW=1500.53 Q100=410
FP=1497.81 0.759 FW=1498.46 Q100=410
FP=1496.10 0.722 FW=1496.26 Q100=410
FP=1494.16 0.670 FW=1494.17 Q100=410
FP=1504.32 0.126 FW=1504.68 Q100=280
FP=1502.29 4.034 FW=1502.52 Q100=440
ZE(WS) 0.046 Q100=280
FP=1498.23 3.949 FW=1499.04 Q100=700
ZONE A 10 Q100=660
FP=1496.33 3.902 FW=1497.27 Q100=700
FP=1493.80 3.842 FW=1494.72 Q100=700
FP=1491.43 0.607 FW=1491.84 Q100=410
FP=1488.69 0.541 FW=1488.77 Q100=410
0.473 Q100=410 FP=1485.97 FW=1486.27
3.684 Q100=1500 FP=1487.05 FW=1488.04
3.768 Q100=1500 FP=1490.83 FW=1491.52
3.711 Q100=1500 FP=1490.69 FW=1491.15
1.027
3.622 Q100=1500 FP=1487.05 FW=1487.60
3.590 Q100=1500 FP=1482.91 FW=1483.74
3.485 Q100=1500 FP=1477.90 FW=1478.73
0.397 Q100=410 FP=1482.75 FW=1483.43
0.322 Q100=410
0.276 Q100=410

FP=1513.64 2.477 FW=1513.86 Q100=490
FP=1509.99 2.403 FW=1510.38 Q100=490
FP=1506.52 2.313 FW=1506.56 Q100=490
FP=1503.46 2.249 FW=1503.92 Q100=490
FP=1499.51 2.177 FW=1500.40 Q100=490
FP=1496.41 2.101 FW=1496.76 Q100=490
FP=1491.78 2.024 FW=1492.65 Q100=490
FP=1489.43 1.969 FW=1489.88 Q100=490
FP=1486.65 1.925 FW=1486.85 Q100=490
FP=1483.82 1.870 FW=1484.57 Q100=490
FP=1482.33 1.826 FW=1483.13 Q100=490
FP=1479.79 1.759 FW=1480.56 Q100=490
ZONE A 1.000 Q100=410
FP=1476.25 1.681 FW=1476.40 Q100=490

SEE SHEET M-16
SEE SHEET O-16
SEE SHEET N-15

FILE: P:\300\310\310032 (Wittmann ADMSU)\Task \Hydraulics\FP-N_16.dwg DATE: 07/23/05

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A — ZONE A
EFFECTIVE ZONE AE — ZONE AH
EFFECTIVE ZONE AH — ZONE AE
EFFECTIVE FLOODWAY — FLOODWAY (FW)
ZONE AO

HYDRAULIC BASE LINE
ZONE DESIGNATION — ZONE A
WASH I.D. LABEL — WASH 9 EAST
ELEVATION REFERENCE MARK — ERM AJ3866
CROSS SECTION — 2.199 Q100=1270 FP=1400.55 FW=1400.56
BASE FLOOD ELEVATION — 1320
DIKE / LEVEE — DIKE
COUNTY BOUNDARY
CORPORATE LIMIT
LIMIT OF STUDY
LIMIT OF DETAILED STUDY
TOWNSHIP/RANGE LINE
SECTION LINE
SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

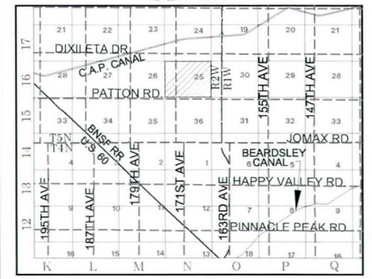
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3867		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 1.90 FEET = NAVD 88

CERTIFICATE NO. 37737 HERNAN A. ARISTIZABAL REGISTERED LAND SURVEYOR ARIZONA U.S.A.

INDEX MAP



Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008-3279
Tel 602.244.2566
Fax 602.244.5947
WEB www.entellus.com

	BY	DATE	
DESIGN	AMG/RAS	07/2005	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	07/2005	
PLANS	KAB	07/2005	RECOMMENDED BY: DATE
PLANS CHK.	AMG/HAA	07/2005	APPROVED BY: DATE
SUBMITTED BY: DATE			CHIEF ENGINEER AND GENERAL MANAGER

SHEET N-16 OF FLOODPLAIN DELINEATION

SEE SHEET N-18

ERM AJ3872

SEE SHEET M-17

SEE SHEET O-17

SEE SHEET N-16

EXISTING ZONE A

EXISTING ZONE AE

ZONE AE

ZONE AH EL.= 1555.12

ZONE AH EL.= 1555.12

FW

FP=1560.79 0.287
FW=1561.79 Q100=3930

WASH 7 EAST

FP=1556.27 0.200
FW=1557.02 Q100=3930

0.127 Q100=3930

C.A.P. CANAL

FP=1542.80 0.951
FW=1542.78 Q100=410

FP=1543.58 4.966
FW=1543.74 Q100=440

LIMIT OF DETAILED STUDY

FP=1538.49 0.960
FW=1538.46 Q100=410

WASH 7 EAST (WEST SPLIT)

COTTON LN. (171ST AVE.) (ALIGNMENT)

FP=1540.62 4.896
FW=1540.70 Q100=440

FP=1535.28 0.815
FW=1535.40 Q100=410

FP=1538.22 4.832
FW=1538.26 Q100=440

0.750 Q100=410 FP=1532.67 FW=1532.69

W.S.(E.S.)

FP=1532.67 1.458
FW=1532.69 Q100=410

FP=1535.02 4.772
FW=1535.09 Q100=440

FP=1529.75 1.395
FW=1529.92 Q100=410

0.696 Q100=280 FP=1530.76 FW=1530.91

FP=1532.56 4.728
FW=1532.94 Q100=440

MARICOPA COUNTY

DIXELETA DR. (ALIGNMENT)

SURPRISE

ZONE AE

FP=1528.28 4.630
FW=1528.37 Q100=440

0.582 Q100=280 FP=1526.42 FW=1526.88

WASH 6 EAST

WASH 7 EAST (WEST SPLIT)

FP=1525.50 1.306
FW=1525.76 Q100=410

WASH 7 EAST (EAST SPLIT)

FP=1524.12 4.551
FW=1524.48 Q100=440

0.517 Q100=280 FP=1523.63 FW=1524.53

ZONE AE

FP=1522.82 1.242
FW=1523.18 Q100=410

FP=1542.04 3.029
FW=1542.01 Q100=490

FP=1536.37 2.953
FW=1536.51 Q100=490

FP=1534.47 2.898
FW=1534.50 Q100=490

WASH 8 EAST

FP=1528.68 2.799
FW=1528.79 Q100=490

FP=1524.89 2.711
FW=1525.07 Q100=490

MARICOPA COUNTY

SURPRISE

FP=1524.08 2.681
FW=1524.19 Q100=490

FP=1521.47 2.633
FW=1521.50 Q100=490

FP=1519.03 2.583
FW=1519.00 Q100=490

FP=1515.90 2.530
FW=1516.26 Q100=490

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A
EFFECTIVE ZONE AE
EFFECTIVE ZONE AH
EFFECTIVE FLOODWAY
ZONE A
ZONE AH
ZONE AE
FLOODWAY (FW)
ZONE AO

HYDRAULIC BASE LINE
ZONE DESIGNATION — ZONE A
WASH I.D. LABEL — WASH 9 EAST
ELEVATION REFERENCE MARK — ERM AJ3866
CROSS SECTION — 2.199 / Q100=1270 — FP=1400.55 / FW=1400.56
BASE FLOOD ELEVATION — 1320
DIKE / LEVEE — DIKE
COUNTY BOUNDARY
CORPORATE LIMIT
LIMIT OF STUDY
LIMIT OF DETAILED STUDY
TOWNSHIP/RANGE LINE
SECTION LINE
SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

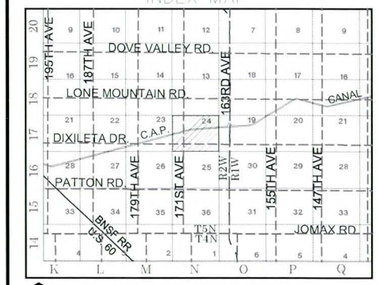
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3872		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 1.90 FEET = NAVD 88

CERTIFICATE NO. 30737 HERNAN A. ARISTIZABAL REGISTERED ARIZONA U.S.A.

INDEX MAP



SCALE: 1"= 200'

Entellus
2255 N. 44th Street Suite 125
Phoenix AZ 85008-3279
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	BY	DATE
DESIGN	AMG/RAS	07/2005
DESIGN CHK.	HAA	07/2005
PLANS	KAB	07/2005
PLANS CHK.	AMG/HAA	07/2005
SUBMITTED BY:		DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

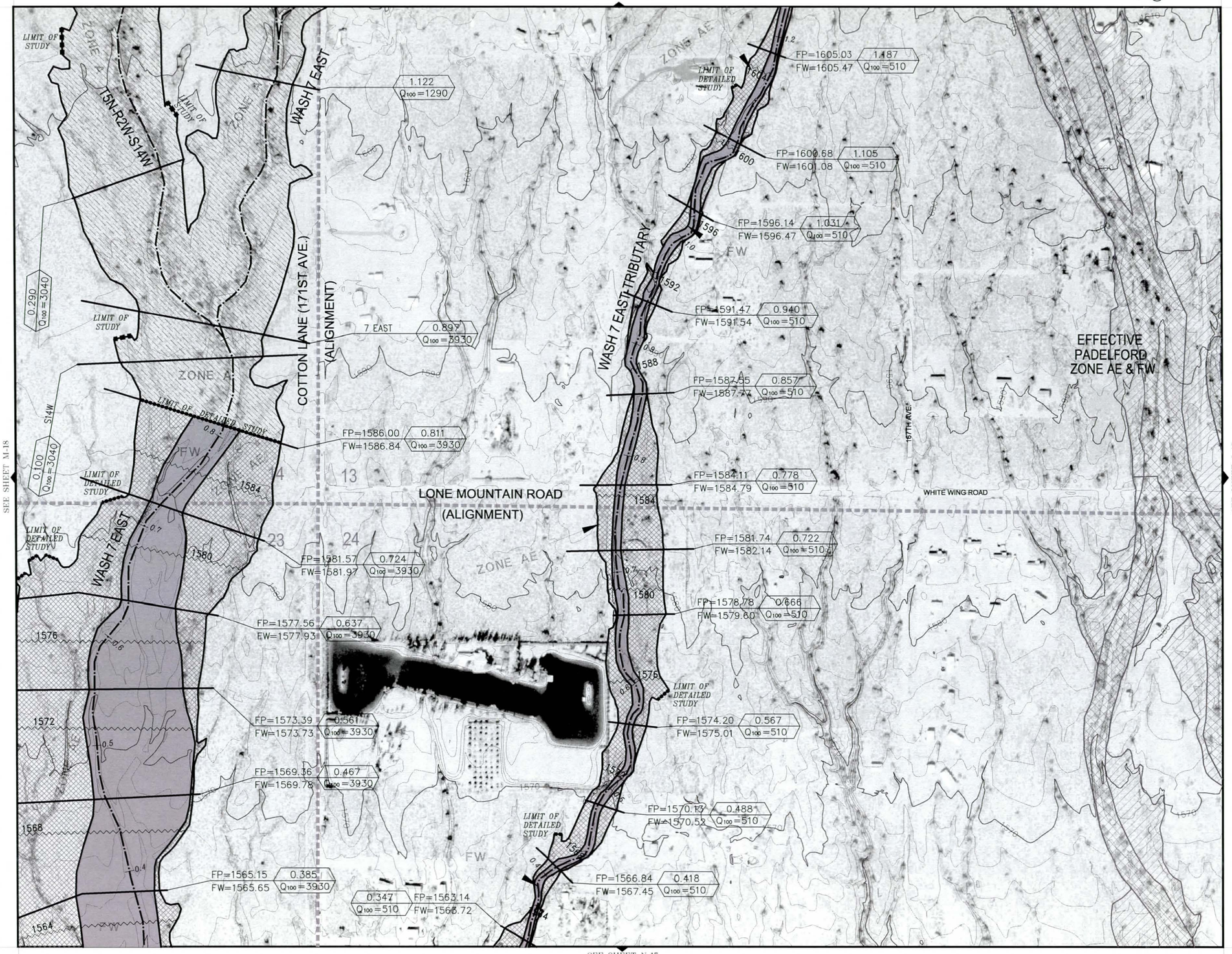
SHEET N-17 OF FLOODPLAIN DELINEATION

FILE: P:\300\310\310032 (Wittmann ADMSU)\Task Hydraulics\FP-N_17.dwg DATE: 08/30/05

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

SEE SHEET N-19

ERM AJ3872



SEE SHEET M-18

SEE SHEET O-18

SEE SHEET N-17

FILE: P:\90\310\310032 (Withmann ADMS4U)\Task 1\Hydraulics\FP-1_18.dwg DATE: 07/21/05

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A / ZONE A
EFFECTIVE ZONE AE / ZONE AH
EFFECTIVE ZONE AH / ZONE AE
EFFECTIVE FLOODWAY / FLOODWAY (FW)
ZONE AO

HYDRAULIC BASE LINE
ZONE DESIGNATION — ZONE A
WASH I.D. LABEL — WASH 9 EAST
ELEVATION REFERENCE MARK — ERM AJ3866
CROSS SECTION — 2.199 / Q100=1270 — FP=1400.55 / FW=1400.56
BASE FLOOD ELEVATION — 1320
DIKE / LEVEE — DIKE
COUNTY BOUNDARY
CORPORATE LIMIT
LIMIT OF STUDY
LIMIT OF DETAILED STUDY
TOWNSHIP/RANGE LINE
SECTION LINE
SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

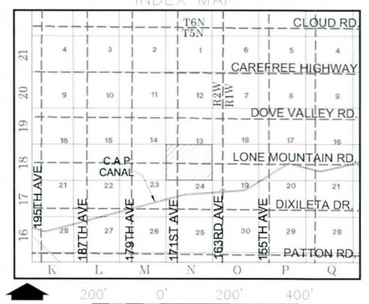
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3872		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 2.00 FEET = NAVD 88

HERNAN A. ARISTIZABAL — 37137 — REGISTERED LAND SURVEYOR

INDEX MAP



200' 0' 200' 400'
SCALE: 1"= 200'

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DESIGN CHK	HAA	07/2005
PLANS	KAB	07/2005
PLANS CHK	AMG/HAA	07/2005

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SUBMITTED BY: DATE

SHEET N-18 OF FLOODPLAIN DELINEATION

SEE SHEET N-20

ERM AJ3879

SEE SHEET M-19

SEE SHEET O-19

SEE SHEET N-18

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

- EFFECTIVE ZONE A
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE AH
- EFFECTIVE FLOODWAY
- ZONE A
- ZONE AH
- ZONE AE
- FLOODWAY (FW)
- ZONE AO
- HYDRAULIC BASE LINE
- ZONE DESIGNATION — ZONE A
- WASH I.D. LABEL — WASH 9 EAST
- ELEVATION REFERENCE MARK — ERM AJ3866
- CROSS SECTION — 2.199 / Q100 =1270 / FP=1400.55 / FW=1400.56
- BASE FLOOD ELEVATION — 1320
- DIKE / LEVEE — DIKE
- COUNTY BOUNDARY
- CORPORATE LIMIT
- LIMIT OF STUDY
- LIMIT OF DETAILED STUDY
- TOWNSHIP/RANGE LINE
- SECTION LINE
- SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

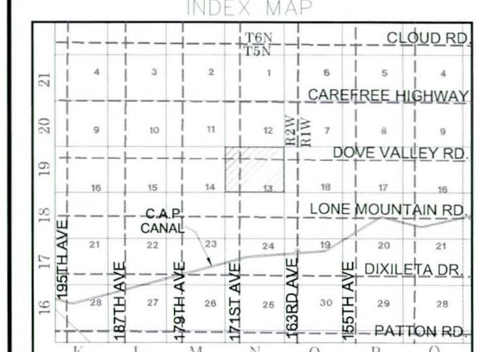
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3879		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 2.00 FEET = NAVD 88

HERNAN A. ARISTIZABAL

INDEX MAP



200' 0' 200' 400'
SCALE: 1"= 200'

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	BY	DATE
DESIGN	AMG/RAS	07/2005
DESIGN CHK.	HAA	07/2005
PLANS	KAB	07/2005
PLANS CHK.	AMG/HAA	07/2005
SUBMITTED BY:		DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

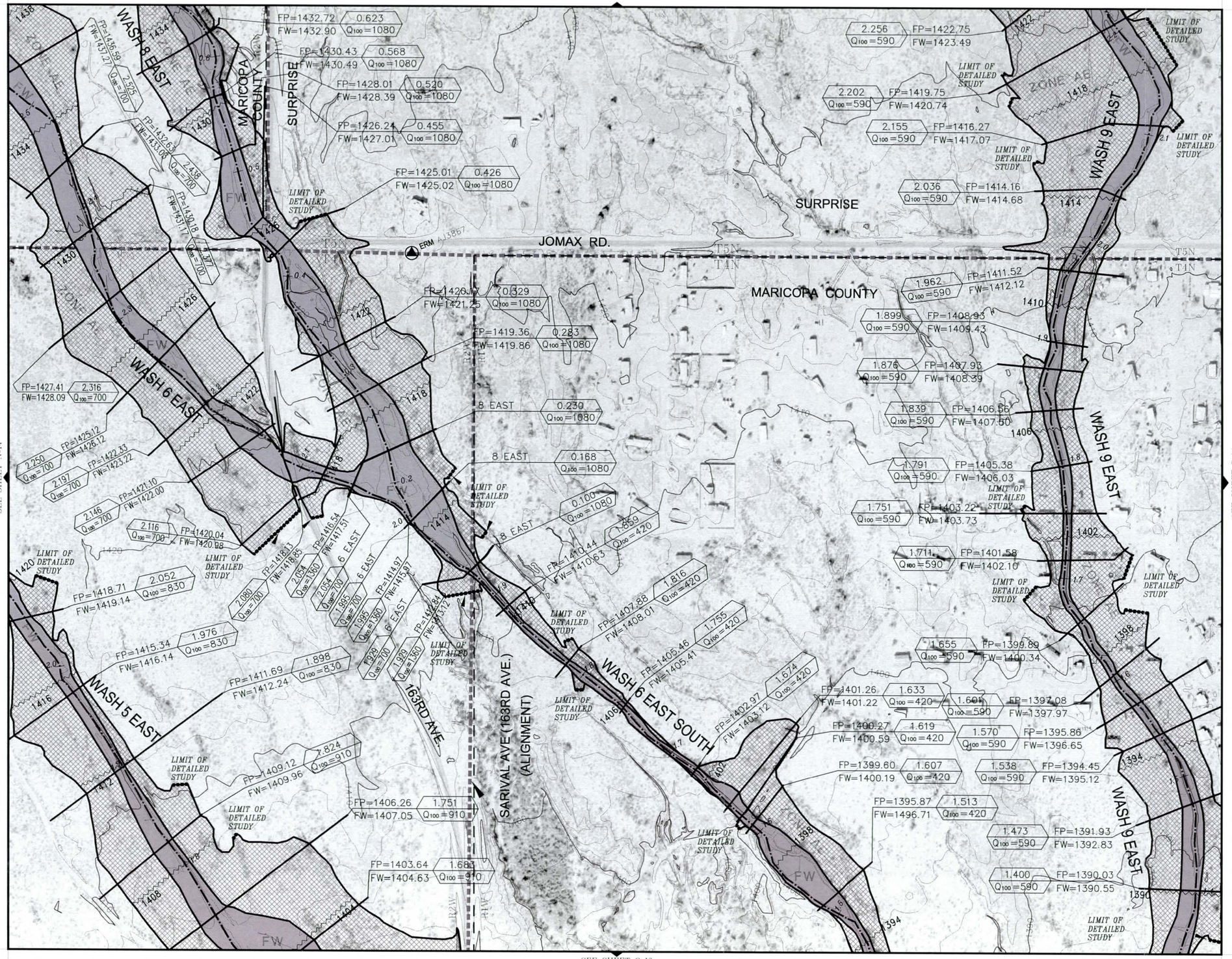
RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET N-19 OF FLOODPLAIN DELINEATION

SEE SHEET O-15



SEE SHEET N-14

SEE SHEET P-14

SEE SHEET O-13

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

FILE: P:\300_3101\310032 (Wittmann ADMS)\Task 9\Hydraulics\FP-O_14.dwg DATE: 07/25/05

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A — ZONE A
EFFECTIVE ZONE AE — ZONE AH
EFFECTIVE ZONE AH — ZONE AE
EFFECTIVE FLOODWAY — FLOODWAY (FW)
ZONE AO

HYDRAULIC BASE LINE
ZONE DESIGNATION — ZONE A
WASH I.D. LABEL — WASH 9 EAST
ELEVATION REFERENCE MARK — ERM AJ3866
CROSS SECTION — 2.199 Q100=1270 FP=1400.55 FW=1400.56
BASE FLOOD ELEVATION — 1320
DIKE / LEVEE — DIKE
COUNTY BOUNDARY
CORPORATE LIMIT
LIMIT OF STUDY
LIMIT OF DETAILED STUDY
TOWNSHIP/RANGE LINE
SECTION LINE
SECTION NUMBER — 29

ELEVATION REFERENCE MARKS

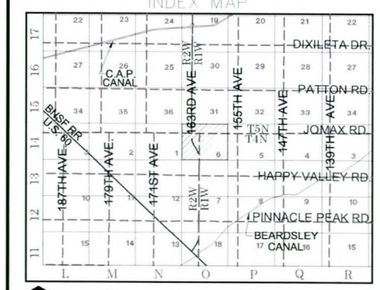
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
AJ3867		NOTE: FOR ERM DESCRIPTION AND ELEVATIONS GO TO THE NATIONAL GEODETIC SURVEY WEB SITE, WWW.NGS.NOAA.GOV

NOTE:
1. NGVD 29 + 1.90 FEET = NAVD 88

CERTIFICATE NO. 37737 HERNAN A. ARISTIZABAL REGISTERED LAND SURVEYOR STATE OF ARIZONA

INDEX MAP



200' 0' 200' 400'
SCALE: 1"= 200'

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	BY	DATE
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DESIGN CHK.	HAA	07/2005
PLANS	KAB	07/2005
PLANS CHK.	AMG/HAA	07/2005
SUBMITTED BY:		DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE:
APPROVED BY: DATE:
CHIEF ENGINEER AND GENERAL MANAGER

SHEET O-14 OF FLOODPLAIN DELINEATION

SEE SHEET O-17

ERM DV2039

SEE SHEET N-16

SEE SHEET P-16

SEE SHEET O-15

WASH 9 EAST

SARIVAL AVE (163RD AVE.)

WASH 10 EAST (EAST SPLIT-1)

WASH 10 EAST

WASH 11 EAST (PADELFORD WASH)

WASH 9 EAST

ZONE AE

FW

LIMIT OF DETAILED STUDY

FP=1509.97 FW=1509.93 4.092 Q100=390

FP=1507.79 FW=1507.88 4.052 Q100=390

FP=1504.70 FW=1504.66 3.998 Q100=390

FP=1501.21 FW=1501.41 3.927 Q100=390

FP=1497.26 FW=1497.32 3.837 Q100=440

FP=1493.57 FW=1493.85 3.760 Q100=440

FP=1490.09 FW=1490.36 3.681 Q100=440

FP=1486.31 FW=1486.87 3.617 Q100=440

FP=1482.89 FW=1482.98 3.545 Q100=440

FP=1479.19 FW=1479.70 3.464 Q100=440

FP=1474.64 FW=1475.47 3.394 Q100=440

FP=1472.27 FW=1472.79 3.346 Q100=440

FP=1507.28 FW=1507.86 3.905 Q100=140

FP=1504.80 FW=1505.32 3.852 Q100=140

FP=1501.46 FW=1501.94 3.818 Q100=140

FP=1499.34 FW=1499.74 3.783 Q100=250

FP=1498.12 FW=1498.40 3.724 Q100=250

FP=1494.66 FW=1494.66 3.667 Q100=250

FP=1492.36 FW=1492.54 3.630 Q100=250

FP=1488.99 FW=1488.99 3.573 Q100=250

FP=1487.41 FW=1487.41 3.538 Q100=300

FP=1486.02 FW=1486.11 3.488 Q100=300

FP=1485.54 FW=1485.56 3.473 Q100=300

FP=1483.48 FW=1483.55 3.436 Q100=300

FP=1482.16 FW=1482.37 3.400 Q100=300

FP=1480.07 FW=1480.21 3.349 Q100=300

FP=1477.28 FW=1475.30 3.294 Q100=300

FP=1472.93 FW=1473.00 3.235 Q100=300

FP=1471.16 FW=1471.25 3.200 Q100=300

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FP=1466.56 FW=1466.64 3.057 Q100=370

FP=1462.88 FW=1463.07 2.970 Q100=370

FP=1460.36 FW=1460.38 2.896 Q100=370

FP=1502.84 FW=1502.89 0.400 Q100=100

FP=1499.52 FW=1499.52 0.340 Q100=100

FP=1496.43 FW=1496.49 0.290 Q100=100

FP=1493.46 FW=1493.58 0.220 Q100=100

FP=1488.84 FW=1488.84 0.160 Q100=100

0.130 Q100=100

0.100 Q100=100

FP=1503.89 FW=1504.52 3.991 Q100=560

FP=1500.34 FW=1500.37 3.931 Q100=560

FP=1498.47 FW=1498.73 3.885 Q100=560

FP=1495.89 FW=1496.08 3.834 Q100=560

FP=1492.05 FW=1492.37 3.780 Q100=560

FP=1489.90 FW=1490.41 3.729 Q100=560

FP=1486.82 FW=1487.36 3.675 Q100=560

FP=1484.70 FW=1484.77 3.629 Q100=560

FP=1483.08 FW=1483.36 3.582 Q100=560

FP=1480.27 FW=1481.09 3.534 Q100=560

3.479 Q100=560 FP=1477.46 FW=1478.17

3.430 Q100=560 FP=1474.91 FW=1475.72

1510 1508 1506 1504 1502 1500 1498 1496 1494 1492 1490 1488 1486 1484 1482 1480 1478 1476 1474 1472 1470

R2W R1W

Dale Ln.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

WITTMANN AREA DRAINAGE MASTER STUDY UPDATE

CONTRACT FCD 2002C029

LEGEND

EFFECTIVE ZONE A — ZONE A

EFFECTIVE ZONE AE — ZONE AH

EFFECTIVE ZONE AH — ZONE AE

EFFECTIVE FLOODWAY — FLOODWAY (FW)

ZONE AO

HYDRAULIC BASE LINE

ZONE DESIGNATION: ZONE A

WASH I.D. LABEL: WASH 9 EAST

ELEVATION REFERENCE MARK: ERM AJ3866

CROSS SECTION: 2.199 Q100=1270 FP=1400.55 FW=1400.56

BASE FLOOD ELEVATION: 1320

DIKE / LEVEE: DIKE

COUNTY BOUNDARY

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LIMIT OF STUDY

LIMIT OF DETAILED STUDY

TOWNSHIP/RANGE LINE

SECTION LINE

SECTION NUMBER: 29

ELEVATION REFERENCE MARKS

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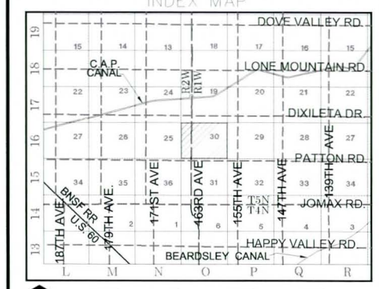
NOTE:

1. NGVD 29 + 1.90 FEET = NAVD 88

CERTIFICATE NO. 37117 HERNAN A. ARISTIZABAL ARIZONA U.S.A.

INDEX MAP



200' 0' 200' 400'

SCALE: 1"=200'

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PLANS CHK.	AMG/HAA	07/2005
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET O-16 OF FLOODPLAIN DELINEATION

FILE: P:\300\310\310032 (Wittmann ADMS)\Task\Hydraulics\FP-O_16.dwg DATE: 07/22/05

1" = 600' (1:7200) FLIGHT DATES: (04/18/02), (04/19/02), (04/23/02), 1"=1200' (1:14400) (04/23/02) BY: STEWART GEO TECHNOLOGIES

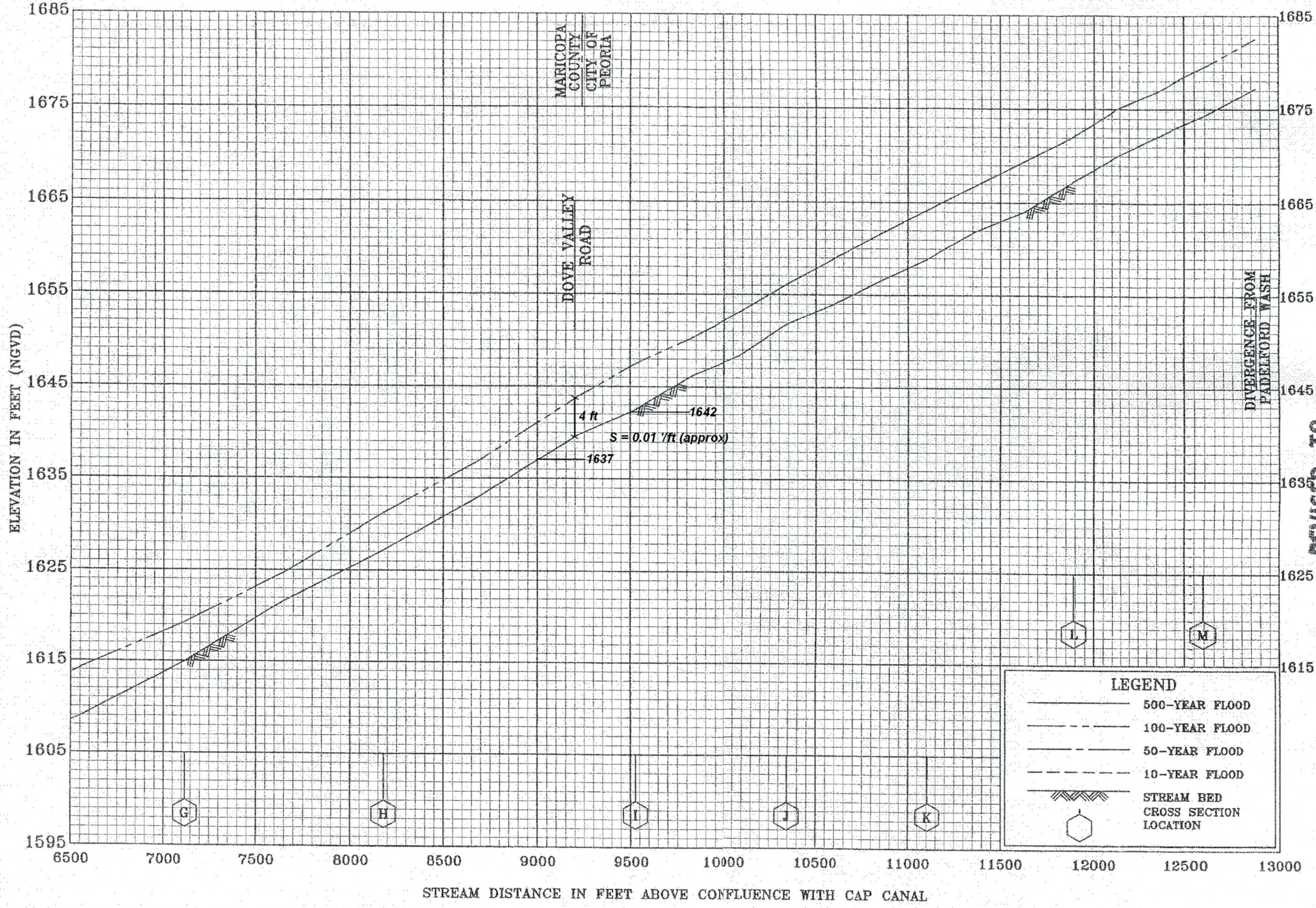
PADELFORD WASH FDS

Summary of Discharges Table
Split 3 Profile Sheet

TABLE 2
SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. Mile)	100-Year, 24-hour Peak Discharge (cfs)
Trib. 'A' to Padelford Wash at S.R.74	1.13	1163
Trib. 'B' to Padelford Wash at S.R.74	4.77	4522
Trib. 'A' at Confluence w/Trib. 'B'	6.35	5722
Trib. 'A' Upstream Padelford Wash Confluence	6.84	5775
Trib. 'C' to Padelford Wash at S.R.74	2.68	2135
Trib. 'C', 0.3 Mi. D/S S.R.74	5.28	4637
Trib. 'C', U/S Padelford Wash	5.63	4733
Padelford Wash, U/S End	1.46	1624
Padelford Wash, 0.5 Mi. from U/S End	2.10	2347
Padelford Wash, 0.9 Mi. from U/S End	3.92	3972
Padelford Wash, U/S of Trib. 'C' Confluence	5.09	5263
Padelford Wash, D/S of Trib. 'C' Confluence	10.72	9063
Padelford Wash, D/S of Trib. 'A' Confluence	17.56	13396
Padelford Wash, U/S of Split 3	18.67	13776
Padelford Wash, D/S Split 3	N/A	9012
Padelford Wash, D/S Split 2	N/A	5863
Padelford Wash, D/S Split 1	N/A	1538
Padelford Wash, R.M. 2.610, D/S Weir Flow from Split 1	N/A	2775
Padelford Wash, R.M. 2.412, D/S Weir Flow from Split 2	N/A	3270
Padelford Wash, at C.A.P. Canal	N/A	3187
Split 3 Wash, D/S of Split with Main Padelford Wash	N/A	4660
Split 3 Wash, D/S White Wing Road, U/S Split 4	N/A	4485
Split 3 Wash, D/S Split 4	N/A	3781
Split 2 Wash, D/S of Split with Main Padelford Wash	N/A	3149
Split 2 Wash, D/S Weir Flow to Main Padelford Wash	N/A	2654
Split 2 Wash at C.A.P. Canal	N/A	2409
Split 1 Wash, D/S of Split with Main Padelford Wash	N/A	4324
Split 1 Wash, U/S of Weir out to Main Padelford Wash	N/A	4270
Split 1 Wash, d/S of Weir out to Main Padelford Wash	N/A	2854
Split 1, U/S of Split 5	N/A	2952
Split 1, D/S of Split 5	N/A	1904
Split4, D/S of Split 3 at White Wing Road	N/A	704
Split 5, D/S of Split 1	N/A	1048

Notes: The drainage area is shown as Non-Applicable (N/A) Downstream of the first Split Flow condition.



FLOOD PROFILES

PADELFORD WASH – SPLIT 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

REVISED TO REFLECT LOMR DATED OCT 12 2005

1260P

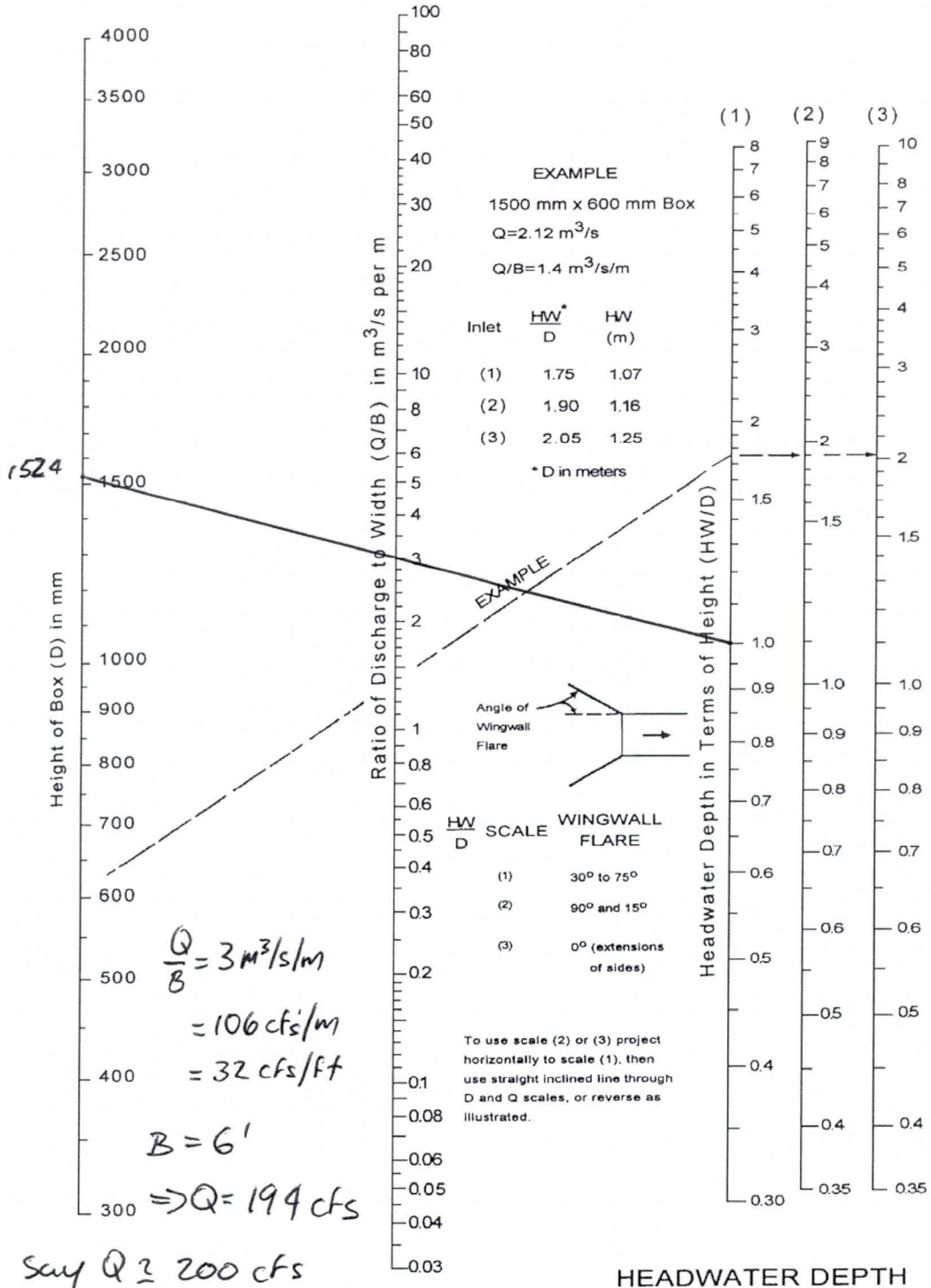
APPENDIX B

PEAK FLOW COMPUTATION

163rd Ave. CIS
Box Culvert Capacity

JOG
12/14/06

CHART 8



$\frac{Q}{B} = 3 m^3/s/m$

$= 106 cfs/m$

$= 32 cfs/ft$

$B = 6'$

$\Rightarrow Q = 194 cfs$

Say $Q \geq 200$ cfs

Adapted from
Bureau of Public Roads Jan. 1963

HEADWATER DEPTH
FOR BOX CULVERTS
WITH INLET CONTROL

6'x5' CBC @ SR 74 - Assumed inlet control with HW=D

Excerpt from "Text of 2002 Nationwide Permits"

United States Army Corps Of Engineers
January 15, 2002

14. Linear Transportation Projects. Activities required for the construction, expansion, modification, or improvement of linear transportation crossings (e.g., highways, railways, trails, airport runways, and taxiways) in waters of the US, including wetlands, if the activity meets the following criteria:

a. This NWP is subject to the following acreage limits:

(1) For linear transportation projects in non-tidal waters, provided the discharge does not cause the loss of greater than 1/2-acre of waters of the US; or

(2) For linear transportation projects in tidal waters, provided the discharge does not cause the loss of greater than 1/3-acre of waters of the US.

b. The permittee must notify the District Engineer in accordance with General Condition 13 if any of the following criteria are met:

(1) The discharge causes the loss of greater than 1/10-acre of waters of the US; or

(2) There is a discharge in a special aquatic site, including wetlands;

c. The notification must include a compensatory mitigation proposal to offset permanent losses of waters of the US to ensure that those losses result only in minimal adverse effects to the aquatic environment and a statement describing how temporary losses will be minimized to the maximum extent practicable;

d. For discharges in special aquatic sites, including wetlands, and stream riffle and pool complexes, the notification must include a delineation of the affected special aquatic sites;

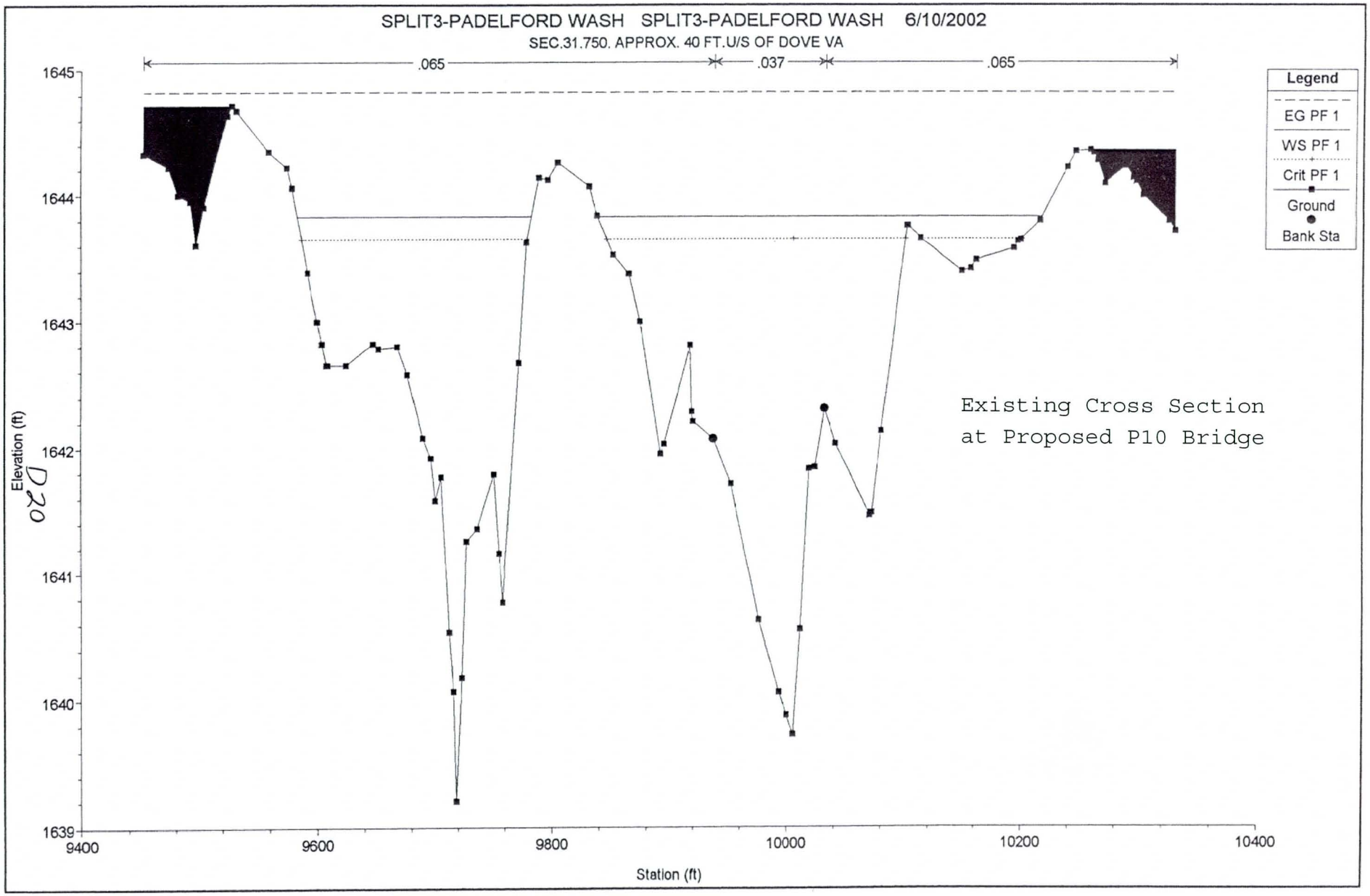
e. The width of the fill is limited to the minimum necessary for the crossing;

f. This permit does not authorize stream channelization, and the authorized activities must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality of any stream (see General Conditions 9 and 21);

g. This permit cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars; and

h. The crossing is a single and complete project for crossing waters of the US. Where a road segment (i.e., the shortest segment of a road with independent utility that is part of a larger project) has multiple crossings of streams (several single and complete projects) the Corps will consider whether it should use its discretionary authority to require an Individual Permit. (Sections 10 and 404)

Note: Some discharges for the construction of farm roads, forest roads, or temporary roads for moving mining equipment may be eligible for an exemption from the need for a Section 404 permit (see 33 CFR 323.4).


SPLIT3-PADELFORD WASH SPLIT3-PADELFORD WASH 6/10/2002
SEC.31.750. APPROX. 40 FT.U/S OF DOVE VA
.065
.037
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Existing Cross Section
at Proposed P10 Bridge
Elevation (ft)
Station (ft)
1645
1644
1643
1642
1641
1640
1639
9400
9600
9800
10000
10200
10400

100-Year

ARIZONA DEPARTMENT OF TRANSPORTATION
BRIDGE DRAINAGE SECTION
TRAP. CHANNEL CALCULATIONS-Vers. 3.0

07-03-2007

PROJECT NUMBER _____ TRACS NO. _____
PROJECT NAME 163rd Avenue CIS DESIGNER JDG
HIGHWAY NAME 163rd Ave - Preferred Alignment CHECKED BY: GP
LOCATION/STATION P10 - Split 3 at Dove Valley Rd. PAGE _____

==> Channel Bottom Width (Ft.) =%111.25
Lt. side slope (Horiz. to 1) =3.00
Rt. side slope (Horiz. to 1) =3.00
Channel Slope,(Ft./Ft.) =0.0100
Manning's 'n' =0.037

Discharge (CFS) = 4660.0

Normal Depth (Ft.) = 4.00
Area of Normal Depth (Sq. Ft.) =493.0
Normal Depth Velocity (Ft./Sec.) = 9.45

Critical Depth (Ft.) = 3.66
Critical Depth Velocity (Ft./Sec.) =10.41
Critical Slope (Ft./Ft.) =0.0135

Sequent Depth-Ft. = 3.35
Froude Number = 0.87

Dc to Dn Table: Subcritcial flow

I	Y	V	E	Sf	DEL X	X	I
0	3.663	10.407	5.345	0.01342	0.00	0.00	0
1	3.680	10.355	5.345	0.01322	-0.00	-0.00	1
2	3.697	10.304	5.345	0.01301	-0.00	-0.00	2
3	3.714	10.253	5.346	0.01281	-0.00	-0.00	3
4	3.730	10.202	5.347	0.01262	-0.00	-0.00	4
5	3.747	10.152	5.348	0.01242	-0.00	-0.00	5
6	3.764	10.102	5.349	0.01224	-0.00	-0.00	6
7	3.781	10.053	5.350	0.01205	-0.00	-0.00	7
8	3.798	10.004	5.352	0.01187	-0.00	-0.00	8
9	3.815	9.956	5.354	0.01169	-0.00	-0.00	9
10	3.832	9.908	5.356	0.01152	-0.00	-0.00	10
11	3.848	9.861	5.358	0.01135	-0.00	-0.00	11
12	3.865	9.814	5.361	0.01118	-0.00	-0.00	12
13	3.882	9.767	5.363	0.01102	-0.00	-0.00	13
14	3.899	9.721	5.366	0.01085	-0.00	-0.01	14
15	3.916	9.675	5.369	0.01070	-0.00	-0.01	15
16	3.933	9.630	5.373	0.01054	-0.00	-0.01	16
17	3.949	9.585	5.376	0.01039	-0.00	-0.01	17
18	3.966	9.540	5.380	0.01024	-0.00	-0.01	18
19	3.983	9.496	5.383	0.01009	-0.00	-0.01	19
20	4.000	9.452	5.387	0.00995	-0.00	-0.01	20

Appendix D

Technical Memorandum No. 4

Utility Overview

Appendix D

Technical Memorandum No. 4

Utility Overview

FINAL

TECHNICAL MEMORANDUM NO. 4

UTILITY OVERVIEW

163rd Avenue CIS & DCR
Jomax Road to SR 74
Jomax Road to SR 74 *CIS*
Jomax Road to Dove Valley Road *DCR*

OCTOBER 2007

Prepared For:

Prepared By:

PB PARSONS BRINCKERHOFF

Table of Contents

List of Tables

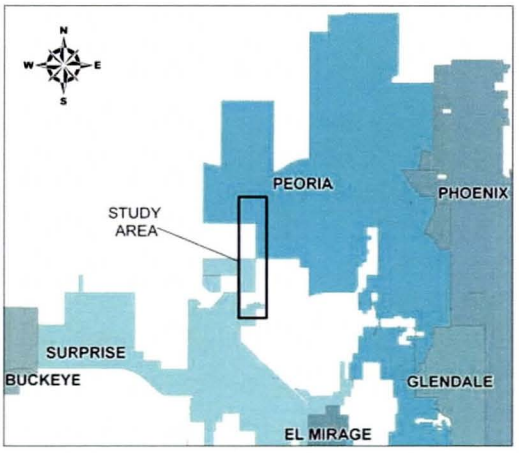
List of Figures

1.0 Introduction

Technical Memorandum No. 4 *Utility Overview* describes the existing utilities, planned utilities and potential utility conflicts located within the study area of the 163rd Avenue, Jomax Road to State Route (SR) 74 Corridor Improvement Study (CIS) and Design Concept Report (DCR). The findings of this memorandum will be used to assess the feasibility of the corridor alignments and determine the impacts associated with the recommended project improvements.

1.1 Study Area

The study area encompasses approximately 10,240 acres in northwest Maricopa County (T4N R1W(Section 6), T5N R1W(Sections 6,7,18,19,30,31), and T6N R1W(Sections 31,30), T4N R2W (Section 1), T5N R2W (Sections 1,12,13,24,25), T6N R2W (Sections 25,36)). The project boundaries extend ½ mile south of Jomax Road to ½ mile north of SR 74 and from 155th Avenue (Reems Road) to 171st Avenue (Cotton Lane). The study area falls under the jurisdiction of Maricopa County, the City of Surprise and the City of Peoria.



Project Vicinity

1.2 Level of Investigation

The utility investigation followed the guidelines established in the *Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data* published by the American Society of Civil Engineers (ASCE). Information regarding the subsurface utilities was collected to a quality level C/D.

Utility Quality Level C: Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to quality level D information.

Utility Quality Level D: Information derived from existing records or oral recollections.

Utility owners were obtained through Arizona Blue Stake Center (602-263-1100). Facility maps and owner records were collected and used to prepare a composite drawing of the existing utilities in the study area. Documentation was not available for some newly installed or private utilities within the study area, including an 18" water line that extends from the Central Arizona Project (CAP) canal to SR 74. Surface features for these utilities and others utilities with documentation discrepancy were obtained during site visits.

2.0 Utility Owners

Utility owners and contact information are provided in Table 1. Contact was made with all owners except for Saguaro View Management who did not respond to inquiry. The utility owners provided existing utility maps and information regarding planned facilities.

Table 1: Utility Contacts

UTILITY	FACILITY	CONTACT	INFORMATION
Arizona American Water Company (Sun City)	Water , Sewer (No facilities within project area)	Mike Conilin	105626 North Dell-Webb Boulevard Sun City, AZ (623) 445-2450
Arizona Department of Transportation	Water, Sanitary Sewer, Storm Drain, Traffic Signals, Fiber Optics, Telephone, Electric	Permits: John Fought Engineering: Janet Doerstling	1109 Commerce Drive Prescott, AZ 86305 (928)777-5877 (928)771-0058 fax
Arizona Public Service	Electric	Cary Deice	(602) 250-1232
City of Peoria	Water, Wastewater	Shawn Kreuziesner	8401 West Monroe Street Peoria, AZ 85345 (623) 773-7643
City of Surprise	Water, Wastewater	Records: Joe Garza Engineering: Todd Gilham	12425 West Bell Road Surprise, AZ 85374 (623)583-6025 (623)583-0721 fax
Central Arizona Water Conservation District	Electric, Fiber Optics, Coaxial	Tom Fitzgerald Abe Sahli	23636 North 7th Avenue Phoenix AZ 85024 (623) 869-2209 (623) 869-2126
Cox Communications	Cable TV, Fiber Optics	Records: Deidra Bryant Engineering: Terran Gutierrez	1550 West Deer Valley Road Phoenix, AZ 85027 (623) 328-3569
Quintero Golf Course Maintenance	Water	Rod Meyers	(928) 501-1580
QWest Local Networks	Fiber Optics, Telephone	Records: Chris Lertique Engineering: Steffan Cline	6350 South Maple Avenue Room 125 Tempe, AZ 85283 Records: (602) 630-0492 Engineering: (602) 630-1435
Saguaro Acres CFD	Water	Robert Chentfant	(623) 584-3467
Saguaro View Management	Water	Rick Malero	623-546-2840 623-546-2840 (fax)
Southwest Gas	High Pressure Natural Gas, Low Pressure Natural Gas	Records: Andrew Ericson Franchise/New Business: Claudia Fisher	9 South 43rd Avenue Phoenix, AZ 85009 Records: (602) 484-5270 Franchise/New Business: (602) 484-5294

3.0 Existing Utilities

The majority of the existing utilities are concentrated in the southern central portion of the study area between Jomax Road and Dove Valley Road. Both public and private utilities are present. The existing utilities include overhead power, underground electric, water, sewer, well fill, effluent, gas, telephone, fiber optic and coaxial cable. Only one known utility exists north of Dove Valley Road, which is a water line that serves the Quintero Golf Course located north of SR 74.

3.1 Electric

Arizona Public Service (APS) is the owner of the electric power lines within the study area. These lines service the local residences and consist of overhead primary and secondary lines, direct buried lines and underground secondary lines, as shown in Figure 1. No transmission lines are located within the study area.

APS Overhead Power Lines Along the West Side of 163rd Avenue

Overhead primary lines have been installed along most streets between Jomax Road and Dove Valley Road. Conduit/direct buried lines have been installed along Jomax Road, White Wing Road and a few other shorter segments along the local residential streets.

3.2 Water and Wastewater

Most residents within the study area obtain water from groundwater wells and utilize septic systems for waste. The City of Surprise owns minimal water and sewer lines within the study area. According to As-Built Maps, the City of Peoria does not have any water or sewer facilities within the study area. However, during conversations with Quintero Golf Course it was mentioned that the City of Peoria is in the process of acquiring the existing private water line that exists between the CAP canal and SR 74.

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 1 (a)
Existing Electric Power

- Overhead Primary
- Conduit/Duct/Direct Buried
- Study Area

N 171st Ave (Cotton Ln)
N 167th Ave
N 167th Ave
W Jomax Rd
N Dale Ln
W Dixileta Dr
W Montgomery Rd
W White Wing Rd
W Quail Run Rd
N 163rd Ave
N 155th Ave (Reems Rd)
Match Line - Figure 1 (b)

0 0.1 0.2 0.3 0.4 0.5 Miles

Source:
Arizona Public Service (APS)

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

W Dove Valley Rd

N 171st Ave

N 167th Ave

N 163rd Ave

SR 74

Match Line - Figure 1 (a)

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 1 (b)
Existing Electric Power

- Overhead Primary
- Conduit/Duct/Direct Buried
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Source:
Arizona Public Service (APS)

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

Figure 2 shows the existing water and wastewater lines.

3.2.1 Pipelines

Along Jomax Road, a 16" water line, 15" sewer line, a well fill line and an effluent line have been recently installed for the City of Surprise to service the Desert Oasis development.

An existing private water line has been installed from the CAP canal to SR 74. The 16" water line services the Quintero Golf Course located north of SR 74. The line originates at the CAP canal and proceeds north along the 163rd Avenue alignment. At Dove Valley Road, the water line bends west to 167th Avenue along the Dove Valley Road alignment. The water line then continues north to SR 74 along the 167th Avenue alignment. Representatives of Quintero Golf Course mentioned that this line will be acquired by the City of Peoria.

Water Valve for the 18" Private Water Line

3.2.2 Groundwater Wells

The Arizona Department of Water Resources (ADWR) database was used to identify wells located within the study area. A records database is maintained in the 55 Well Registry, which is available online at azwater.gov. According to ADWR staff, each well is given a registration number. The documentation is organized by township-range-section information. A summary of the existing wells retrieved from the website is summarized in Table 2.

Table 2: Existing Well Registration Numbers in 55 Registry

4N2W 01	5N2W 36	5N2W 25	5N2W 24	5N2W 13	5N2W 12	5N2W 01	6N2W 36	6N2W 25
59 Wells	2 Wells	3 Wells	64 Wells	53 Wells	0 Wells	72 Wells	0 Wells	5 Wells
4N1W 06	5N1W31	5N1W30	5N1W 19	5N1W18	5N1W 07	5N1W 06	6N1W 31	6N1W 30
32 Wells	10 Wells	1 Well	3 Wells	1 Well	0 Wells	0 Wells	5 Wells	0 Wells

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 2 (a)
Existing Water and Sewer

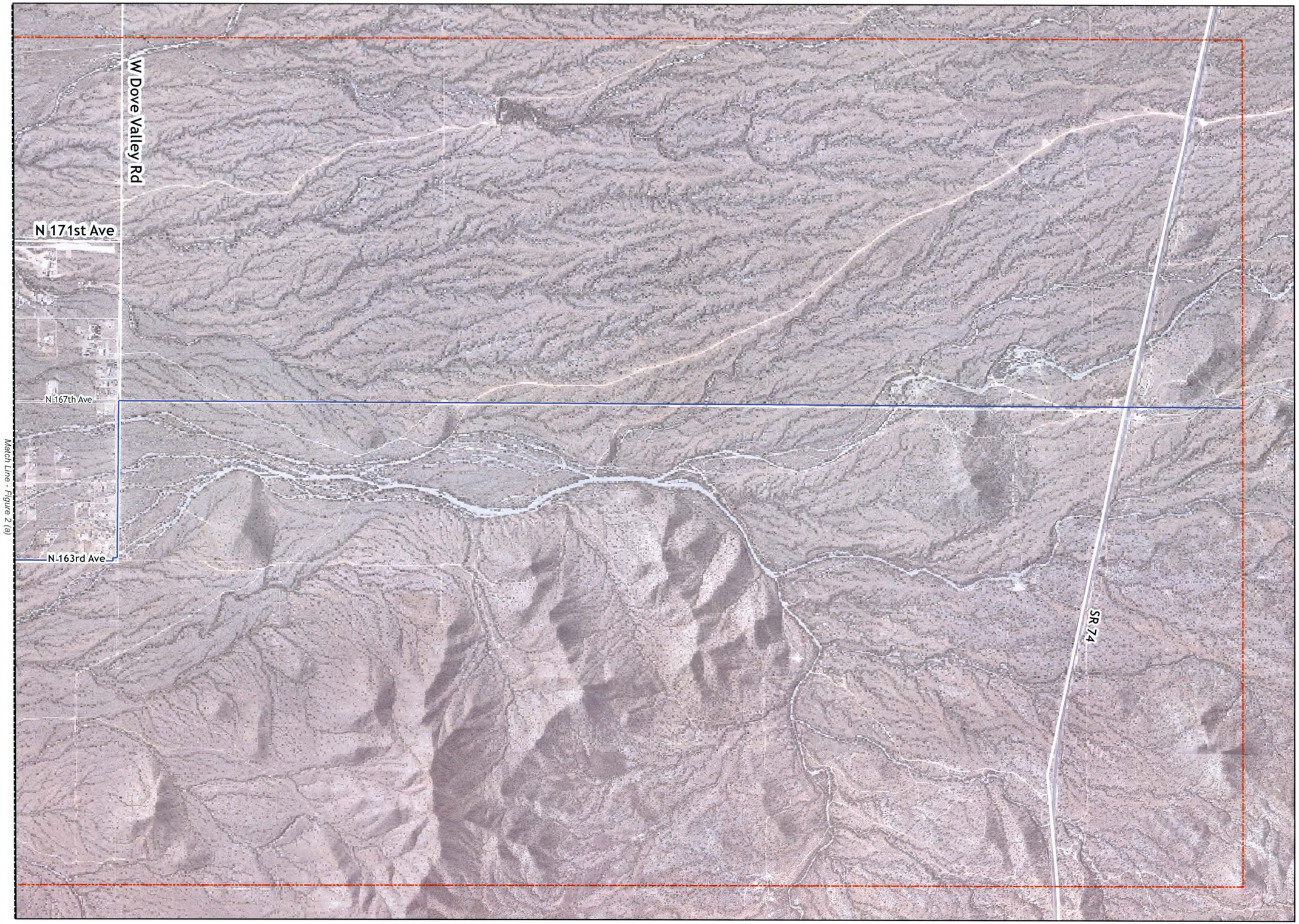
- Water
- Reclaimed Water
- Sewer
- Study Area

N 171st Ave (Cotton Ln)
N 167th Ave
N 163rd Ave
N 155th Ave (Reems Rd)
W Jomax Rd
N Dale Ln
W Dixileta Dr
W Montgomery Rd
W White Wing Rd
W Quail Run Rd

Match Line - Figure 2 (b)

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.



163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 2 (b)
Existing Water and Sewer

- Water
- Reclaimed Water
- Sewer
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

3.3 CAP Canal Facilities

The CAP Hayden-Rhodes Aqueduct bisects the study area between the Dixileta Road and White Wing Road (Lone Mountain Road) alignments. A CAP canal crossing structure exists at 163rd Avenue. Access roads are provided from 163rd Avenue to the maintenance roads located on the northern and southern banks of the canal.

CAP Canal from the 163rd Avenue Crossing with an Overshoot in the Background

On the north side of the canal, a levee system protects the canal from drainage runoff. Several 72" Diameter overshoots span the canal. An existing recharge project utilizes two sets of retention basins between 171st Avenue and 163rd Avenue. Several green-up areas exist along the canal within the study area.

The Quintero Turnout is located in the northwest quadrant of the canal and 163rd Avenue. Water is piped from the turnout to the Quintero Golf Course north of SR 74.

3.4 Gas

Southwest Gas supplies gas to the project area. Gas service is limited to a 6" polyethylene line that runs along Jomax Road between 171st Ave and 163rd Ave. The gas line provides service to the Desert Oasis residential development.

3.5 Communications

Both QWest Local Networks and Cox Communications have underground facilities within the project area, see Figure 3. These facilities consist of telephone lines, fiber optic cables and cable television (CATV) that provide service to local residents.

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

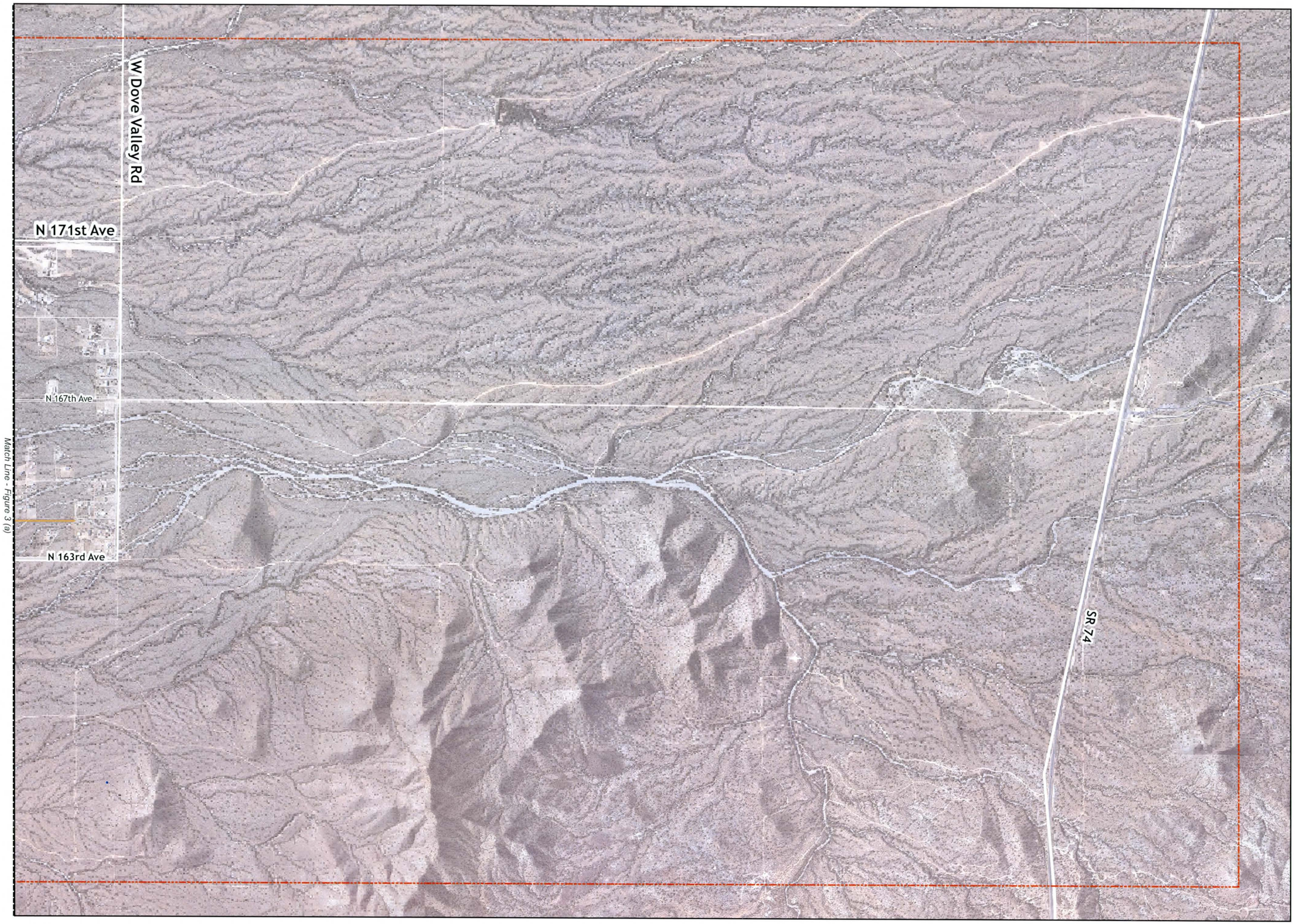
Figure 3 (a)
Existing Communications

- Cable Television
- Telephone
- Study Area

N 171st Ave (Cotton Ln)
N 167th Ave
N 167th Ave
W Jomax Rd
N Dale Ln
N 163rd Ave
W Dixileta Dr
W Montgomery Rd
W White Wing Rd
W Quail Run Rd
N 155th Ave (Reems Rd)
Match Line - Figure 3 (b)

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.



Match Line - Figure 3 (a)

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 3 (b)
Existing Communications

- Cable Television
- Telephone
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

3.5.1 Telephone Lines

The primary distribution lines run along 163rd Avenue and Jomax Road. Service lines are located on Dale Road, Dixileta Road, White Wing Road, 171st Avenue, 167th Avenue, 165th Avenue, and other fragmented segments.

3.5.2 Fiber Optic Cables

The existing maps received by the utility companies did not show fiber optic lines, however during field reconnaissance, evidence of fiber optic infrastructure was present. A splice box was located on 163rd Avenue near Dixileta Road. Fiber optic equipment likely belongs to QWest Local Networks. When contacted after the field investigation, QWest Local Networks still did not have any information about the splice box. Follow-up is required.

3.5.3 CATV

Cox Communication owns CATV lines along Jomax Road between 170th Avenue alignment to east of 163rd Avenue. According to the provided maps, these are the only Cox facilities in the study area.

4.0 Planned Utilities

The utility owners listed in Table 1 were contacted to determine if any future facilities were planned within the study area.

The Arizona Department of Transportation (ADOT) and CAP do not have any planned utility facilities in the study area. The CAP has plans for the Hieroglyphics Recharge Project immediately west of the study limits.

APS also does not have any planned facilities within the study area at this time. However, APS plans to install several new transmission lines near the study limits including projects TS-9 to Pinnacle Peak (500 kV), West Valley North (230 kV), North Valley (230 kV) and Northwest Valley (69kV/230kV).

The City of Peoria updated the Water Master Plan in October 2006 and the Wastewater Master Plan in July 2002. Maps from the Water Master Plan show that a network of 12", 16" and 24" water mains along with a reservoir to be installed between Dove Valley Road and SR 74 by the year 2010. By the year 2015, the system will be expanded with several 16" water mains and a pump station. Additional 12" water mains have been planned for the year 2030. As indicated in the City of Peoria Wastewater Master Plan, new infrastructure will be installed within the project area. The Padelford Wastewater Treatment Plant and a lift station are planned to be installed near 163rd Avenue and Cloud Road. Wastewater lines connecting to these facilities include a 6" force main and 8", 10", 12", and 15" gravity lines.

The City of Surprise is involved with the future planning of water and wastewater facilities between Jomax Road and Dove Valley Road. The City has hired RBF Consulting to analyze the existing facilities and develop an infrastructure plan to address future growth. The Integrated Water Master Plan (IWMP) was approved by the City Council in 2004. The Master Plan divides the city into six Special Planning Areas (SPAs). Some SPAs, including SPA-2 and SPA-4 which are located within the project area, require modification to balance needs between developments. SPA representatives meet monthly to address changing needs. Also, the Jomax Water Group has been formed by several developers in the area to study new water supply facilities. It is anticipated that the new water and sewer facilities will installed in the three to five year time-frame.

Southwest Gas will continue to respond to service demand for the developing area. In addition, a 16" pipeline is planned to be installed along SR 74 within the next three years.

QWest also continually responds to service demand from local growth. In addition to adding service lines as needed, a Serving Area Interface will be installed near the intersection of 163rd and White Wing Road for a new distribution area.

5.0 Preliminary Alignment Corridors

At the time of the memorandum development, five preliminary alignment corridors are being explored by the CIS project team. The preliminary corridors have been superimposed over the existing and planned utilities in Figures 4 and 5 to assist in identifying potential impacts. All of the alignments will require a new CAP canal crossing. The CAP has provided guidelines associated for new structures spanning the canal. Some alignments may be more favorable to the CAP than others. Input from the CAP will be requested at the next project stakeholder meeting tentatively scheduled for February 14, 2007. With respect to the other existing utilities, the overhead power lines will be impacted to varying levels depending on the alignment. Because so few underground utilities exist, minimal impact is expected. Also, the roadway profile can generally be designed to raise the roadway above the existing ground and avoid utility conflict. Table 3 summarizes the anticipated existing utility impacts.

Table 3: Existing Utilities Impact

Utility	Alignment 1A (West)	Alignment 2D (CAR)	Alignment 3B (East)	Alignment 4C (Marisol)	Alignment 7C (171st Ave)
Power	●	⊙	○	⊙	⊙
CAP	●	●	●	●	●
Water	○	⊙	⊙	⊙	○
Sewer	○	○	○	○	○
Gas	○	○	○	○	○
Telephone	○	⊙	⊙	⊙	○
CATV	○	○	○	○	○

Low Impact ○ Medium Impact ⊙ High Impact ●

Several utility companies have new infrastructure planned for installation within the study area as mentioned in Section 4. The most significant improvements will involve new water and wastewater systems by the Cities of Surprise and Peoria. Impacts associated with the planned utilities are minimal and summarized in Table 4.

Table 4: Planned Utilities Impact

Utility	Alignment 1A (West)	Alignment 2D (CAR)	Alignment 3B (East)	Alignment 4C (Marisol)	Alignment 7C (171st Ave)
Power	N/A	N/A	N/A	N/A	N/A
CAP	N/A	N/A	N/A	N/A	N/A
Water	⊙	⊙	⊙	⊙	⊙
Sewer	⊙	⊙	⊙	⊙	⊙
Gas	○	○	○	○	○
Telephone	○	○	○	○	○
CATV	○	○	○	○	○

Low Impact ○ Medium Impact ⊙ High Impact ●

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 4 (a)
Preliminary Corridor Alignments and Existing Utilities

- Overhead Primary
- Conduit/Duct/Direct Buried
- Gas
- Water
- Reclaimed Water
- Sewer
- Cable Television
- Telephone
- Corridor Alignments
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Source:
Electric Power–Arizona Public Service (APS)

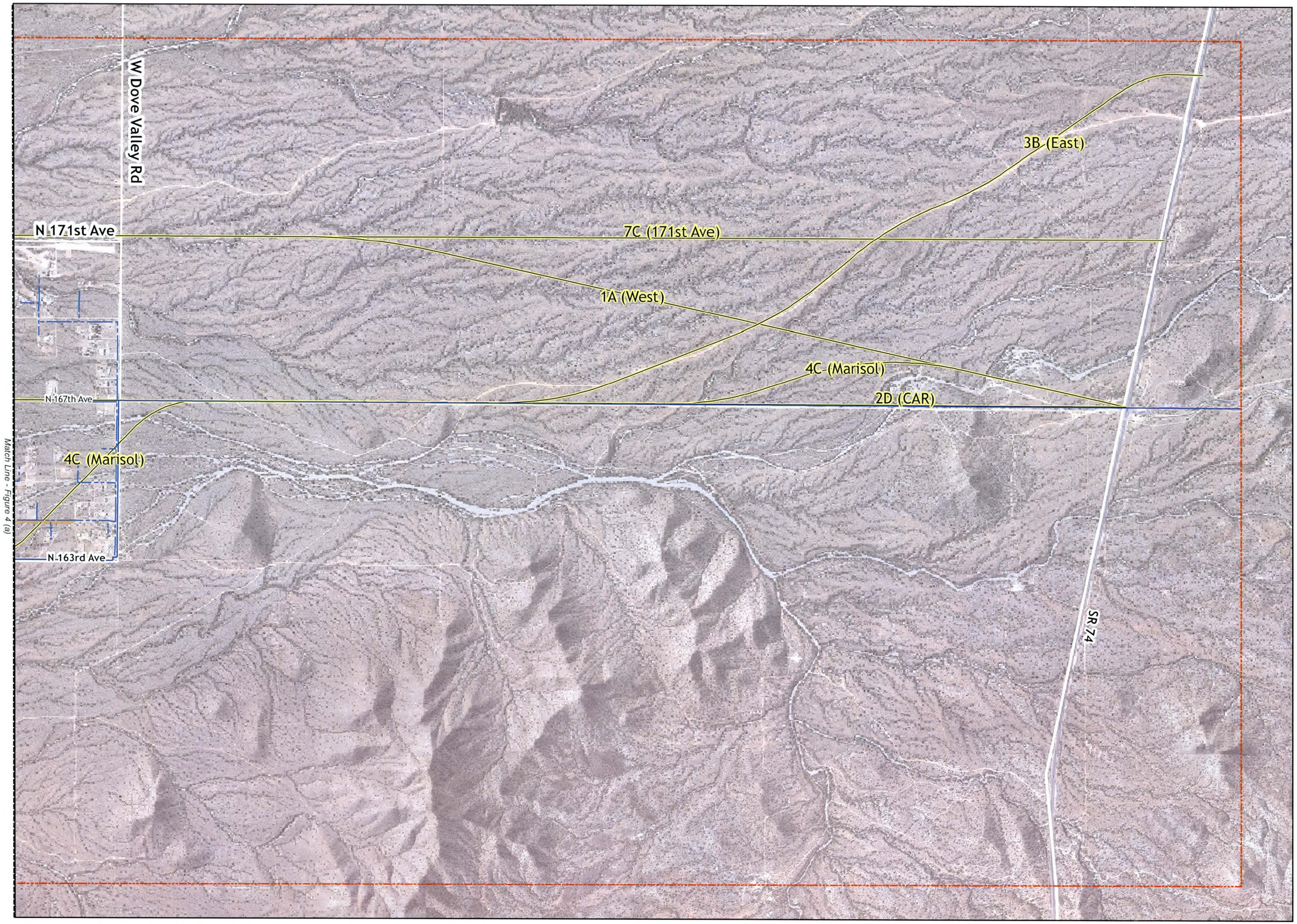
Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

Match Line - Figure 4 (b)

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 4 (b)
Preliminary Corridor Alignments and Existing Utilities



- Overhead Primary
- Conduit/Duct/Direct Buried
- Gas
- Water
- Reclaimed Water
- Sewer
- Cable Television
- Telephone
- Corridor Alignments
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Source:
Electric Power--Arizona Public Service (APS)

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 5 (a)
Preliminary Corridor Alignments and Planned Utilities

- Planned Gas
- Planned Water
- Planned Sewer
- Planned Telephone
- CHECK NAME
- Corridor Alignments
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

PB 100 YEARS

N 171st Ave (Cotton Ln)
7C (171st Ave)
1A (West)
N 167th Ave
2D (CAR)
3B (East)
W Jomax Rd
N Dale Ln
W Dixieleta Dr
W Montgomery Rd
W White Wing Rd
W Quail Run Rd
N 163rd Ave
4C (Marisol)
N 155th Ave (Reems Rd)
Match Line - Figure 5 (b)

163rd Ave CIS & DCR

Jomax Rd to Dove Valley Rd ***CIS***
Dove Valley to SR74 ***DCR***

Figure 5 (b)
Preliminary Corridor Alignments and Planned Utilities

- Gas
- Water
- Sewer
- Telephone
- Water Pump Station
- Wastewater Lift Station
- Padelford Wastewater Treatement Plant
- Water Reservoir
- Corridor Alignments
- Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

Note:
This map is provided solely for display and reference purposes. The utility locations shown on this map are approximate only and are not reliable for construction purposes. In addition, there may be facilities in existence due to recent construction that are not shown.

Match Line - Figure 5 (a)

6.0 Findings

The purpose of the *Utility Overview* was to identify the existing and planned utilities within the 163rd Avenue CIS study area then use the information to develop an understanding of the potential utility impacts. The land use is either low density residential or undeveloped, thus the study area contains relatively few existing utilities. The existing utilities include overhead power, underground electric, water, sewer, well fill, effluent, gas, telephone, fiber optic and coaxial cable. These utilities are mainly concentrated in the southern central section of the study area with APS electric power lines possessing the most infrastructure within the area. In general, overhead utilities will require relocation if within the proposed improvement cross section while underground utilities may remain in place if the roadway profile can be designed to provide adequate vertical clearance. The utility impacts will be a factor in evaluating the corridor alignments. Conflicts can be determined after the preferred alignment has been selected.

A quick glance at the agencies' future planning documents confirms that development in the area is imminent. As indicated in Section 4 of this memorandum, utility infrastructure will be installed to support the population need. A significant portion of the planned utility work will take place in the next three to five years. Consideration will need to be given to the relationship of the new roadway alignment and planned water and wastewater systems. It may be desirable to adjust the location of the planned utilities to make use of the roadway right-of-way. The utility owners are key stakeholders in the 163rd Avenue CIS and will continue to be invited to participate in its development.

Appendix E

Technical Memorandum No. 5

Major Features & Access Management

Appendix E

Technical Memorandum No. 5

Major Features & Access Management

TECHNICAL MEMORANDUM NO. 5

MAJOR FEATURES of the PREFERRED CORRIDOR ALIGNMENT

163rd Avenue CIS & DCR
Jomax Road to SR 74 *CIS*
Jomax Road to Dove Valley Road *DCR*

September 2007

Prepared For:

Prepared By:

PB PARSONS BRINCKERHOFF

Table of Contents

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1.0 Introduction

Technical Memorandum No. 5 *Major Features of the Preferred Corridor Alignment* describes the key components of Alignment Alternative 4C (163rd Avenue) for the 163rd Avenue, Jomax Road to State Route (SR) 74 Corridor Improvement Study (CIS) and Design Concept Report (DCR). Alternative 4C (163rd Avenue) was selected among five corridors alignments evaluated for this study. Evaluation criteria involved multi-disciplinary analysis and public/stakeholder input. The findings of this memorandum will be used as the basis for future planning and design efforts.

1.1 Roadway Classification

Existing 163rd Avenue is primarily a two-lane roadway from Jomax Road to Dove Valley Road and is functionally classified as a Rural Minor Collector. The roadway ends at Dove Valley Road.

Within the study limits, the ultimate 163rd Avenue roadway is classified as a Principal Arterial (Road of Regional Significance) according to the MCDOT Major Streets and Routes Plan. The roadway traverses two jurisdictions, the Cities of Surprise and Peoria. The ultimate 163rd Avenue roadway is classified as a Parkway according to the Surprise *Draft Transportation Plan* and the Peoria *General Plan*. The Principal Arterial and Parkway classifications provide for a six-lane cross-section.

1.2 Design Speed and Posted Speed

According to the MCDOT *Roadway Design Manual*, the design speed of a Principal Arterial is 55 mph on level terrain. Due to the presence of vertical curb and gutter used in an urban condition, AASHTO recommends that the speed be limited to 45 mph. While AASHTO states that the speed of a given road may be posted at the design speed. MCDOT's design and operating policy states that the posted speed limit shall be 45 mph or less where vertical curbs are installed.

The existing posted speed is 50 mph between Jomax Road and Dove Valley Road. It is recommended that a speed study be performed and existing conditions reviewed prior to final design to determine if the posted speed should be reduced. If the result of the speed study concludes that the posted speed remain 50 mph, then a phased implementation of the typical section is recommended as outlined in the MCDOT Policy/Procedure Manual "Median Policy for High Speed Roadways", dated 3/21/02.

1.3 Design Criteria

The design criteria for this project were established using the MCDOT *Roadway Design Manual* (November 3, 1993) including updates through April 27, 2004, City of Surprise Dra*ft Transportation Plan*, City of Peoria *Infrastructure Development Guidelines*,

FCDMC *Drainage Design Manual, Volume I, Hydrology and Volume II, Hydraulics* and the AASHTO Policy on Geometric Design of Highways and Streets (2001).

Selective design criterion used for the CIS development is summarized in Table 1.

Table 1: Design Criteria

Design Year	Build-Out
Build-Out ADT	13,000 to 40,400 (See TM No. 1 – Traffic Overview)
Design Vehicle	WB-50
Design Speed	55 mph Min (Urban Principal Arterial)
Pavement Design Life	20 Years
Pavement Section	4 inches AC, 9 inches ABC, 6 inches Lime Stabilized Subgrade (To be reviewed against current standards during final design)
Horizontal Alignment	Curve Length 500 feet Min, e = 4% Max
Vertical Alignment	Vertical curve is required for algebraic grade difference equal to or greater than 0.5% (0.2% if Federally Funded). At major street/major street urban intersections, the maximum intersection ride through break-over at signalized intersections shall not exceed 2.5%.
Longitudinal Profile Grades	0.25% Min (MCDOT) 0.15% Absolute Min (MCDOT Special cases) 0.40% Min (Peoria) < 0.40% (Peoria City Engineer Approval)
Roadway Cross Slope	2%
Lane Widths	Travel Lanes: 12 feet
Curb Return Radii (Face of Curb)	45 feet (MCDOT Arterials and Major Collectors)
Clear Zone	30 feet Desirable
Cut & Fill Slopes	4:1 Max
Tapers	Design Speed:1 Minimum
Flares	15:1 Minimum
Right-of-way	Desirable 200 feet total width (Surprise) Desirable 150 feet total width (Peoria)
Utilities	MCDOT guidelines for relocations and the AUCC Public Improvement Project Guide
On-Site Drainage – Roadway	▪ Design culverts and bridges for the 50-year event. ▪ Design roadway for 6" maximum depth for the 100-year event. ▪ Size storm drains for the 10-year event and provide 12' of "dry" pavement for both directions of traffic. ▪ On-site hydrology to be computed for the proposed right-of-way limits using the Rational Method procedures outlined in the *Drainage Design Manual for Maricopa County, Hydrology*.

2.0 Roadway Features

2.1 Alignment Description

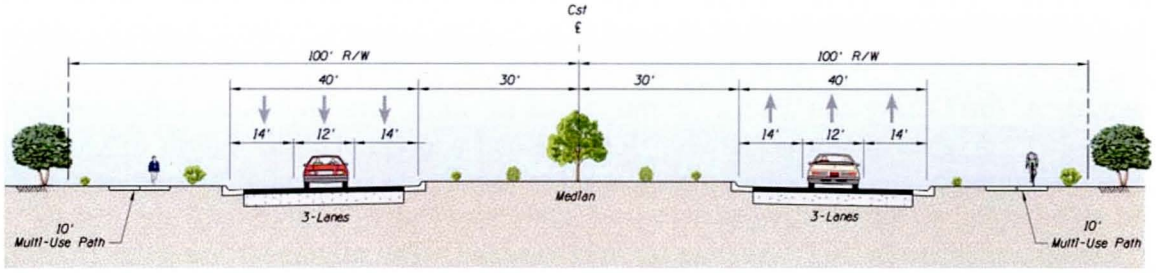
The preferred corridor alignment is based on the existing 163rd Avenue roadway, see Appendix A for Conceptual Plans. From south to north, the alignment follows the existing 163rd Avenue roadway between Jomax Road and Quail Run. North of Quail Run, the alignment curves northwest to minimize impacts to residential properties and avoid topographic features. Reverse curves of 3,000 foot and 1,400 foot radii are used to shift the alignment from 163rd Avenue to 167th Avenue. The alignment joins the 167th Avenue alignment approximately 1,000 feet north of Dove Valley and continues on tangent for approximately 7,900 feet. A series of reverse curves (5,000 foot, 2,800 foot and 2,000 foot radii) are used to avoid a hill and cross the Padelford Wash where it is narrowly defined. The alignment terminates at SR 74, south of the Quintero Development entrance, at a proposed future traffic interchange.

The vertical profile is envisioned to follow the topography with the exception of the segment between the CAP canal and Dove Valley Road. The profile of the roadway in a delineated floodplain should be such that the base flood elevation is not increased as a result of the construction of the roadway embankment. If the finished grade profile is above the base flood elevation, the system of culverts, bridges and channels should have sufficient capacity and freeboard (the design event may need to be the 100-year storm rather than the 50-year) that will allow the base flood elevation to remain unchanged or be lower. In the opposite case, the profile of the roadway should be such that the base flood elevation is no more than 6" above finished grade, provided that the combined capacity of the offsite drainage system and the overtopping of the roadway do not increase the base flood elevation. A profile will be designed during the DCR phase of this study for 163rd Avenue between Jomax Road and Dove Valley Road.

2.2 Typical Section

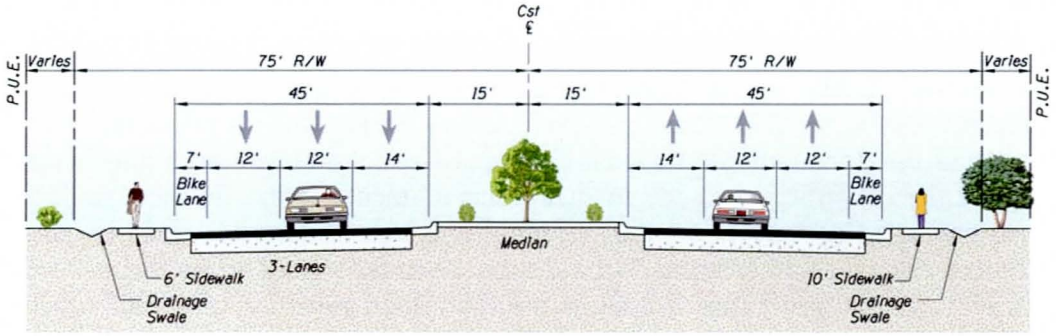
The typical section for the preferred alignment alternative consists of three travel lanes in each direction separated by a raised median. Pedestrian and bicycle traffic will be accommodated on both sides of the roadway. The Parkway Typical Sections developed by the cities will be used within their respective jurisdictions as shown below in Figures 1 and 2. The primary difference between the sections is the median width, which relates to the proposed treatment of intersections in each jurisdiction (see Sections 6.1.1 and 6.1.2 for more information). Other differing features include right-of-way, bike lane and sidewalk widths.

Figure 1: Surprise Parkway Typical Section



CITY OF SURPRISE
PARKWAY

Figure 2: Peoria Parkway Typical Section



CITY OF PEORIA
PARKWAY

Dove Valley Road to SR 74

3.0 Drainage

3.1 Off-Site Drainage

The Padelford Wash is the most significant natural drainage feature of the CIS, traversing the study area in a north to south direction. Several other washes follow the general direction of the Padelford Wash. The main channel of the Padelford Wash is well defined and incised from its origin north of SR 74 to a point approximately 0.5 miles north of the Dove Valley Road alignment, where it opens onto an alluvial fan. The fan splits into several channels that have shallow banks that overtop during significant events.

The preferred alignment crosses fourteen major drainage ways. . According to Maricopa County Policy, all culverts and bridges shall be designed with capacity for the 50-year event and a maximum of 6" of depth over the paved road for the 100-year event, given

the principal arterial designation of 163rd Avenue. A summary of the flows and conceptual type and size of drainage structures at the waterway crossings is provided in Table 2. The 6'x 5' barrel size criterion is used for simplicity during the CIS. Different rise/span configurations may be more efficient.

Table 2: Preliminary Drainage Structure Summary

Crossing ID	50-year Flow (cfs)	100-year Flow (cfs)	6'x5' RCBC (# of barrels)	Bridge Span (ft)
P1	864	1080	6	
P2	125	157	1	
P3	118	148	1	
P4	158	197	1	
P5	312	390	2	
P6	1058	1323	7	
P7	1058	1323	7	
P8	1090	1575	8	
P9	1090	1575	8	
P10	3931	4660		150
P11	49	62	1	
P12	964	1215	7	
P13	3439	4506		150
P14	160	200	1	

3.2 On-Site Drainage

Options for the collection and disposal of pavement runoff include open and closed drainage systems, assuming that the preferred alternative has curb and gutter along the outside edge of pavement as shown in the typical sections provided by the cities. In an open system, runoff would be collected at scuppers or catch basins and routed to linear basins or ditches to outfall locations. In a closed system, runoff collected at catch basins would be routed to the system outfall by a network of storm drain laterals and trunk lines. Open systems are typically viable where there is sufficient right-of-way for open channels and/or basins. The design event for a principal arterial is the 10-year storm with at least 12' of "dry" pavement for both directions of traffic. Separation of on-site and off-site flows is not usually required in urban street projects.

3.3 Section 404 of the Clean Water Act

Most natural channels in the study area may be considered to fit the criteria for designation as jurisdictional waters of the United States and would therefore be regulated by the United States Army Corps of Engineers (USACOE). Construction of roadway improvements within delineated jurisdictional waters will require permits issued by the USACOE.

3.4 Floodplain Considerations

The 100-year floodplains have been delineated in the study area for the Padelford Wash (see Technical Memorandum No. 3 – *Conceptual Drainage Report*). Base flood elevation lines have also been developed for the inactive alluvial fan. The Preferred Corridor Alignment conflicts with the delineated 100-year floodplains, especially between the CAP Canal and Dove Valley Road. Guidelines state that the base flood water surface elevation in a FEMA delineated floodplain should not be increased as a result of the construction of roadway improvements. Therefore, it may be necessary to provide 100-year capacity at the culvert crossings, construction of guide banks or levees, roadway embankment protection, and sections of wash realignment to minimize changes to the distribution of split flows across the floodplain.

Conditional Letters of Map Revision (CLOMR) from FEMA may be required for the construction of proposed improvements.

4.0 Structures

4.1 Existing Structures

There is one existing bridge structure within the project limits, the Sarival Avenue Bridge crossing the Granite Reef Aqueduct (CAP Canal). This bridge was constructed in 1980 by the Bureau of Reclamation at the time of the construction of the CAP canal. The crossing is a one span precast prestressed concrete I-Girder bridge with a reinforced concrete deck. The out-to-out roadway width is 48 feet with an overall width of 59'-7". The superstructure is supported by abutments founded on spread footings. The bridge crosses the canal with a skew of approximately 4.5 degrees and with a total length of about 88 feet.

4.2 Minor Structures

The preferred alignment has six minor structures that are all Reinforced Concrete Box Culverts (RCBC). A minor structure is defined as having a span width of less than 20 feet.

4.3 Major Structures

A major structure is defined as having a span width of greater than 20 feet. There are nine major structures including six RCBCs and three bridges along the preferred corridor alignment. The RCBCs will be standard boxes utilizing the Arizona Department of Transportation Standard Drawings. The three bridges are located at the CAP Canal, Padelford Wash Split 3 and Padelford Wash Tributary B.

CAP Canal

The existing deck is too narrow to accommodate the increased width required of the future parkway. Furthermore, the CAP Operating and Maintenance (O & M) roads currently are at grade and do not satisfy CAP's new criteria for bridges crossing their operations and maintenance (O & M) roads. For a new bridge it is necessary to locate the O & M roads below the proposed crossing of the CAP Canal and replace the existing bridge with new bridge(s).

Bridges crossing the CAP Canal must satisfy the following Central Arizona Project requirements:

1. The bridge must span the CAP Canal and the O & M roads on both sides. The O & M road on the north side shall be 20 feet wide; the O & M road on the south side shall be 24 feet wide.
2. The bridge must span the future Central Arizona Project Trail. The minimum trail width shall be 20 feet and located on the south side of the canal.
3. The bridge must provide a minimum vertical clearance of 14'-10" to the O & M roads. It may be possible to lower the O & M road elevation below the bridge structure in order to minimize the raising of the bridge elevation of the proposed Sarival Avenue Bridge.
4. The bridge must provide a minimum vertical clearance of 8'-6" to the top of the CAP Canal Liner.
5. Bridge piers located on each side of the canal shall not be closer than 5'-0" from the edge of the canal lining.
6. During construction the O & M roads may be closed one at a time but both roads shall not be closed simultaneously.
7. Material/debris should be prevented from falling into the canal during construction. Any material/debris falling into the canal must be removed per CAP instructions.

For the proposed crossing, two alternatives are envisioned:

- Alternative One - A single bridge structure accommodating 6 lanes of traffic with bike lanes and sidewalks, including a raised median of 14 feet.
- Alternative Two - Two separate and parallel bridge structures each accommodating 3 lanes of traffic with combined bike lane and sidewalk, and with a clear out-to-out distance of 60 feet to match the roadway on each side of the bridge.

Substantial new roadway embankments will be required to elevate the proposed crossing over the Canal to achieve the required clearances. The governing clearance for the bridge will be the clearance above the O & M roads. It is therefore of great importance to minimize the structural depth of the proposed crossing at these locations.

The crossing of the Canal itself would require a superstructure length of about 95 feet. The length has been increased compared with the existing bridge in order to satisfy the new horizontal clearance requirements. The crossing of the O & M road with future Trail would require a length of about 50 feet, and the crossing of the O & M road itself about 25 feet. Therefore, the total superstructure span length required would be about 170 feet.

For these types of crossings the most common form of superstructure is precast prestressed I-Girders with cast-in-place reinforced concrete deck. The maximum length that I-Girders can span is about 140 feet. Therefore, a single span structure utilizing I-Girders is not feasible. The use of steel plate girders with a reinforced concrete deck could be feasible, but the structural depth would be significant. In order to reduce the structural depth above the O & M roads it would be more prudent to use a three span structure. The center span would utilize I-Girders, and the side spans would utilize precast prestressed Box Beams with reduced structural depth compared with prestressed I-Girders. It is common to make each side span of equal length, hence the total length of the three-span structure would be about 195 feet.

Circular reinforced concrete columns with a reinforced concrete cap beam supported on drilled shafts can be utilized for the two piers. Each abutment is envisioned to be supported by spread footings similar to the existing structure.

Padelford Wash Split 3

Immediately north of the existing Dove Valley Road, a new bridge will be needed to span a branch of the Padelford Wash (approximately Sta 319+00). This bridge will fall within the City of Peoria and will therefore need to accommodate their Parkway Typical Section. Due to the close proximity of this bridge to the new Dove Valley Road intersection, it is envisioned that one bridge will be constructed instead of two parallel structures so that left turn lane storage can be provided. The bridge width will provide a clear out-to-out distance of 120 feet. The span length will be approximately 150 feet. Guide banks may be required upstream and downstream to align flows with the bridge opening.

Padelford Wash Tributary B

Approximately ½ mile south of SR 74, the Preferred Corridor Alignment crosses the Padelford Wash Tributary B (approximately Sta 462+50). Similar to the other Padelford Wash Split 3 crossing, this structure will accommodate the City of Peoria Parkway Typical Section. However, this location is not near any intersections and two alternatives may be considered:

- Alternative One - A single bridge structure accommodating 6 lanes of traffic with bike lanes and sidewalks, including a raised median of 14 feet
- Alternative Two - Two separate and parallel bridge structures each accommodating 3 lanes of traffic with combined bike lane and sidewalk separated by approximately 30 feet.

The span length will be approximately 150 feet. Because the existing channel banks are well defined at this crossing, the anticipated upstream and downstream channel work is minimal.

5.0 Utilities

5.1 Existing Utilities

Existing utilities in the vicinity of the preferred alignment alternative include electric, gas, water, telephone, coaxial, cable TV and fiber optics. Preliminary utility information was obtained to a Quality Level D as defined in Technical Memorandum No. 4 – *Utility Overview*. Contact information for these facilities is provided in Table 3.

Potential existing utility conflicts include electric, water and telephone. Underground utility locating has not been performed for this CIS. A complete field investigation, including utility potholing will be required during final design of the roadway.

The existing electric facilities in the vicinity of the preferred alignment consist of overhead and underground power lines in short segments along 163rd Avenue. The total length of overhead power potentially in conflict is approximately 5,280 feet, with the longest stretch installed from Dixileta Road to Montgomery Road. The underground electric is located between White Wing Road and Quail Run Road for an approximate distance of 500 feet. There are also overhead lines that cross the preferred corridor alignment at 164th and 165th Avenues.

Existing water facilities that may conflict with the preferred alignment include a 16" waterline that extends from the CAP canal at 163rd Avenue to the Quintero Golf Course located north of SR 74. According to as-built maps, this facility has approximately 4 feet of cover. The 163rd Avenue roadway profile can be designed to minimize impact to the waterline, particularly between the CAP and Dove Valley Road where the water line lies within the 100 year flood plain and the roadway grade must be raised from the existing ground elevation.

Existing underground telephone is also located in the vicinity of the preferred alignment corridor. Telephone lines run parallel to 163rd Avenue between Jomax Road and the CAP canal. The preferred alignment also crosses an existing line along 164th Avenue between Quail Run Road and Dove Valley Road. As previously mentioned, the new roadway profile can be designed to minimize impacts to underground facilities.

Table 3: Utility Contacts

UTILITY	FACILITY	CONTACT	INFORMATION
Arizona Public Service	Electric	Cary Deice	(602) 250-1232
Central Arizona Water Conservation District	Electric, Fiber Optics, Coaxial	Tom Fitzgerald Abe Sahli	23636 North 7th Avenue Phoenix AZ 85024 (623) 869-2209 (623) 869-2126
Cox Communications	Cable TV, Fiber Optics	Terran Gutierrez	1550 West Deer Valley Road Phoenix, AZ 85027 (623) 328-3569
Quintero Golf Course Maintenance	Water	Rod Meyers	(928) 501-1580
QWest Local Networks	Fiber Optics, Telephone	Steffan Cline	6350 South Maple Avenue Room 125 Tempe, AZ 85283 (602) 630-1435
Saguaro Acres CFD	Water	Robert Chentfant	(623) 584-3467
Saguaro View Management	Water	Rick Malero	623-546-2840 623-546-2840 (fax)
Southwest Gas	High Pressure Natural Gas, Low Pressure Natural Gas	Claudia Fisher	9 South 43rd Avenue Phoenix, AZ 85009 (602) 484-5294

5.2 Planned Utilities

Several of the utility owners have plans to extend service within the study area as noted in Technical Memorandum No. 4 – *Utility Overview.* Both the Cities have expansive plans to extend water and sewer service. These plans should be adaptive to the preferred alignment corridor of 163rd Avenue. Other facility owners, like APS, Qwest and Southwest Gas will continue to respond to local growth. Qwest is planning to install a Serving Area Interface near the intersection of 163rd Avenue and White Wing Road. The results of the CIS will be shared with the utility companies to ensure future compatibility.

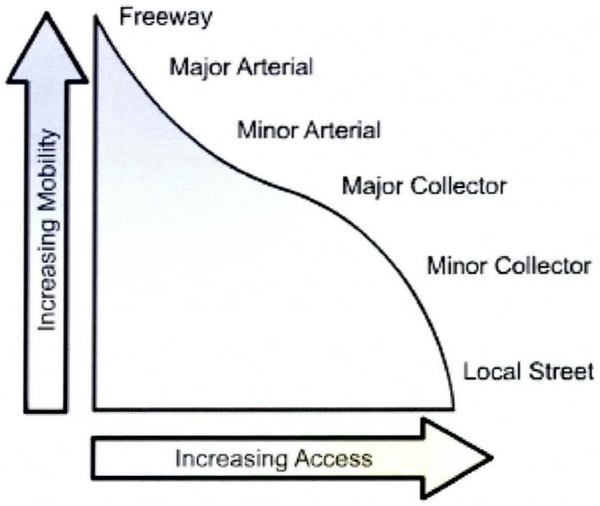
6.0 Access Management

Access management is a tool that can be used by municipalities to shape the nature and usage of a roadway, as well as the neighboring land uses. Access management focuses on techniques that increase the capacity, manage congestion, and reduce crashes. The methods used are:

- Increasing spacing between signals and interchanges;
- Driveway location, spacing, and design;
- Use of exclusive turning lanes;
- Median treatments, including two-way left turn lanes that allow turn movements in multiple directions from a center lane and raised medians that prevent movements across a roadway;
- Use of service and frontage roads; and
- Land use policies that limit right-of-way access to highways

An appropriate level of access is allowed depending on the type and purpose of a roadway. Major regional routes should have less access in order to increase the flow of traffic and minimize accidents.

Figure 3: Access vs. Mobility



163rd Avenue is designated as a Parkway by the Cities of Peoria and Surprise within the project study area, creating a major north-south connection in the region. The Surprise portion of the 163rd Ave alignment will utilize indirect left turns north of Jomax Ave ending just south of Dove Valley Blvd. The portion of 163rd Ave within Peoria city limits will utilize standard intersection design. The Access Management Plan for the preferred alignment corridor acknowledges that the corridor with serve to both carry a large volume of traffic through the region but also to destinations along the corridor, such as homes, businesses, and workplaces. The Access Management Plan includes intersection configurations, frontage roads and driveway spacing recommendations to create an outline to properly balance the traffic flow and congestion with land use access needs.

6.1 Intersections

Between Jomax Road and SR 74, eleven crossroads intersect the preferred alignment. Future roadway classifications in this area, as well as two new intersections along the Patton Road/Dynamite Road alignment have been identified in the *Northwest Adopted General Plans Roadway Network*, which is summarized in Table 4.

Table 4: Intersections

Crossroad	Existing Classification	Future Classification	Intersection Type	Future Traffic Control
Jomax Road	Major	Parkway	"+"	Signal
Patton Road (Dynamite Road)	N/A	Minor Arterial	"+"	Signal
Dale Lane	Local Residential	Local Residential	"+"	Two-Way Stop
Peak View Road	Local Residential	Local Residential	"+"	Two-Way Stop
Duane Lane	Local Residential	Local Residential	"T"	One-Way Stop
Dixileta Drive	Local Residential	Minor Arterial	"+"	Signal
Windstone Trail	Local Residential	Local Residential	"T"	One-Way Stop
Montgomery Road	Local Residential	Local Residential	"T"	One-Way Stop
Lone Mountain Road (White Wing Road)	Local Residential	Parkway	"+"	Signal
Quail Run Road	Local Residential	Local Residential	"T"	One-Way Stop
Dove Valley Road	Collector	Minor Arterial	"L"	Signal
Black Mountain Road	N/A	Major Arterial	"T"	Signal
SR 74	Rural Highway	Freeway	Traffic Interchange	Signal

Increasing distance between traffic signals improves traffic flow by increasing travel speeds and decreasing congestion. Increasing the distance between signals also reduces the incidence of crashes.

Table 5: Signal Spacing- Travel Time

Signal Per Mile	Increase in Travel Time (%)
2	-
3	9
4	16
5	23
6	29
7	34
8	39

Source: "Impacts of Access Management Techniques", 1999, NCHRP Report 420, Transportation Research Board

Table 6: Signal Spacing- Travel Time

Signal Per Mile	Crashes Per Million, VMT
Under 2	3.53
2 to 4	6.89
4 to 6	7.49
6+	9.11

Source: "Impacts of Access Management Techniques", 1999, NCHRP Report 420, Transportation Research Board

Traffic signals along the 163rd Ave corridor are located at major crossroads to optimize traffic flow and decrease congestion. This 1/2 to 1 mile spacing will allow signal coordination at the posted speed of 45 mph with a 90 second signal cycle length. The signalized intersections are at:

- Jomax Rd
- Patton Rd
- Dixileta Dr
- Lone Mountain Rd
- Dove Valley Rd
- Black Mountain Rd
- SR 74

Unsignalized intersections along the corridor will provide more localized access to minor roadways in the area. Many of the homes which currently have access off of 163rd will have access from these smaller roadways in the future, which is discussed in further detail in section 6.4. The unsignalized, stop controlled intersections are:

- Dale Ln
- Peakview Rd
- Skinner Rd
- Morning Vista
- Duane Ln
- Windstone Trail
- Quail Run Rd
- Three currently unnamed roadways

The intersection design will also address transit and pedestrian needs through phase-protected pedestrian cross-walks and near or far side bus pullouts. For the pedestrian movement crossing 163rd Ave, a median refuge may be needed to facilitate a two-phase pedestrian crossing in order to maintain a proper signal progression.

6.2 Driveway Location, Spacing, and Design

Driveway access to side activities at inappropriate locations can reduce the carrying capacity of the roadway and create conflicts that can impair motorist safety. Fewer driveways spaced further apart allow for more orderly merging of traffic and present fewer challenges to drivers. Due to the existing level of development, this plan both recommends access management techniques for existing driveway access but also standards to use while undergoing future development.

Due to the speed and capacity requirements of a parkway, acceleration and deceleration lanes are mandatory for all right turns, at both intersections and driveways, which will minimize impact on traffic flow and enhance turning vehicle safety. For a parkway with high traffic volumes, no right-turn access should be permitted within 300 feet of the intersection and no left-turn access within 600 feet of the intersection. In order to meet this distance requirement, driveways in conjunction with future development should be placed at the furthest edge of the property line. An additional consideration to reduce the number of driveways is to combine property access points and provide alternative access, such as from secondary roadways.

Many homes currently have direct driveway access to 163rd Ave. In order to reduce the number of driveways several of these driveway accesses were consolidated into shared drives or access has been relocated to a series of collector roads offset from 163rd Ave. Through consolidation several drives have become cul-de-sacs, especially those near future signalized intersections. Future detailed plans will outline more detailed design and maintenance for these new routes.

6.3 Median Treatments

Median treatments can restrict access to driveways and local streets, while consequently increasing roadway speed and safety. The parkway median treatment for the Cities of

Surprise and Peoria utilize a raised landscaped median with periodic breaks to allow for turns. Within the City of Peoria there are to be breaks in the medians allowing left turns at all signalized intersections. Along the portion of 163rd Ave utilizing the indirect left turn concept median breaks will be located 660' on either side of the intersection to allow for the indirect left turn. Additional median breaks may be considered at driveway access points, either a full median break or a left-in only to improve safety.

7.0 Right-of-Way

7.1 Existing Right-of-Way

Right-of-way maps have been provided by MCDOT along the existing 163rd Avenue roadway. The existing right-of-way width is generally 55 feet west and east of the section line, but varies between 40 to 65 feet at some locations. According to Maricopa County Assessor information, ownership adjacent to the preferred alignment corridor is mixed between federal, state, county, and private lands. Between Jomax Road and Dove Valley Road, several private properties with residences abut the roadway right-of-way. North of Dove Valley Road, there are no residences.

7.2 Proposed Right-of-Way

The proposed right-of-way width is 200 feet in the City of Surprise and 150 feet in the City of Peoria as required by the respective roadway typical sections. 163rd Avenue from Jomax Road to Dove Valley Road will utilize the 200 foot width resulting in 79 acres of additional right-of-way. The centerline of the roadway was established based upon the west roadway right-of-way line, which is generally 55 feet west of the section line. Holding this boundary, the centerline was projected 100 feet east to minimize the right-of-way needed on the west side of 163rd Avenue where more residences exist. Between Dove Valley Road and SR 74, the proposed right-of-way width is 150 feet centered about the section line resulting in 58 acres of additional right-of-way.

8.0 Constructibility

Construction of a new 163rd Avenue facility along the preferred corridor alignment is relatively straightforward with the existing level of development. The Parkway Typical Section will allow for the northbound roadway to be constructed while the existing roadway remains in use for two-way traffic. Traffic can then be shifted to the new northbound roadway while the existing roadway is obliterated and the new southbound lanes are constructed. Maintaining access to local residences is a key consideration.

9.0 Future Development

At this time, only one future development is known in the immediate vicinity of the preferred corridor alignment, Marisol Ranch by Beazer Homes. Marisol Ranch is located in the section bounded between Quail Run and Dove Valley Road (south and north) and 163rd Avenue and 155th Avenue (west and east). This development falls within the City of Surprise and is preliminary (plat not yet been submitted or approved). Improvements to 163rd Avenue as recommended by this study will need to be incorporated by any future development.

Other future development in the vicinity includes Saddleback Heights and Vistancia. These developments are located in the City of Peoria, north of Dove Valley Road and east of 167th Avenue. Both developments are shown on the City's General Plan.

10.0 Estimated Cost

The preliminary cost estimate for Alternative 4C - 163rd Avenue Alignment is $132,640,000, which includes estimates for design, construction, utility relocation, new right-of-way and oversight. Approximately $60,395,000 is estimated for Construction, $7,245,000 for Design (12% of Construction Value), $9,060,000 for Construction Management (15% of Construction Value), $48,690,000 for New Right-of-Way, $1,210,000 for Utility Relocation (2% of Construction Value), and $6,040,000 for Administration (10% of Construction Value).

The preliminary cost estimate for Alternative 4C - 163rd Avenue Alignment is located in Appendix B. The cost estimate is intended to be used for comparative purposes only. Several assumptions have been made since detailed information regarding area survey, topographic features, utilities, etc were not available.

Appendix A

Conceptual Plans of the Preferred Corridor Alignment

Appendix B

Preferred Corridor Alignment Cost Estimate

Appendix F

Preliminary Cost Estimates

Appendix F

Preliminary Cost Estimates

Project Name: 163rd Avenue CIS
Termini: Jomax Road to SR 74
Date: June 2008

2008 SUMMARY COST ESTIMATES (Current Dollars)

COST CATEGORIES	*Factors*	*Alternative 2D*	*Alternative 3B*	*Alternative 4C*
Construction		$51,825,043	$50,674,793	$52,074,434
Design (10% TO 15%)	12%	$6,219,005	$6,080,975	$6,248,932
Construction Management	15%	$7,773,756	$7,601,219	$7,811,165
Right-of-Way		$55,824,056	$53,810,120	$49,264,320
Utility Relocation	2%	$1,036,501	$1,013,496	$1,041,489
Administration (8% TO 13%)	10%	$5,182,504	$5,067,479	$5,207,443
Total		**$127,860,866**	**$124,248,082**	**$121,647,783**

PRELIMINARY SUMMARY COST ESTIMATES (Adjusted for Inflation)

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

Adjusted Construction Cost		$59,788,347	$58,461,352	$60,076,058
Design	12%	$7,174,602	$7,015,362	$7,209,127
Construction Management	15%	$8,968,252	$8,769,203	$9,011,409
Right-of-Way		$64,401,838	$62,078,446	$56,834,150
Utility Relocation	2%	$1,195,767	$1,169,227	$1,201,521
Administration	10%	$5,978,835	$5,846,135	$6,007,606
Adjusted Total		$147,507,640	$143,339,725	$140,339,871

2008 163rd Avenue
CIS Construction Cost Worksheet
Alternative 2D

Alternative:				
Item Description	*Unit*	*Quantity*	*Unit Cost*	*Total*
N.P.D.E.S.	Lump Sum	1	$8,600.00	$8,600
Partnering	Allowance	1	$10,000.00	$10,000
Community Relations	Allowance	2	$12,000.00	$24,000
Engineer's Field Office	Lump Sum	2	$36,000.00	$72,000
Roadway Excavation	C YD	100,000	$5.90	$590,000
Drainage Excavation	C YD	80,000	$8.00	$640,000
Borrow	C YD	700,000	$9.50	$6,650,000
Subgrade Preparation	SQ YD	338,424	$2.60	$879,902
Pavement Structural Section (Alternative 1)	SQ YD	338,424	$18.45	$6,243,923
Concrete Curb & Gutter	LF	77,865	$11.30	$879,875
Single Curb	LF	77,864	$8.80	$685,203
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	48	$2,000.00	$96,000
Concrete Sidewalk Std Det 230	SQ YD	89,167	$39.00	$3,477,513
Traffic Signing & Striping - 6 lanes	LF	42,240	$4.50	$190,080
Traffic Signal, Full Intersection	EA	6	$280,000.00	$1,680,000
Traffic Signal, Indirect Lefts	EA	3	$75,000.00	$225,000
Interconnect/Traffic Signals	LF	42,240	$14.59	$616,282
Box Culverts	LS	1	$4,981,258.00	$4,981,258
Off-Site Drainage	LS	1	$1,550,000.00	$1,550,000
Bridges	SQ FT	60,654	$107.00	$6,489,978
	Subtotal Roadway & Structures			$35,989,614
Removal of Existing Improvements @ 2%	Lump Sum	1	$719,792.00	$719,792
Mobilization/Demobilization @ 4%	Lump Sum	1	$1,439,585.00	$1,439,585
Traffic Control @ 3%	Lump Sum	1	$1,079,688.00	$1,079,688
Contingency @ 35%	Lump Sum	1	$12,596,364.73	$12,596,365
	Subtotal Construction			$51,825,043
Right-of-Way	SQ FT	6,028,007	$8	$48,224,056
Home Relocations	Home	19	$400,000	$7,600,000
	Subtotal Right-of-Way			$55,824,056

2008 163rd Avenue
CIS Construction Cost Worksheet
Alternative 3B

Alternative:				
Item Description	*Unit*	*Quantity*	*Unit Cost*	*Total*
N.P.D.E.S.	Lump Sum	1	$8,600.00	$8,600
Partnering	Allowance	1	$10,000.00	$10,000
Community Relations	Allowance	2	$12,000.00	$24,000
Engineer's Field Office	Lump Sum	2	$36,000.00	$72,000
Roadway Excavation	C YD	100,000	$5.90	$590,000
Drainage Excavation	C YD	80,000	$8.00	$640,000
Borrow	C YD	700,000	$9.50	$6,650,000
Subgrade Preparation	SQ YD	338,744	$2.60	$880,734
Pavement Structural Section (Alternative 1)	SQ YD	338,744	$18.45	$6,249,827
Concrete Curb & Gutter	LF	77,882	$11.30	$880,067
Single Curb	LF	77,882	$8.80	$685,362
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	48	$2,000.00	$96,000
Concrete Sidewalk Std Det 230	SQ YD	88,990	$39.00	$3,470,610
Traffic Signing & Striping - 6 lanes	LF	42,240	$4.50	$190,080
Traffic Signal, Full Intersection	EA	6	$280,000.00	$1,680,000
Traffic Signal, Indirect Lefts	EA	3	$75,000.00	$225,000
Interconnect/Traffic Signals	LF	42,240	$14.59	$616,282
Box Culverts	LS	1	$4,981,258.00	$4,981,258
Off-Site Drainage	LS	1	$1,550,000.00	$1,550,000
Bridges	SQ FT	53,187	$107.00	$5,691,009
	Subtotal Roadway & Structures			$35,190,828
Removal of Existing Improvements @ 2%	Lump Sum	1	$703,817.00	$703,817
Mobilization/Demobilization @ 4%	Lump Sum	1	$1,407,633.00	$1,407,633
Traffic Control @ 3%	Lump Sum	1	$1,055,725.00	$1,055,725
Contingency @ 35%	Lump Sum	1	$12,316,789.80	$12,316,790
	Subtotal Construction			$50,674,793
Right-of-Way	SQ FT	6,326,265	$8	$50,610,120
Home Relocations	Home	8	$400,000	$3,200,000
	Subtotal Right-of-Way			$53,810,120

2008 163rd Avenue
CIS Construction Cost Worksheet
Alternative 4C

Alternative:				
Item Description	*Unit*	*Quantity*	*Unit Cost*	*Total*
N.P.D.E.S.	Lump Sum	1	$8,600.00	$8,600
Partnering	Allowance	1	$10,000.00	$10,000
Community Relations	Allowance	2	$12,000.00	$24,000
Engineer's Field Office	Lump Sum	2	$36,000.00	$72,000
Roadway Excavation	C YD	100,000	$5.90	$590,000
Drainage Excavation	C YD	80,000	$8.00	$640,000
Borrow	C YD	700,000	$9.50	$6,650,000
Subgrade Preparation	SQ YD	383,863	$2.60	$998,044
Pavement Structural Section (Alternative 1)	SQ YD	383,863	$18.45	$7,082,272
Concrete Curb & Gutter	LF	77,061	$11.30	$870,789
Single Curb	LF	77,534	$8.80	$682,299
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	48	$2,000.00	$96,000
Concrete Sidewalk Std Det 230	SQ YD	85,105	$39.00	$3,319,095
Traffic Signing & Striping - 6 lanes	LF	42,240	$4.50	$190,080
Traffic Signal, Full Intersection	EA	6	$280,000.00	$1,680,000
Traffic Signal, Indirect Lefts	EA	3	$75,000.00	$225,000
Interconnect/Traffic Signals	LF	42,240	$14.59	$616,282
Box Culverts	LS	1	$4,981,258.00	$4,981,258
Off-Site Drainage	LS	1	$1,550,000.00	$1,550,000
Bridges	SQ FT	54,926	$107.00	$5,877,082
Subtotal Roadway & Structures				$36,162,801
Removal of Existing Improvements @ 2%	Lump Sum	1	$723,256.00	$723,256
Mobilization/Demobilization @ 4%	Lump Sum	1	$1,446,512.00	$1,446,512
Traffic Control @ 3%	Lump Sum	1	$1,084,884.00	$1,084,884
Contingency @ 35%	Lump Sum	1	$12,656,980.44	$12,656,980
Subtotal Construction				$52,074,434
Right-of-Way	SQ FT	6,058,040	$8	$48,464,320
Home Relocations	Home	2	$400,000	$800,000
Subtotal Right-of-Way				$49,264,320

Project Name: 163rd Avenue CIS
Termini: Jomax Road to SR 74
Date: June 2008

Note: Quantities will be automatically calculated when section widths are entered in "Used" column.

Unit Cost Derivation for Arterial Section Shown:	Actual (mm)	Actual (in)	Used (in)	
1 Aggregate Base Thickness	250	9.843	4	See
Asphalt Rubber Concrete Thickness	37	1.457	1.5	Computations
Asphalt Concrete Thickness	63	2.480	4	Below

Item Description	Unit	Quantity	Unit Cost	Total	
Aggregate Base*	Ton	0.2100	$15.87	$3.33	Calculated at 1.89 tons per CY for 1 SY of 10" AB (0.5250 tons/SY)
Bituminous Prime Coat (0.4 gal per SY)*	Ton	0.0006	$424.78	$0.27	Calculated at 8.0 lbs per gal for 1 SY of Prime (0.0016 tons/SY)
Tack Coat	SY	1	$0.17	$0.17	248 gallons/ton, 0.12 gal/sq yd 0.000484 tons/sq yd
Asphalt Rubber Concrete*	Ton	0.0821	$52.70	$4.33	
Asphalt Concrete*	Ton	0.2189	$47.17	$10.33	per cu yd AB/Cu Yd
Rubberized Pavement cost per SY				$18.43	$664.02 $29.99
Rubberized Pavement cost per SQ M				$22.04	
Rounded unit cost per SQ FT for Rubberized Asphalt Pavement			Total	$18.45	***Subgrade Preparation not Included***

Unit Cost Derivation for Arterial Section Shown:	Actual (mm)	Actual (in)	Used (in)	
2 Aggregate Base Thickness	250	9.843	10	See
Asphalt Concrete Thickness	100	3.937	6	Computations
				Below

Item Description	Unit	Quantity	Unit Cost	Total	
Aggregate Base	Ton	0.5250	$15.87	$8.33	Calculated at 1.89 tons per CY for 1 SY of 10" AB (0.5250 tons/SY)
Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	$424.78	$0.68	Calculated at 8.0 lbs per gal for 1 SY of Prime (0.0016 tons/SY)
Tack Coat	SY	1	$0.17	$0.17	
Asphalt Concrete	Ton	0.32805	$47.17	$15.47	Calculated at 1.97 tons per CY for 1 SY of 4" AC (0.2189 tons/ SY)
Pavement cost per SY				$24.66	
Pavement cost per SQ M				$29.49	
Rounded unit cost per SQ FT for Asphalt Concrete Pavement			Total	$24.65	***Subgrade Preparation not Included***

Unit Cost Derivation for Asphalt Rubber Overlay:	Actual (mm)	Actual (in)	Used (in)	
3 Asphalt Rubber Concrete Thickness	50	1.969	2	See Computations Below

Item Description	Unit	Quantity	Unit Cost	Total	
Tack Coat	SY	1	$0.17	$0.17	Includes Surface Preparation
Asphalt Rubber Concrete	Ton	0.1095	$52.70	$5.77	0.15004
50 mm Asphalt Rubber Overlay per SY				$5.94	
50 mm Asphalt Rubber Overlay per SQ M				$7.10	
Rounded unit cost per SQ FT for 50 mm Asphalt Rubber Overlay			Total	$5.95	

Unit Cost Derivation for Chip Seal on AC Pavement:	Actual (mm)	Actual (in)	Used (in)	
4 Chip Seal Surface Treatment (polymer/rubber)				See Computations Below

Item Description	Unit	Quantity	Unit Cost	Total	
Stone Chips @ 22 lbs per SY	Ton	0.0110	$89.29	$0.98	Calculated at 0.0220 tons/ SY for Chip Seal Application
Asphalt Binder @ 0.4 gal per SY	Ton	0.0017	$501.51	$0.85	
Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$330.26	$0.13	Calculated 8.3 lbs per gal for 1 SY of Fog (0.0004 tons/SY)
Chip Seal on AC Pavement cost per SY				$1.97	
Chip Seal on AC Pavement cost per SQ M				$2.35	
Rounded unit cost per SQ FT for Chip Seal on AC Pavement			Total	$1.95	

Unit Cost Derivation for Double Chip Seal on AB:	Actual (mm)	Actual (in)	Used (in)	
5 Chip Seal Surface Treatment (polymer/rubber)				See Computations Below

Item Description	Unit	Quantity	Unit Cost	Total	
Aggregate Base	Ton	0.0000	$15.87	$0.00	
Stone Chips @ 22 lbs per SY	Ton	0.0110	$89.29	$0.98	Calculated at 0.0220 tons/ SY for Double Chip Seal Application
Stone Chips @ 22 lbs per SY	Ton	0.0110	$89.29	$0.98	Calculated at 0.0220 tons/ SY for Double Chip Seal Application
Asphalt Binder @ 0.4 gal per SY	Ton	0.0017	$501.51	$0.85	
Asphalt Binder @ 0.4 gal per SY	Ton	0.0017	$501.51	$0.85	
Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$330.26	$0.13	Calculated 8.3 lbs per gal for 1 SY of Fog (0.0004 tons/SY)
Double Chip Seal on AB cost per SY				$3.80	
Double Chip Seal on AB cost per SQ M				$4.55	
Rounded unit cost per SQ FT for Double Chip Seal on AB			Total	$3.80	

Project Name: 163rd Avenue CIS
Termini: Jomax Road to SR 74
Date: June 2008

BOX CULVERT COST CALCULATIONS

TYPE OF ROAD	BOX LENGTH (ft)	BOX DESCRIPTION	BOX WIDTH (ft)	TOP SFC AREA*	UNIT	COST**	TOTAL COST
URBAN MINOR ARTERIAL OR LESS	165	CBC 1	6.5	1072.5	SQ FT	$79.00	$84,727.50
(27 m or 88.58' for 5 lanes & 2 sidewalks)	164	CBC 2	6.5	1066		$79.00	$84,214.00
	273	CBC 3	6.5	1774.5		$79.00	$140,185.50
	185	CBC 4	11.34	2097.9		$79.00	$165,734.10
	201	CBC 5	44.8	9004.8		$79.00	$711,379.20
	200	CBC 6	44.56	8912		$79.00	$704,048.00
	291	CBC 7	65.47	19051.77		$79.00	$1,505,089.83
	228	CBC 8	54.56	12439.68		$79.00	$982,734.72
	132	CBC 9	6.5	858		$79.00	$67,782.00
	130	CBC 10	44.6	5798		$79.00	$458,042.00
	145	CBC 11	6.75	978.75		$79.00	$77,321.25
							$4,981,258.10
URBAN MINOR ARTERIAL W/ BIKE LANES (28.8 m or 94.49' for 5 lanes, 2 B/L's & 2 S/W's)	94.49		0	0	SQ FT	$79.00	$0.00
URBAN MAJOR ARTERIAL (31.8 m or 104.33' for 7 lanes & 2 S/W's)	104.33		0	0	SQ FT	$79.00	$0.00
SPECIAL LOW VOLUME ROAD CONDITION*** (16 m or 52.49' for 2 lanes with shoulders)	52.49		0	0	SQ FT	$52.00	$0.00
							$4,981,258.10

* Top surface area of box.

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

*** 16 m box with approval only. Generally a non-section line, low volume location.

BRIDGE COST CALCULATIONS

TYPE OF ROAD	BRIDGE LENGTH (ft)	DESCRIPTION	BRIDGE WIDTH (ft)	TOP SFC AREA*	UNIT	COST**	TOTAL COST
URBAN MINOR ARTERIAL OR LESS	172		41	7052	SQ FT	$107.00	$754,564.00
(27 m or 88.58' for 5 lanes & 2 sidewalks)	172		41	7052		$107.00	$754,564.00
	200		142	28400		$107.00	$3,038,800.00
	150		121	18150		$107.00	$1,942,050.00
Alternative 2D				60654			$6,489,978.00
	172		41	7052		$107.00	$754,564.00
	172		41	7052		$107.00	$754,564.00
	323		121	39083		$107.00	$4,181,881.00
Alternative 3B				53187			$5,691,009.00
	172		40	6880		$107.00	$736,160.00
	172		40	6880		$107.00	$736,160.00
	150		45	6750		$107.00	$722,250.00
	239		72	17208		$107.00	$1,841,256.00
	239		72	17208		$107.00	$1,841,256.00
Alternative 4C				54926			$5,877,082.00
URBAN MINOR ARTERIAL W/ BIKE LANES (28.8 m or 94.49' for 5 lanes, 2 B/L's & 2 S/W's)	0		0	0	SQ FT	$107.00	$0.00
URBAN MAJOR ARTERIAL (31.8 m or 104.33' for 7 lanes & 2 S/W's)	0		0	0	SQ FT	$107.00	$0.00
SPECIAL LOW VOLUME ROAD CONDITION*** (16 m or 52.49' for 2 lanes with shoulders)	0		0	0	SQ FT	$79.00	$0.00
						<100' Long	$0.00
						>=100' Long	$18,058,069.00

* Top surface area of bridge.

** Cost includes bridge railings, barriers, approach slabs, piers, and other items used in bridge construction.
Note: Show cost of channel excavation and other bridge site work on Road Construction Sheet.

*** 16 m bridge with approval only. Generally a non-section line, low volume location.

Appendix G

Study Meeting Information

Appendix G

Study Meeting Information

163rd Avenue Partner Kick-Off Meeting

August 29, 2006
12:30 PM – 2:15 PM

Meeting Summary

Participants

Bob Maki – City of Surprise
Randy Overmyer – City of Surprise
Renee Probst – MCDOT
Greg Davies – MCDOT
Joy Melita – PB
Steve Hogan – PB

General Discussion

DCR Alignment

- Participants agreed that the alignment shown in the CAR between Jomax Rd and Dove Valley Rd should be reviewed and additional alternatives be considered rather than moving directly forward with the CAR recommendation. PB mentioned that the decision about a preferred alignment corridor could affect the DCR timeline because it will delay the required survey work.
- PB will identify 200 scale alignments early to expedite the preferred alignment corridor selection process. Potential alignments will be shown graphically at the public scoping meeting to help speed the decision-making process.
- Alignments will rely on identifying constraints to simplify decision-making: items of interest will include property impacts, drainage and topography. Surprise noted that the alignments must provide all-weather profiles and 200-foot ROW width.
- MCDOT will try to find the CADD files from the CAR for PB to use

ACTION ITEM: *PB to modify the schedule to show the DCR development lagging the CIS development.*

ACTION ITEM: *MCDOT to request CADD files from the CAR.*

Traffic Assessment

- Current traffic volumes of little value

- PB will describe the subregional traffic environment through future volumes from MAG model and traffic impact studies prepared for development in the general area (e.g., Mirasol, Asante, Grandview).
- Surprise would like Tillman Blvd identified in the subregional area maps as a major reliever for Grand Avenue east of the BNSF line running from (Loop 303 to Dove Valley?)

ACTION ITEM: *PB to include Tillman Blvd in the traffic analysis.*

ACTION ITEM: *Surprise to provide PB with most up-to-date development maps.*

Review of Workplan

Project team reviewed the draft workplan and provided comments. PB will revise and submit final workplan.

The environmental process for this project was discussed. This project will be prepared assuming no Federal participation. The scope of work includes an Environmental Overview (EO).

ACTION ITEMS: *PB to address comments to the workplan including modify reference to CAR alternative (pg 1), clarify CD lanes between Grand Ave and Loop 303 (pg 2), change Carefree Highway reference (pg 3), include Indirect Left Turn alternative in objectives (pg 3), include Tillman Blvd (pg 4), provide 30% plans and Final DCR sooner than 8/31/07 (pg 6), clarify reference to Federal requirements (pg 11).*

Public Involvement/Team Coordination

- Field review will be held on September 11th. Participants to meet at Bob Maki's office at 8:30 am.
- Stakeholder meeting will be held 10 days before Public Scoping on October 18th.
- Public Scoping will be on November 1st. A planning meeting will be held with Roberta Crowe on October 5th.
- Surprise and MCDOT will refine the TAC membership and bring to the field review on September 11th
- ProjectSolve2 was discussed as a vehicle for sharing and reviewing information, documents and plans. PB will provide assistance in getting comfortable with the tool when required.

ACTION ITEM: *Surprise and MCDOT to prepare TAC membership list and bring to field review on September 11th.*

ACTION ITEM: *PB to send out meeting "invitations" through Outlook (and ProjectSolve2) versus meeting notices for this project.*

Schedule

- Schedule will be updated to reflect the discussion at the Kickoff meeting
- Additional tasks to be added to recognize reviews and document submittals

ACTION ITEM: *PB to revise the project schedule as discussed.*

163rd Avenue Field Review Meeting

September 11, 2006
8:30 AM – 11:00 AM

Meeting Summary

Participants

Renee Probst – MCDOT
Robert Maki – City of Surprise
Randy Overmyer – City of Surprise
Javier Guana – Andes Engineering
Jennifer Love – PB
Joy Melita – PB
Steve Hogan – PB

General Discussion

The participants met in the field at Jomax Rd and drove the project limits together. Various routes were taken between Jomax Rd and SR 74. The group observed that maintaining a 200 foot ROW width may have some impact to residential homes depending on the alignment. Bob Maki mentioned that the ROW width may be reduced if roadway cross sections allow.

Jomax Rd to Dove Valley Rd

The roadway alignment recommended by the 163rd Ave CAR utilized the existing 163rd Ave alignment between Jomax Rd and the CAP canal. Immediately north of the canal near Montgomery Rd, the alignment curves left (west), proceeds westerly then curves right (north) to align with 167th Ave. Between White Wing Rd and Dove Valley Rd, the alignment is along 167th Ave. While this alignment still appears viable, other routes were also discussed.

Bob Maki mentioned the possibility of shifting 163rd east near the CAP canal then curving back to the west. On the north side of the existing structure, CAP has a facility adjacent to the existing roadway that may be impacted by a 200 foot ROW width.

Other alignments that could serve as alternatives to the existing 163rd Ave roadway included:

- A route that curves northwesterly toward 167th immediately north of Jomax Rd: Bob Maki noted that this option may not be well received by the community.
- Similar to the above route, but near White Wing Rd
- Similar to the above route, but near Quail Run Rd

Dove Valley Rd to SR 74

Five alignments were considered between Dove Valley Rd and SR 74 in the 163rd Ave CAR. The two alignments considered viable were:

- Along the 167th Ave alignment – recommended alignment because it ties into 167th Ave across from the Quintero entrance and is the proposed future location of a traffic interchange on SR 74
- Along the 167th Ave alignment then shifting west to 171st Ave before intersecting to SR 74 – reduces drainage crossings and better matches topography.

The three alignments eliminated include:

- Along the 163rd Ave alignment – mountainous terrain and several major drainage crossings.
- Along the 167th Ave alignment then shifting east to the 163rd Ave alignment before connecting to SR 74 - mountainous terrain and several drainage crossings.
- Along the 175th Ave alignment – makes connections to several north/south roadways more difficult.

Two possible routes were driven between Dove Valley Rd and SR 74. The first route was along the 167th Ave alignment on a graded road constructed by Quintero developers to install a water line. For approximately 2 miles, this alignment was relatively flat with few drainage crossings, likewise for the roadway section immediately south of SR 74. However, for approximately 0.7 miles between, several large drainage ways crossed the alignment. The road also had to negotiate a steep knoll along the alignment.

The second route driven was along the Picacho Wash Trail (this alignment is near 175th Ave and was eliminated in the CAR). The trail connects to SR 74 approximately 0.8 miles west of the 167th alignment then proceeds southeasterly until the trail connects to the 167th Ave alignment, approximately 2.2 miles south of SR 74. This route was relatively flat following a ridge between washes and had few drainage crossings. The washes that parallel the alignment for short segments may require re-channelization if this alignment is selected.

Other alignments discussed included:

- Along the 167th Ave alignment from Dove Valley Rd, proceeding north then curving east to minimize drainage crossings and avoid outcropping.
- Along the 167th Ave alignment from Dove Valley Rd, proceeding north then curving west to the 171st Ave alignment.

According to the CAR, a future traffic interchange will be located on SR 74 along the 167th Ave (references the ADOT Access Management Report). PB will verify if this location is approximate and if it can be moved to align with the recommendations of this CIS if necessary.

Meeting Minutes
PARSONS BRINCKERHOFF
1501 W. Fountainhead Parkway, Suite 400
Tempe, Arizona 85282-1853
PHONE 480 966-8295
FAX 480 966-9234

Meeting Date:	October 18, 2006
Meeting Time:	10:00 a.m.
Location:	Adobe Conference Room, Maricopa County Flood Control District
Subject:	Stakeholder Advisory Committee Meeting 163rd Ave: Jomax Rd to Dove Valley Rd DCR & Dove Valley Rd to SR 74 CIS Contract 2006-19
Attendees:	See Attached Sign-In Sheet

This meeting was the first Stakeholder Advisory Committee (SAC) meeting for the 163rd Ave, Jomax Rd to SR 74 CIS and DCR. The purpose of the meeting was to acquaint the members with the project and illicit input on preliminary roadway alignments. Renee Probst (MCDOT) and Steve Hogan (PB) facilitated the meeting with a presentation discussing the project overview, goals and objectives, role of a SAC member, stakeholder visions, and CIS & DCR schedules. A presentation handout was provided at the meeting.

Following the presentation, stakeholders shared information with regard to their project knowledge and area of expertise.

- Two other MCDOT corridor studies are being performed in the project area. Both are managed by Gregory Davies (MCDOT).
  i. *Patton Rd/Jomax Rd: 299th Ave to 187th Ave (Tillman Blvd)* (Consultant Contact: Mohammed Rehman – CK Group). This study is in the Alternative Analysis Phase. The Environmental Overview, Utilities and Drainage Technical Memos are complete. The Traffic Technical Memo is underway. CK Group is working with MCDOT to obtain the traffic forecasts in the area. Mohammed advised that locating section corners has been an issue. This study will conduct a stakeholder meeting in November.
  ii. *Jomax Rd: Grand Ave to Loop 303* (Consultant Contact: Tom Herz – URS). This study is in the Initial Phase. URS is currently preparing the project work plan. Tom mentioned that the City of Surprise is currently undergoing a Long Range Street Plan for areas 2 and 3 (conducted by URS).

Gregory Davies noted that coordination among the study teams is essential. The teams will conduct separate SAC, TAC and public meetings. However, communication is critical to ascertain corridor issues and delivery consistent information to the public. The study teams will also need to keep abreast of the *Hassayampa Valley Roadway Framework Study* findings (conducted by DMJM).

- Roberta Crowe (MCDOT) shared the study process with the members. The process includes three phases: Initial, Alternative Analysis and Recommended Alternative. At least three SAC meetings will be held during the study. These meetings will be followed by a public meeting (typically two weeks). Only information agreed upon by the stakeholders will be presented at the public meetings. Public meetings will highlight the specific project, but have on hand information from the other studies.

  The first public meeting for 163rd Ave will be held on November 2, 2006 from 5 to 7 p.m. at the Hampton Inn (14783 W. Grand Ave, Surprise, AZ). A TSP meeting will be conducted between 3 to 5 p.m. at the same location.

- Hedy Hall (MCDOT) discussed the right-of-way considerations. A 200-foot right-of-way corridor is the desired width for this project. If right-of-way is required from State Land, additional requirements may be needed including a 401/404 permit and an archaeological study.

- Tom Sonnemann (MCDOT) noted that the CAP crossing must be coordinated. Also, any wash crossing should utilize a standard ADOT box culvert or plan for a bridge. Non-standard box culverts have resulted in maintenance issues.

- Bob Maki (City of Surprise) discussed some of the benefits of the indirect lefts alternative. Aside from reducing intersection delay, this concept also forestalls the need for signals. The 60-foot median allows for some storage of cross street traffic. In Michigan, the indirect lefts alternative has proven to be safer than the conventional intersection.

- Abe Sahli and Paul Zellaner represented the CAP. Some of the issues associated with the CAP crossing include:
  i. Quintero Turnout: located at the NW corner of the existing crossing and the basins are located immediately west. The turnout itself can not be impacted. However, it may be possible to narrow and lengthen the turnout while maintaining same cannel access point. The basins may be relocated IF approved by the City of Peoria, right-of-way is available, or right-of-way is provided. As shown on graphics provided at the meeting, alignments 2, 3, 4 and 5 may impact the turnout. These alignments will be shifted accordingly.
  ii. Recharge project: Two large areas located between 163rd Ave and 171st Ave.
  iii. Structure design: the CAP has a set of design criteria for crossing structures. These include 14′ 6″ clearance above O&M roads, 3-tier bridge (90-120′)

iv. Access locations: currently four access points from 163rd Ave. Must ultimately still have four access points.
v. National trail along canal: trail designated adjacent to canal on the south side. The trail must be accommodated under bridge with a 20-foot width for the trail and 10-foot donated extra space.
vi. Green-up areas: several green-up areas are located along canal. The alignments can not cut through these areas.
vii. Levees: CAP owns levees for water retention. No drainage can enter the canal. The existing levees follow the Bureau of Rec standards and are either 50-year or 100-year designed. New federal standards are currently be developed by FEMA. These will be adopted by the CAP.
viii. Preferred alignments: as presented at the meeting, Alignments 3 and 6 are preferred and Alignment 1 is okay. As mentioned above, the other alignments will be shifted to avoid the Quintero Turnout.

- Michael Duncan and Kelli Sertich (FCDMC) provide information from studies in the area. The Wittman Drainage Master Study began in March 2006 and the Paddelford Wash Study began in 2005. The following considerations were noted:
  i. Preferred alignments: prefer alignments on 167th Ave since they follow ridgeline. Alignments to the west of 167th Ave are also ok. Alignments 3, 4, 5 and 6 have high drainage costs.
  ii. Median basins: basins located in the widened median of the indirect lefts concept are being considered in the Wittman Drainage Master Study.
  iii. Archaeological study: an archaeological study for the area is being prepared by Entellus.
  iv. Floodplains: show floodplains on graphics and plans. Some homes within the floodplains have been identified as potential buy-outs. This information will be useful in developing and evaluating alignments.
  v. Alluvial fans: alluvial fans should be preserved.

- Randy Overmyer (City of Surprise) noted that if 163rd alignment is shifted west (Alignments 1, 2 and 3), Marisol Ranch (engineered by Coe & Van Loo) will not have section line access. The status of the Sierra Norte and Tierra Rico developments was discussed. Follow-up is required. Randy also mentioned that the plot plan (City of Surprise Development Status Map) needs to be updated.

- Mohammed Rehman (CK Group) provided some lessons learned on the Patton Rd/Jomax Rd Study. He suggested that that the new CAP structure could be built on the existing with a phased construction approach. Also, that Greg Keller (State Land) did not recommend moving the alignment off of the section line for their study.

The next SAC Meeting is tentatively scheduled for November 15, 2006.

Action Items:

- Continuous coordination among study teams.
- Obtain design criteria and right-of-way information from CAP
- Obtain potential residential buy-outs, floodplain delineations and archaeological study from the FCDMC.
- Determine status of Sierra Norte and Tierra Rico developments.
- Modify alignments based on input from SAC meeting.
- Schedule meeting with the City of Peoria and State Land.

PB 100 YEARS

Meeting Minutes

1501 W. Fountainhead Parkway, Suite 400
Tempe, Arizona 85282-1853
PHONE 480 966-8295
FAX 480 966-9234

Meeting Date:	January 29, 2007
Meeting Time:	9:30 a.m.
Location:	Apache Conference Room, MCDOT
Subject:	Project Partners Progress Meeting 163rd Ave CIS and DCR Jomax Road to SR 74 CIS Jomax Road to Dove Valley Road DCR Contract 2006-19

1) **Technical Memorandums** – A status of the four TMs was provided. All TMs will be available on the ProjectSolve Site.
   - Technical Memorandum No. 1: Traffic Analysis – A draft of the TM is underway and will be completed by February 14th (to share at the SAC Meeting). The modeling information should be available to complete the TM. PB will confirm the latest information has been received from Dave Wolfson.
   - Technical Memorandum No. 2: Environmental Overview – The TM will be submitted to the project partners on February 2nd. Comments will be due back to PB by February 23rd.
   - Technical Memorandum No. 3: Conceptual Drainage Report – Comments from FCDMC were provided to PB. In general, the flows were lower than expected. The 50 year flows should be calculated using FCDMC software and Padelford Wash Study information. PB will address comments and submit final conceptual report.
   - Technical Memorandum No. 4: Utility Overview – Hard copies of the TM were provided to the partners. Comments are due back to PB by February 16th.

2) **Revised Alignments** – The corridor alignments have been revised based on input provided at the October SAC Meeting and the November Public Meeting. Five alignments have been advanced and will be presented at the February SAC Meeting. Two alignments have been eliminated from consideration since they were east of the drainage ridge line north of Dove Valley Road. The FCDMC noted that any alignment east of 167th Avenue in this vicinity is undesirable. The project partners agreed with the alignment refinements and observed that portions of the alignments could be mixed and matched. Randy Overmyer (Surprise) noted that Alignments 1A and 7C should be moved slightly west to avoid the lake located north of Montgomery Road.

3) **Alignment Evaluation Criteria –** PB provided a draft matrix for the partners to consider as evaluation criteria. Based on the potential mixing and matching of alignments, Renee Probst (MCDOT) recommended using a screen line approach and evaluating 3 or 4 sections of the corridor. Dave Moody (Peoria) noted that it would be beneficial to show any new major east/west arterials within the project limits and evaluate the impacts associated with the 163rd alignments. The Lone Mountain and Dove Valley alignments were noted as the primary east/west considerations (aside from Jomax Road and SR 74). These will likely be combined into one route – Lone Mountain Road. Randy will provide PB with a preliminary alignment for Lone Mountain Road.

   Other items that should be included in the matrix are Termini Location, Impacts North of SR 74 and Public Acceptability.

4) **Indirect Lefts** – Renee mentioned that MCDOT is developing a parkway typical section and that indirect lefts are being discussed for projects outside of Surprise. PB provided a handout with general information on Indirect Lefts to the partners. PB will utilize internal contacts in the PB Michigan office to gather more specific information including maximum capacity, impacts associated with truck traffic, capacity where other intersection types may be more effective, percent of left turn movement, etc. PB will prepare a fact sheet to be presented at the February SAC Meeting. Randy noted that Surprise references an 80,000 vpd capacity for a 6-lane roadway. He also mentioned that Indirect Lefts have been approved by the City Council. Renee requested a copy of the supporting language.

5) **Developments in the Project Area** – PB inquired about the Sierra Norte and Tierra Rico developments shown on Surprise growth maps. These developments may be significantly impacted by some of the alignments. Randy will review their status.

6) **MCDOT Northwest Valley Corridor Studies** – Renee has requested the Patton/Jomax team prepare a document outlining the results of the *Patton Road and Jomax Road Corridor Area Study Population and Employment Socioeconomic Forecast Development*. She also noted that the Hassyampa Study will be utilizing a parkway typical section (not freeway) with a 200 foot right-of-way width.

   Future Meetings
   - February 15th , 1:00pm – Patton/Jomax TAC Meeting
   - February 22nd , 10:00am – Patton/Jomax SAC Meeting

7) **163rd Avenue SAC Meeting** – The SAC Meeting will be held on February 14th at 10:00 am (MCDOT Conference Room). The purpose of the meeting is to update stakeholders with project progress and illicit input on the refined alignments.

8) **MCDOT and PB Coordination for Upcoming SAC and Public Meetings** – Roberta Crowe (MCDOT) reviewed the materials for PB to prepare for the meetings. These are:

- PowerPoint Presentation (due 2/6/07): Include TM status, Typical Sections, Indirect Lefts, Alignments, Evaluation Matrices.
- Typical Sections (due 2/6/07): Current Surprise and Peoria parkway sections.
- Alignment DGN (due 2/6/07): A MicroStation file showing all of the advanced alignments. PB to coordinate file details directly with Mike Pavlina.
- Alignment Sections DGN (due 2/6/07): A MicroStation file showing the each separate section being evaluated (screen line approach).
- Evaluation Matrices (due 2/6/07): Completed matrices of each alignment section. Mention eliminated alignments (color code red) and advanced alignments (color code green)
- Traffic Numbers (due 2/6/07): Show 2030 and Build-Out ADT. Get 2030 numbers from the Patton/Jomax study.
- Fact Sheet (due 2/9/07): Build from previous sheet. Add description of alignments advanced (3 bullet items) and eliminated. Roberta will provide PB with a sample.

The public meeting is being targeted for February 27, 2007 at the Hampton Inn.

9) **Action Items**:
- PB to verify that model information has been requested and received.
- PB to compile a fact sheet on Indirect Lefts.
- Randy Overmyer to provide preliminary alignment of Lone Mountain Road.
- Randy Overmyer to provide Renee with Indirect Lefts adoption language as approved by the City Council.
- Randy Overmyer to provide PB with a status of pending developments Sierra Norte and Tierra Rico.
- Roberta Crowe to email PB previous fact sheet.

10) **Attendees**:

Renee Probst, MCDOT
Roberta Crowe, MCDOT
Dave Moody, City of Peoria
Randy Overmyer, City of Surprise
Steve Hogan, PB
Joy Melita, PB

(Greg Keller is no longer with ASLD; Dave will follow-up on the new contact)

Meeting Minutes
PARSONS BRINCKERHOFF
1501 W. Fountainhead Parkway, Suite 400
Tempe, Arizona 85282-1853
PHONE 480 966-8295
FAX 480 966-9234

Meeting Date:	February 14, 2007
Meeting Time:	10:00 a.m.
Location:	Adobe Conference Room, Maricopa County Flood Control District
Subject:	Stakeholder Advisory Committee Meeting 163rd Ave: Jomax Rd to Dove Valley Rd DCR & Dove Valley Rd to SR 74 CIS Contract 2006-19
Attendees:	See Attached Sign-In Sheet

The second Stakeholder Advisory Committee (SAC) meeting for the 163rd Ave, Jomax Rd to SR 74 DCR & CIS was held February 14th in preparation for a public meeting on March 6th. The purpose of the meeting was to update stakeholders with the project progress and discuss corridor alignment alternatives. Handouts distributed at the meeting included the presentation slides, forecast traffic volumes figure, Peoria and Surprise roadway typical sections and public meeting notice.

Technical Memoranda (TM)

The TMs are being developed, reviewed or finalized. Hard copies are provided to the project partners (MCDOT, FCDMC, ASLD, City of Peoria and City of Surprise) for review. All stakeholders have access to the TMs on the Project Solve2 Site.

- **TM No. 1 - Traffic Analysis**: The draft TM will be distributed on February 23rd.
- **TM No. 2 – Environmental Overview**: The draft overview was distributed on February 7th. Comments are due to Steve Hogan (PB) by February 28th. The Environmental Overview describes the social, economic, and environmental character of the study area. The findings did not identify any "fatal flaws" within the study area.
- **TM No. 3 – Conceptual Drainage Report**: The Draft Conceptual Drainage Report was distributed in December 2006. The FCDMC has reviewed the document and their comments are being incorporated. The report summarizes previously collected data, analyzes peak flows for concentration points and identifies drainage impacts of the proposed corridor alignments. As expected, significant and numerous drainage structures are required for most alternatives.
- **TM No. 4 – Utility Overview**: This TM was distributed on January 29th with comments due to Steve Hogan by February 16th. The overview describes the existing utilities, planned utilities and potential utility conflicts located within the study area. The existing utilities are mainly concentrated in the southern central section of the study area including overhead power, underground electric, water, sewer, well fill, effluent, gas, telephone, fiber optic and coaxial cable. Moderate impact to existing utilities is expected with all corridor alignment alternatives.

Corridor Alignment Alternatives

Five alignment alternatives were presented to the stakeholders. These alignments have been refined based on input received from the first SAC meeting. Two alignment alternatives were eliminated from consideration as the FCDMC noted any alignment east of 167th Avenue (north of Dove Valley Road) is undesirable.

Alternative Evaluation

To facilitate alternative comparison, the corridor was divided into three segments. Alternatives from each segment can be mixed and matched. Alternative matrices were prepared for each segment. The stakeholders provided comments on the alternatives as follows:

- **Segment 1**: The City of Surprise and CAP favor alignment 3B. Randy Overmyer (Surprise) indicated that alignments 1A and 7C impact future north-south capacity that would have to be replaced at another location if selected since both 163rd and 171st Aves are planned as future arterials (this comment applies to all segments). Also, the preliminary plat for the Sierra Norte and the final plat for the Tierra Norte developments have been approved and an alignment would invoke questions about property takings that could require significant compensation. Both developments are impacted by alignments 1A and 7C. Abe Sahli (CAP) mentioned that 2C and 4D alignments are okay if the Quintero Turnout is not continued in the future. After the SAC meeting, Dave Moody (Peoria) confirmed that the turnout is permanent. Mohammed Rehman (CK Group) noted that the constructability of the 2C and 4D alignments must be reviewed since a new structure over the CAP Canal will need to be constructed in the same location as the existing structure, but at a higher elevation. The stakeholders discussed the possibility of leaving the existing crossing in place for the southbound lanes and constructing a parallel and higher structure for the northbound lanes. Abe Sahli and Paul Zellmer (CAP) recommended holding a separate meeting to strategize the optimal crossing after the preferred alignment has been selected.
- **Segment 2**: In general, the stakeholders preferred the 4C alignment in this segment. The future Dove Valley / Lone Mountain alignment needs to be shown in this segment to clarify the impact of other roadway alignments on 163rd Avenue. Randy Overmyer will provide this information. Javier Guana noted the relationship between the alignments and the floodplain. Locations where the alignment crosses the floodplain must be built to 100 year standards instead of 50 year standards allowed elsewhere. The further south the alignment shifts west, the smaller the encroachment into the floodplain.
- **Segment 3**: Dave Moody stated that the City of Peoria will not support any alignment that does not meet SR 74 at 167th Ave – the termini of alignments 3B and 7C at 171st and 175th Avenues, respectively, have "fatal flaws". The work involved with reconstructing the Quintero entrance is extensive (significant roadway realignment crossing significant

drainage ways and avoiding severe terrain). The alignment recommended by this study will be adopted into Peoria's General Plan. Randy Overmyer favored alignment 3B transitioning into 1A. The Picacho Wash Trail was discussed. Joe Pinto (MCDOT Environmental) asked about a designated equestrian trail and BLM trails. PB will investigate the trail systems and identify any associated impacts. Steve Hogan also observed that the alignment length should be added as an evaluation criterion in the matrices, since roadway cost is proportional to its length.

The matrices will be updated prior to the public meeting to reflect the aforementioned discussions. The "Public Acceptance" row will be highlighted and left blank.

Indirect Left Turns

Steve Hogan and Jennifer Love (PB) reviewed information obtained on indirect left turn intersection type. The Detroit PB office was consulted for practical experience and empirical analysis. The indirect left turn movement is located about 1/8 mile from the intersection – it may or may not be signalized. Implementation, benefits and disadvantages were discussed.

- **Right-of-Way (ROW)**: Variable ROW width was discussed. A 200 foot width will accommodate the indirect left intersections, however, is this much ROW needed between intersections? Dr. Maki (City of Surprise) agreed variable right-of-way may be appropriate for some locations, but wherever possible, the full right-of-way width is desirable. Major roadway spacing is generally ½ mile at build-out. Consequently, not much distance is left for varying the ROW.
- **Capacity**: Dave Wolfson (MCDOT) noted that MCDOT is unable to endorse a 50% increase in capacity; instead MCDOT recognizes a 25% increase. Based upon PB's research, the theoretical increase is 20-50%, however Steve Hogan noted that to achieve this increase the driver must be familiar/comfortable with the indirect lefts.
- **Crossroads**: The efficiency of indirect left intersections with other major arterials was discussed. Indirect lefts at arterial to arterial intersections work well in Michigan. Indirect lefts can be utilized on both intersecting roadways or just on the major roadway. With the 2-phase signal operation, corridor progression is enhanced and cycle lengths can be shortened.
- **Driveways**: Lefts out of commercial developments are typically avoided near any intersection. Lefts into developments can utilize directional median breaks.
- **Side Friction & Weaving**: Renee Probst (MCDOT) asked about side friction and weaving. Because weaving movements between entering traffic and traffic on a major roadway can be challenging at a driveway near an indirect left intersection, they should be avoided. But they can be located where the entering traffic can benefit from the reversing movement signal if need be. Driveways should not be located within 150' of the left turn movement. The preferred distance is 200-250'. If this cannot be met then it is an acceptable to align the driveway with the left turn median break.

- **Multi-Modal Traffic**: How are pedestrian and bike traffic flow addressed? Jennifer Love noted that it is desirable to separate bike traffic from parkway facilities and provide a multi-use path instead. Both bike and pedestrian traffic can make use of the pedestrian crossings, which will likely involve two short traffic signal cycles and require pedestrians to take refuge in the wide median between the cycles. Transit has not been identified in the RTP for the 163rd Ave corridor, but it could be accommodated in the indirect left intersection configuration. Randy Overmyer also noted that the City of Surprise policy of far-side bus pullouts would be compatible with the indirect left turns.
- **Costs**: The stakeholders recognized that the highest costs associated with the indirect lefts involve ROW. By contrast, capital and maintenance costs of additional signals at the indirect left location are small.

Videos, sample SYNCHRO and VISSIM models from Michigan showing indirect left turns are available and will be posted on Project Solve2 .

Traffic Modeling

The model used for the future traffic volumes is an updated version of the MAG 2030 model. This model has been modified to include build-out conditions for the Northwest Valley study area, which updates the MAG model to reflect the socioeconomic conditions of the adopted General Plans from Peoria, Surprise, and Buckeye. Dave Wolfson expressed concern over showing too much detail at the public meetings. The public will only be presented with a traffic estimate which has been rounded to the nearest thousand.

Northwest Corridor Studies

A meeting will be held on February 15th to discuss the modeling results from the "Buildout Socioeconomic Data Forecast Development and Planning Level Traffic Analysis of Future Base Network", prepared by Wilson & Company. All teams will use consistent volume and base network graphics. CK Group copy their base files onto Project Solve2 for the other teams to use.

- **Patton Rd/Jomax Rd: 299th Ave to 187th Ave (Tillman Blvd)** (Consultant Contact: Mohammed Rehman – CK Group): A TAC meeting will be held on February 16th at 1 p.m. followed by the SAC meeting on February 22nd at 10 a.m. The public meeting for this study will be held on February 28th
- **Jomax Rd: Grand Ave to Loop 303** (Consultant Contact: Tom Herz – URS). The Work Plan for this project is complete and available on Project Solve2. A TAC meeting will be held on February 16th at 3:30 p.m.

163rd Ave Public Meeting

A public meeting will be held at 5-7 p.m., March 6th at the Hampton Inn Grand Colonnade. The purpose of the meeting is to share advanced alternatives and elicit input from local residents and businesses. Future public meetings will be scheduled on Wednesdays to avoid Peoria and Surprise Council Meetings.

Project Solve2

All stakeholders will be re-invited to the site. Jennifer Love will also send contact information if anyone has problems logging in. Project documents are stored on this site as well as the project calendar. Stakeholders can upload and download files as appropriate. A revised PowerPoint file for this meeting will be copied to the site.

Action Items:

- Randy Overmyer to provide the future Dove Valley / Lone Mountain alignment.
- PB to investigate the trail systems in the vicinity and identify any associated impacts.
- PB to update the segment matrices for the public meeting.
- PB and Dr. Maki to copy indirect left turn videos on Project Solve2.
- PB to copy the revised SAC meeting PowerPoint file to Project Solve2.
- CK Group to copy their volume and base network files onto Project Solve2.
- PB to re-invited all stakeholders to Project Solve2.

Meeting Minutes

1501 W. Fountainhead Parkway, Suite 400
Tempe, Arizona 85282-1853
PHONE 480 966-8295
FAX 480 966-9234

Meeting Date:	October 29, 2007
Meeting Time:	2:00 p.m.
Location:	City of Surprise
Subject:	Project Partners Progress Meeting 163rd Ave CIS and DCR Jomax Road to SR 74 CIS Jomax Road to Dove Valley Road DCR Contract 2006-19
Attendees:	See Attached Sign In Sheet

1) **Status** – The Draft CIS was submitted to MCDOT on October 5th. Comments have been received. The Draft will be revised and distributed to the project partners in November. The next public meeting was also discussed. Renee Probst (MCDOT) will coordinate with Roberta Crowe (MCDOT) for December 11th. At the public meeting, the preferred DCR Alternative will be shared. A TAC / SAC meeting will be scheduled the week of November 26th.

2) **Traffic Volumes** – The traffic volumes from the Patton/Jomax study will be used for this study as well. These volumes are the basis for all 3 Northwest Valley Corridor Studies and reflect the 2030 design year. The Hassayampa traffic volumes have been obtained from MAG. Because this model forecasts the build out time frame, the volumes were extremely high (magnitude of 120k) which correlates to a four-lane freeway facility. A management decision was made that the build out volumes were not appropriate for this study.

3) **East Jomax Road CIS Update –** Technical Memorandums No. 8 & 9 were distributed at the meeting. All TMs are available on the URS FTP site. Peggy Rubach (MCDOT) requested that the reviewers provide comments by November 7th. The next TAC/SAC meeting has not been scheduled yet. The next public meeting will be held November 28th. The East Jomax Team is targeting Final CIS completion by the end of the year.

4) **Southern Termini @ Jomax Rd** – An interim signal project is currently being designed by Kimley-Horn (City of Surprise project). As part of this project, traffic counts will be taken and available in January. Dr. Maki (City of Surprise) recommended for the DCR to leave the south leg of the intersection in the existing condition. The City will build the indirect left cross section in the future. PB will run the synchro analysis for this configuration and share the results at the next meeting. Traffic numbers will need to justify dual right turn

lanes at this location and all others within the corridor. This intersection will also be examined in the traffic model with indirect left turns only on Jomax, to avoid reconstruction of the south leg. PB will also obtain traffic analysis for the 163rd/Jomax intersection from URS. Additionally, Kimley-Horn will be conducting traffic counts in January for a signal warrant analysis. While this will not be a basis for design for the 163rd corridor it can be referenced in the final report if timely.

5) **Northern Termini @ Dove Valley Rd** – The northern DCR limit will end the project at the reconfigured Dove Valley Rd intersection. A tee intersection will be designed for the DCR. This limit will provide a mechanism to preserve right-of-way to Dove Valley Rd. Both Cities agreed to this northern termini location.

   Marisol Ranch is located near the north termini. PB will contact CVL to obtain the status of the development. Randy Overmyer (City of Surprise) confirmed that a plat has not been submitted and believed the project is at least 1 ½ years out.

6) **DCR Alternatives** – Six preliminary DCR alternatives were reviewed. All of these alternatives focused on different treatments near the Dixileta Drive intersection to avoid property takes. Dr. Maki provided 3 design goals: 1) Minimize property takes, 2) Avoid loons and 3) Crossovers need to be approximately 660 feet from the intersections. The City recommended moving forward with Alternative 1 – Standard Indirect Left Configuration, Alternative 3 – Indirect Lefts on Minor Arterial and Alternative 5 – Conventional Intersections (30 foot median). Each of these alternatives will be improved to adhere the goals noted above. Improvements will include new roadway alignments to optimize distance from opposing houses, both on 163rd Avenue and Dixileta Drive.

7) **Next Meeting** – A DCR progress meeting will be held at 9:30 am on November 7th (MCDOT). If possible, a preferred alternative will be selected at this meeting.

8) **Action Items**:
   - Renee Probst to schedule TAC / SAC meeting and public meeting dates with Roberta Crowe.
   - ALL to provide comments back to Peggy Rubach on TMs No. 8 & 9.
   - PB to perform Synchro analysis at Jomax Rd modeling no improvements on the south intersection leg.
   - PB to contact CVL regarding the progress of Marisol Ranch development.
   - PB to further develop Alternatives 1, 3 and 5.

Appendix H

Public Involvement Report

Appendix H

Public Involvement Report

Appendix H

Public Involvement Report

MCDOT *RightRoads* Program

The Right System The Right Time The Right Cost

Summary of Public Involvement

April 2008

163rd Avenue

Corridor Improvement Study: Jomax Road to SR 74
Design Concept Report: Jomax Road to Dove Valley Road

Maricopa County Department of Transportation

MCDOT *RightRoads* Program
Summary of Public Involvement

163rd Avenue
Corridor Improvement Study: Jomax Road to SR 74
Design Concept Report: Jomax Road to Dove Valley Road
TT005

Final Report

Purpose of Public Involvement
This study evaluated planned corridor development and the resulting projected 2026 traffic volumes along the 163rd Avenue corridor to develop the most cost-effective improvement plans that include a recommendation for establishing the future roadway type, alignment, access management strategies, future drainage structures, network connectivity and prioritized construction phasing plans.

Gaining consensus among the agencies and the public is critical to the success of this transportation study as well as the future implementation of its recommendations to provide an efficient roadway for the long term.

Maricopa County Department of Transportation (MCDOT), the City of Surprise, the City of Peoria, the Flood Control District of Maricopa County (FCDMC), the Arizona Department of Transportation (ADOT), Arizona State Land Department, Maricopa Association of Governments (MAG), area property owners and residents, developers, the public and impacted railroad and utility companies are all major stakeholders in this study.

The participation of stakeholder public and multi-agency involvement aids in the development of a consistent roadway and the resolution of conflicting agency requirements; facilitates ultimate regional traffic flow; and preserves the interests and rights of area residents and adjacent development.

STUDY INFORMATION & BACKGROUND

The 163rd Avenue corridor serves northwestern Maricopa County through the cities of Surprise and Peoria. Existing land use south of Dove Valley Road is single family residential on large lots. Between Dove Valley Road and SR 74,

the land is primarily undeveloped. Currently, 163rd Avenue between Jomax Road and Dove Valley Road is a two-lane paved roadway that is intersected by unimproved cross-streets that serve local residential development. North of Dove Valley Road, the roadway is an unimproved dirt road built largely to provide access for waterline construction to development north of SR 74.

In 1997, Maricopa County Department of Transportation (MCDOT) completed a Comprehensive Plan and Transportation System Plan (TSP) for the unincorporated areas of the County. The TSP included recommendations to improve the existing County arterial road network to meet future transportation demands resulting from projected growth and development county-wide. MCDOT's TSP recommendations were considered in the development of the 2004 Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP). 163rd Avenue is classified as a future Principal Arterial by MCDOT, a future Parkway by Surprise and as an Arterial Roadway by Peoria (all six-lane divided roadways).

The MAG RTP further established a need to identify and designate the future 163rd Avenue alignment for the entire corridor connecting Grand Avenue (US 60) and SR 74, traversing all three jurisdictions.

In September 2006, MCDOT, the City of Surprise and the City of Peoria initiated the 163rd Avenue Corridor Improvement Study (CIS) between Jomax Road and SR 74 to address the rapid growth being experienced along this corridor in northwestern Maricopa County. Study findings and recommendations were presented during a public meeting held in July 2007. As the final phase of this study, MCDOT, in coordination with Surprise, conducted a more detailed Design Concept Report (DCR) for the four-mile segment between Jomax Road and Dove Valley Road beyond private development improvements. The DCR has developed 30% design plans for the preferred roadway alignment recommended in the CIS phase specifically to help the City of Surprise guide traffic control, access-related issues and right-of-way requirements for new development. (Roadway construction funded by private development is currently already underway on the southern two-mile segment of 163rd Avenue between Grand Avenue and Jomax Road.)

STUDY PURPOSE & GOAL

The purpose of this study is to develop a consensus-driven vision among partner jurisdictions for 163rd Avenue between Jomax Road and SR 74. The study will establish the facility type, number of lanes, right-of-way needs, and general alignment for Jomax Road that will eventually be required to accommodate projected traffic growth and enhance safety. In cooperation with the City of Peoria and the City of Surprise, the two municipalities within the study area, the study will also develop

access management guidelines (intersection spacing, median breaks and locations) and a plan for the implementation of those guidelines.

In general, this study will provide MCDOT and other jurisdictions with a future "footprint" of 163rd Avenue and a recommended timeframe for the implementation (construction) and phasing of the identified roadway improvements.

Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "footprint" for 163rd Avenue and develop an implementation plan
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish future roadway design criteria
- Develop access management guidelines (intersection spacing/median breaks and locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road (DCR)
- Coordinate with other current ongoing area studies to ensure an integrated roadway network system

Key Issues and Challenges

- Incorporate regional and local travel
- Achieve optimum mobility/access balance for operational efficiency
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department

- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

Study Milestones

Corridor Improvement Study (CIS)

Field Review	September 2006
Scoping and Data Collection Phase Public Input Meeting	November 2006
Alternatives Analysis Phase Public Input Meeting	February 2007
Planning/Engineering	April 2007
Design Features	May 2007
Findings & Recommendations Phase Public Input Meeting	July 2007

Design Concept Report (DCR)

Planning/Engineering	September 2007
Design Features	October 2007
Draft Report Submittal CIS & DCR	December 2007
DCR Public Input Meeting	December 2007
Final Report Submittal CIS & DCR	April 2008

STUDY APPROACH

The 163rd Avenue CIS was carried out in two phases: a Planning Phase and an Engineering Phase.

The CIS Planning Phase:
The Planning Phase gathers general background information and prepares several reports (traffic analysis, drainage, utilities, environmental) leading to well-founded recommendations for improvements and longer-term needs along 163rd Avenue. During the Planning Phase, meetings are conducted with affected jurisdictions, agencies, stakeholders and the impacted public to form a broad consensus of the overall needs and vision of the corridor.

Based on the needs identified, alternatives are developed and evaluated for technical and environmental feasibility, public acceptability and economic viability.

CIS Engineering Phase:
The Engineering Phase of the study followed the selection of a preferred alternative. Preliminary engineering design plans, right-of-way requirements and estimated construction costs were prepared for near-term and long-term roadway improvements. Roadway construction phasing priorities, along with policies and guidelines to preserve the intended function of the future roadway, were also developed.

With the selection of the preferred roadway alignment, the more detailed DCR phase of the study proceeded to evaluate 163rd Avenue between Jomax Road and Dove Valley Road. The report developed 30% design plans that specify roadway type, alignment and access points. The DCR also defines crossing drainage ways (bridges or culverts) and generated a more detailed cost estimate to allow accurate budgeting for construction.

CIS/DCR RECOMMENDATIONS AND CONCLUSIONS

CIS Draft Findings & Recommendations
163rd Avenue: Jomax Road – SR 74

In both Peoria and Surprise General Plans, 163rd Avenue is designated as a future six-lane divided "Parkway" with provision for right and left turns at major intersections. The Peoria parkway right-of-way width requirement is 150-feet. Peoria uses standard intersections with all turn lanes concentrated at the intersection and managed by traffic signal.

The required Surprise parkway right-of-way width is 200-feet, 50-feet greater than City of Peoria's parkway right-of-way width requirement. The additional

roadway right-of-way width (50') requirement within the City of Surprise jurisdiction is necessary to accommodate the "indirect left turn" traffic control measure currently under evaluation for implementation on portions of the 163rd Avenue corridor within Surprise. Under this access plan, left-turn movement is eliminated at the intersection. Instead, motorists make a U-turn at a point beyond the intersection then return to the intersection from the opposite direction and turn right in the desired direction.

Selection of the "Preferred Alignment"
The 163rd Avenue corridor alignment alternatives cover a broad area bounded by 175th Avenue alignment on the west side of the corridor and 163rd Avenue alignment on the east side of the corridor. The primary basis for the selection of a preferred roadway alignment is to identify an efficient "path" through the area that has the least possible impact on existing development and homes, drainage paths, utilities and environmentally sensitive areas. The preferred alignment must also be economically feasible (affordable to build).

Each of the advanced alignment alternatives sought to balance corridor attributes and impacts (positive or negative). Through additional analysis of the advanced alternatives, the preferred alignment alternative emerged as the option that minimized, mitigated or avoided negative impacts.

The preferred alternative follows the general alignment of 163rd Avenue between Jomax Road and Quail Run, then moves westerly to the 167th Avenue alignment between Quail Run and Dove Valley Road. This preferred alternative minimizes negative impacts to private properties and the need for expensive bridge structures at major drainage crossings.

Within the City of Surprise, between Jomax Road and Dove Valley Road, the roadway should consist of six travel lanes (three lanes each direction) in a 200-foot right-of-way corridor (to accommodate indirect left-turn traffic control measure). Roadway widening will occur east of the existing western right-of-way line to avoid potential acquisition of improved properties. This alignment also avoids environmentally sensitive areas near the CAP canal.

North of Dove Valley Road to SR 74, within the City of Peoria, the future roadway should also consist of six travel lanes (three lanes each direction) in a 150-foot right-of-way corridor. Currently, there is no development in this reach and the primary concern is the most efficient traversing of major drainage courses such as the Padelford Wash. The preferred alignment along 167th Avenue at this point also aligns with the entrance to the Quintero development, a future grade separated traffic interchange at SR 74 under ADOT's plan.

Access Management Guidelines
In general, a variety of techniques will be used to manage roadway access. In Surprise, intersection treatments will incorporate the "indirect left-turn" concept. In Peoria, signalized intersections with traditional left-turn lanes will be implemented. In some cases, a frontage road system may be appropriate to augment local access. Throughout the corridor, left turns may be restricted to maintain roadway efficiency and enhance traffic safety.

Design Concept Report (DCR) Preferred Alternative 163rd Avenue: Jomax Road to Dove Valley Road

The 163rd Avenue DCR evaluated the segment between Jomax Road and Dove Valley Road and developed 30% design plans that specify roadway type, alignment, access points and crossing drainage ways (bridges/culverts). The DCR has also identified new right-of-way needs and generated a more detailed cost estimate to allow accurate budgeting for construction.
Several alternatives within the preferred alignment corridor (established through the CIS process) were developed between Jomax Road and Dove Valley Road. Each alternative consisted of a six-lane divided "parkway" with provision for right and left turns at major intersections. The alternatives differed according to alignment, median width and intersection treatment. Three study alternatives were selected for more detailed investigation:

Alternative 1 - Indirect Left-Turn:
This alternative utilizes the City of Surprise 200-foot, six-lane Parkway typical roadway cross section (Indirect Lefts) with a 60 foot median width. The roadway alignment follows the existing 163rd Avenue roadway for the majority of the project limits. At the northern limit, the alignment is shifted to 167th Avenue.

Alternative 2- Indirect Left-Turn on Dixileta Drive:
This alternative also utilizes the City of Surprise 200-foot, six-lane Parkway typical roadway cross section (Indirect Lefts) with a 60 foot median width. However, a narrower median width is used at Dixileta Drive. To compensate for the narrower median, indirect left crossovers are used on Dixileta Drive to provide for left-turning traffic on 163rd Avenue.

The roadway alignment follows the existing 163rd Avenue roadway except at Dixileta Drive where the alignment shifts approximately 29-feet to the west. At the northern limit the alignment shifts to 167th Avenue. The median width is 10-feet at the intersection and then flares to 60-feet through the remaining project limit.

Alternative 3- Standard Left-Turn:
This alternative utilizes a conventional signalized intersection configuration with a 30-feet median for the project limit. The roadway alignment follows the existing 163rd Avenue roadway for the majority of the project limits. At the northern limit the alignment is shifted to 167th Avenue.

Evaluation of DCR Alternatives

The benefits and disadvantages of each alternative were evaluated among the project partners. Considerations included safety, private property impacts, drainage issues, operational characteristics, roadway corridor consistency, public input and project costs.

All of the alternatives impacted at least two private residences. Alternative 2 complicated the Indirect Left-Turn concept by placing the u-turn crossovers on Dixileta Drive. This alternative also has greater impacts to drainage ways. Alternative 3 did not support the City of Surprise's vision for a "Parkway" classification. It also did not achieve the same higher projected safety benefits as Alternative 1.

The 163rd Avenue DCR recommends Alternative 1 "Indirect Left-Turn" as the preferred option. Alternative 1 is consistent with the vision of the City of Surprise for future parkways, which utilizes the Indirect Left-Turn concept. Alternative 1 consists of a six-lane roadway with three lanes in each direction divided by a 60-feet median. The right-of-way width is 200-feet. Proposed improvements to 163rd Ave between Jomax Road and Dove Valley Road include the installation of drainage culverts to provide an all-weather roadway, multi-use paths for pedestrian, bicycle and equestrian traffic, and access management strategies (median breaks, intersection spacing and locations) to enhance safety and improve traffic flow.

RECOMMENDED FUTURE IMPLEMENTATION & ROADWAY CONSTRUCTION SCHEDULE

(Based on Project Need- Forecasted traffic volumes, area growth and development)

163rd Avenue: Jomax Road to Dove Valley Road

- *Interim Four-Lane Divided Roadway with Indirect Left Turn Intersection Treatment*

Final Design	Year 2017
Construction	Year 2018 to 2020

Construction of segments of this roadway may be advanced by the City of Surprise and/or adjacent developers. It is recommended that the traffic analysis for this area be reevaluated upon approval and adoption of traffic impact studies of adjacent developments.

- *Ultimate Six-Lane Parkway with Indirect Left Turn Intersection Treatment*

  Final Design & Construction "Build Out"

Build-Out Year is beyond 2030 and dependent on local development.

163rd Avenue: Dove Valley Road to SR 74

- Interim Four-Lane Divided Roadway
- Ultimate Six-Lane Parkway with Conventional Intersection Treatment

The City of Peoria has no current plans to advance this segment of 163rd Avenue. The need for additional study and design work will be evaluated on an annual basis as part of the City's Capital Improvement Program.

PROJECT FUNDING

Funding for final design and construction of 163rd Avenue between Jomax Road and Dove Valley Road has not yet been identified. The DCR recommendations will be evaluated for inclusion in the MCDOT Transportation Improvement Program and the City of Surprise Capital Improvement Program. A portion of the funding is expected to come from adjacent developments as part of project requirements.

PUBLIC INVOLVEMENT

Through the course of this study's process, MCDOT *RightRoads* Program conducted a total of four open house public input meetings. Three public meetings were conducted during the corridor study phase to discuss and gather public comment on future corridor improvements and access control measures for 163rd Avenue between Jomax Road and SR 74 followed by a final public meeting to present the recommended conceptual design alternative for the southernmost segment of the study area (163rd Avenue between Jomax Road and Dove Valley Road).

Participants: Renee Probst, MCDOT Planning
Roberta Crowe, MCDOT Planning
Tim Oliver, MCDOT Planning,
Mike Pavlina, MCDOT Planning
Hedy Hall, Lands and Real Estate Division
Steve Hogan, Parsons Brinckerhoff
Jennifer Love, Parsons Brinckerhoff
Joy Melita, Parsons Brinckerhoff

The first "Public Scoping" meeting, held November 2006, provided the public with an opportunity to inform the project team about the study area and local transportation needs. The second meeting, held March 2007, presented corridor alignment alternatives for public review and comment. The third "Findings & Recommendations" (Preferred Alignment) public meeting, held July 2007, presented the CIS findings and a recommended roadway and corridor selection along with generalized access management strategies for public review. The fourth and final public meeting summarized the preferred alternative of the DCR conducted for 163rd Avenue between Jomax Road and Dove Valley Road and presented proposed roadway improvements.

All public meetings were conducted in an "open house" format which provided a free, open and accurate exchange of information between area residents with specific issues and questions and the project team.

Outreach Methods

The following outreach methods were used to inform and notify the general public and impacted residents about the study, public input meeting dates and locations and additional opportunities or means for input:

- Media releases
- Newspaper articles
- Display advertisements in local and regional publications
    - Arizona Republic
    - Daily News Sun
    - Surprise Independent
    - Peoria Independent
    - Peoria Times
    - The Wester
    - Surprise Today
    - Northwest Valley News
- MCDOT website
- Partner agency mediums
- Direct mail flyers to adjacent property owners and previous meeting attendees

Public Comment

Over 240 people attended four public input meetings conducted through the course of this study. Graphics, aerials and display exhibits presented corridor alternatives and study information. Study Fact Sheets and Comment Sheets were distributed to all those in attendance. A computerized simulation showing the "Indirect Left-Turn" intersection concept and operation was presented at the final DCR public meeting. The following information is representative of discussions that the project team had with meeting attendees and written comments received by MCDOT. Please refer to "Exhibit C" as reference for public comments.

Scoping Phase Public Meeting
Meeting Purpose: Gather public comment regarding the study area, existing conditions, current corridor deficiencies, future transportation needs and public review of overall Study Goals and Objectives

5:00 – 7:00 p.m., November 2, 2006
Hampton Inn, 14783 W. Grand Avenue, Surprise, AZ 85374
Attendance: 55

Written public comments

- Don't like routes 3 and 6
- Any info on Patton Rd. please advise
- Since my property includes ¾ of 163rd how are you going to compensate owners that are required to have 2 ½ acres to meet the subdivision requirements?
- Based on alignments on the map, the road cuts into our property dangerously close to home.
- Line #1 seems to be best. Hope it will be highly considered.
- Line #1 is best.
- Overall I appreciate the presentation. Thank you for including me.

Alternatives Analysis Phase Public Meeting
Meeting Purpose: Gather public comment regarding preliminary study findings, traffic analysis and corridor alignment alternatives and future roadway options.

5:00 – 7:00 p.m., March 6, 2007
Hampton Inn, 14783 W. Grand Avenue, Surprise, AZ 85374
Attendance: 85

Written public comments:

- It would impact me severely to have the Alternatives of 3B or 4C developed – it would necessitate selling my property!! VERY BAD FOR ME and all my neighbors feel the same!!!! 163rd Ave. to Alt. 2D out to 167th Avenue extending out to SR74 or any of the alternatives south; (1A or 7C) would be acceptable.
- Between 163rd and Grand and Lake Pleasant Blvd, we prefer Highway 7C. It's less developed and seems most ideal.
- Between Jomax and Dove Valley Rd. I would like to use 171st Ave.
- If north of the CAP should 171st Ave. be chosen would the alignment be moved to the State Trust Land rather than impact private residences and a commercial enterprise.
- Section 1 – I really like 7C. It impacts the least amount of homes. The most offensive in Sec. 1 is 3B, 4C and 2D. After Dove Valley Rd., it doest not seem to matter much as far as homes being affected. It does look like 1A off 7C would be great.
- 1. I prefer Alternative 7c from Jomax to approximately Dove Valley and Alt. 1A from approximately Dove Valley to SR 74. This arrangement would impact few homes and give less impact to the neighborhood overall. Also, with this, 163rd would need a dead end type of collector (much like it functions now) for the area north and south of the CAP canal. 2. If alternative 7C truly has a fatal flaw, then my second choice would be: Alt. 2D – from Jomax to about 1 mile south of SR 74 AND Alt. 4C – from 1 mile south of SR74 to SR74.
- The 3B proposal on 163rd Avenue is the preferred plan. The other plan requires some property loss and relocation of fencing.
- 9 years ago this coming May we moved out here to get away from all the hustle and bustle of city living. We love the peace & quiet that we have. All the 8 families on our little slice of heaven have an acre and ¼, so we don't have the congestion and crowding that we had in the city. As to your suggested routes for 163rd Ave. or alternate routes: 3B & 4C would only add to congestion & noise level for our area. Say no, please. 2D only if deemed necessary. My choice would be 7C which would still give us somewhat a sense of country life.
- Please consider your final choices with us in thought. Most of us in my area are retired seniors and we had planned on being here permanently. Thank you.
- Would like to know why you would need 60 feet median with 6 lanes & sidewalk and bike path. I have been driving around Surprise and in no other location with 6 lanes of traffic do I find a 60 ft. median – 6 lanes is fine – 10 feet median would suffice.
- The six lane parkway on 163rd Ave: I would like to see a route that would affect the least amount of people. Wondered if a route going a little bit east of the original 163rd Ave. was considered, especially north of the CAP canal. I really don't like route #3B out of the plans. This

goes almost through my backyard when it curves off 163rd and White Wing. I am a 48 year old, chronically ill and facing disability very soon. I can not afford to move and buy another house. I will not have a home if I have to move. I could not afford another home. Most people that like out on 163rd wanted to have a little bit of rural in their lives. The inconvenience of a few roadways was their trade-off for that little bit of rural. With your plan it shows that there are plans of housing developments east of 163rd and north of the CAP canal. You show that White Wing or Lone Mountain as a 6-lane road. Why not consider making the 6 lane roads running east and west near the CAP canal, and on or north of Dove Valley. This is not far off, or distance-wise from your plans. Utilizing the land near the CAP canal since I don't think homes will be built next to it. It would be neat to have some rural homes still intact. This will not affect too many homes. There will still be a little bit of rural looking area in the city. The 6 lane east and west if not far off from the plan. The residential areas going in really don't have to sacrifice much, as far as distance to roadways. Really would like to see White Wing/Lone Mountain as a 4 lane road instead of 6 lanes. Making it 6 lanes you would be taking a lot of homes then if made 4 lanes. Also would like to see that route 3B NOT be used on 163rd Ave.

Comments/questions received by Project Team during discussions with meeting attendees:

- Most comments and questions focused on the increasing need for improvements to address growth and development, improve accessibility and public safety. The importance of minimizing or avoiding negative impacts to existing development was also stressed by most meeting attendees along with the desire for information regarding a construction timetable.
- Interest in the floodplains and the voluntary buy-out program.
- Many liked the alternatives along 171st Ave which were identified as having fatal flaws by City of surprise
- Burros. Wild burros are roaming the area according to a few people. How are these animals handled from environmental and construction perspectives?
- 163rd Ave, south of Jomax (outside project limits). The old road is being used where the new road curves away from the existing alignment. A few people mentioned the old road should be blocked off with a physical barrier.
- Maintenance of 163rd Ave and Jomax Rd. The roads have many potholes according to the local residents and need attention.
- Right-of-way. Some residents along 163rd Ave mentioned that they own the property the existing roadway is on. If an alignment is

selected that leaves the existing alignment, how will the row need be handled for the existing road?

- Timeline. When will construction start and we need to move?!?
- General expression of not wanting growth and development.
- How are these potential alignments going to impact my property?
- How will the new power lines and fiber optic cables on the south side of Patton Road be impacted by the future roadway?
- Is there going to be a crossing of Patton Road over US 60?
- Can the city of Surprise rezone my property?
- How will the potential alignment impact my specific parcel?
- How much right-of-way is needed to accommodate the roadway on Patton and Jomax Roads?
- Prefer the 171st Avenue alignment, less impact to existing properties.
- The 4C alternative was also an alternative that many people liked. A gentleman whose property would be impacted by this alignment was very interested in a "full take" but he wouldn't be interested in a minor property acquisition since he felt the new Roadway would be in his front yard. His home is located in the floodplain, so we provided him with information regarding the voluntary buy-out program being offered by FCD.
- Concerns about the Dove Valley Road parkway transition to Lone Mountain. Again impacts a few homes.
- Numerous complaints about the roadway condition of both Jomax Road and 163rd Avenue. The roads have many potholes and loose gravel.
- 163rd Ave, south of Jomax (outside project limits). The old road is being used where the new road curves away from the existing with a barrier.
  Right-of-way. Some residents along 163rd Ave mentioned that they own the property the existing roadway is on. If an alignment is selected that leaves the existing alignment, how will the right of way need be handled for the existing road?
  Schedule: All wanted to know when construction or at least ROW buy out would occur. Explained the process and that this is development driven. No funding is currently identified for design or construction.
- General concern about the City of Surprise "not being up front about all of their roadway plans".
- General concern about the indirect left concept and the additional ROW associated w/such a design.
- Many people where happy that we are at least "planning for the future" especially since the big Chrysler Proving Ground buyout occurred. Many people wanted to see pavement in the ground now though and were disappointed when told that we were only making sure we preserve the right-of-way necessary to accommodate the ultimate facility concept.

Findings and Recommendations Phase Public Meeting
Meeting Purpose: Gather public comment regarding study findings and "Preferred Alternative", recommended access management strategies and improvement phasing timeline.

5:00 – 7:00 p.m., July 17, 2007
Hampton Inn, 14783 W. Grand Avenue, Surprise, AZ 85374
Attendance: 65

Written public comments:

- I still don't see why there is 60' median, not enough cross-overs – none in front of my house. I am totally opposed to this!
- There is no need for a 60' median.
- I am very unhappy with this plan. What will happen with run-off? Why not put it in undeveloped areas just east of here?
- They had pat programmed answers for the most part. I did not feel they were really interested in what the community said or cared. Cities and developers already had them. I am very unhappy with this plan. What will happen with run-off? Why not put it in undeveloped areas just east of here?
- The road does not enter our property but will run right behind us. What happens to our property value and will we be able to be zoned commercial at some stage? Will there be a noise barrier? What about washes and their routing? Will this roadway cause our land to be in a flood zone? Will there be any building restrictions? What kind of time line are we looking at?

Comments/questions received by Project Team during discussions with meeting attendees:

- The 163rd Avenue Meeting was well attended. Many people were satisfied w/the alternative that we were recommending, alignment wise, but most were not happy that this roadway will be a 6-lane higher capacity facility.
- …disappointed in the indirect left turn intersection configuration mainly because of the additional ROW needed to implement. Some were confused over the operational implications but most understood the approach.
- A main issue was access to the new facility by both those on the corridor and those a street away.
- The most contentious issue was in the area just south of Dove Valley were the shift in the alignment occurs. Many people were concerned about their property values, the noise and visual impact that this new facility might cause. We discussed ways to minimize these impacts and our ROW agent discussed the ROW acquisition process with

those who might be impacted. Many of these residences either wanted to shift the alignment east and tunnel through the mountain terrain or shift it further west along alignment alternative 7.

- When we discussed the significant environmental impacts along with additional wash crossings and the potential lost of capacity (alternative 7), a few were still not satisfied with our recommendation.
- In the area of Dixileta, where a potential impact to three properties exists, residents were upset. The project team needs to discuss possible approaches to mitigate these impacts during the DCR phase.
- In general, many voiced the need for better roadway network in the area but still wanted to maintain a rural environment.
- The section of 163rd south of Jomax needs improvements. The curve just south of the "intersection isn't functioning properly" and the residents were upset that Surprise only had the developer put in a three-lane section.
- Some residents also expressed their displeasure of the City allowing changes in the drainage flow patterns by the new developments.
- Most were very interested in a connection to SR74 and would like to see these improvements in Peoria immediately.
- Based on numerous comments regarding the 200 ft. ROW and the ROW impacts in the vicinity of Dixileta we will re-evaluate the need for this full cross-section in this area.

DCR Preferred Alternative Public Meeting

Meeting Purpose: Gather public comment regarding the DCR conducted for 163rd Avenue between Jomax Road and Dove Valley Road and present the proposed roadway improvements.

5:00 – 7:00 p.m., December 12, 2007
Hampton Inn, 14783 W. Grand Avenue, Surprise, AZ 85374
Attendance: 37

Written Comments:

- The road does not enter our property but will run right behind us. What happens to our property value and will we be able to be zoned commercial at some stage? Will there be a noise barrier? What about washes and their routing? Will this roadway cause our land to be in a flood zone? Will there be any building restrictions? What kind of time line are we looking at?
- Would appreciate someone who could speak to us who has access to information about what is going to happen- This affects our lifestyle- most of us live many miles from our work because we appreciate the solitude and quietness of the neighborhood- This road has a very

negative impact on our lifestyle to say the least- building walls to lessen the noise is not enough.

- The length of time for this project should be more specific. Living with this proposed project casts a big cloud over my life. Who is going to want to buy our property when it's possibly commercial but not positively?
- Staff was evasive with questions asked. (Regarding construction schedule)
- We moved to 163rd to raise our family away from town and crime, know you are bringing it all right to our front door. I'm not happy about this road at all. You are taking our life away.
- Concerned about the ability to enter and exit with a 30 ft 5th wheel travel trailer. And how much of my yard am I going to lose.
- Why are builders assuming that this extension is necessary? At this time houses are not being built. And I don't think the economy will support this
- Would like a more formal meeting and be told the truth by someone who really knows what is going on with all the cards on the table. It is hard to live and run a business with this kind of a black cloud.
- My home is all I have for my retirement now you have taken that away.

Comments/questions received by Project Team during discussions with meeting attendees:

- Encouraged all with whom I talked to fill out a card. Some concern over unable to sell home.
- One comment about indirect lefts "You have to go a half mile out of your way".
- Residents currently have access to 163rd for their horse trailers and 5th-wheels. Please ensure these types of vehicles will be able to access property on new frontage road system.
- Re-examine access to homes near Dove Valley Rd intersection
- Consider access to lots which does not currently have a home
- Some comments about areas outside our limits, specifically the new development at Grand and Jomax.
- Many people were very disappointed that these improvements are not scheduled for construction.
- I received numerous complaints about 163rd Avenue, south of Jomax because of the alignment change and roadway geometry approaching this intersection. Also, there is the perception that it took a fatality for both agencies to act and install a signal at this intersection.
- The homeowners who would be directly impacted by the improvements (south of Dixileta) had offered solutions to row issues. One owner

simply wanted her house relocated to the southeast corner of her property with new access to Dixileta. Another on the west side of 163rd wanted his home rotated 180 degrees so his front of his home would face the new access road, thus eliminating his direct access to 163rd.

- Many homeowners in this area have already establish functional joint access and access road network that either has minimized or totally eliminated direct access onto 163rd.
- Many people were concerned about the impacts that the new proposed facility will have on:
    - Drainage patterns
    - Well water – worried about contamination
    - Noise level
    - Access to property
    - Property Values
    - Environment
- The simulation that presented the "Michigan Left Turn" intersection operation was very successful. However, response to this new unconventional intersection design was mixed. Many were pleased with this approach since it improves facility safety. Others were frustrated that they would have to drive 660 feet beyond the access road to their property. Many were also concerned about making a U-turn with their horse trailer.
- Pedestrian and equestrian crossings were very important to the community.
- Should consider equestrian friendly drainage structures.
- Overall, many agreed w/the alignment chosen and understood the need for a higher level facility in the future but would prefer standard intersections and construction to occur for a four-lane facility sooner than later. They feel the new developments in this area should be constructing these facilities.

FUTURE ACTIVITIES AND CONSIDERATIONS FOR FUTURE CORRIDOR DEVELOPMENT

As the preferred alternative becomes better defined through more in-depth phases of project development, additional elements will be considered that address the needs and impacts of future projects within the context of the current and future settings along the 163rd Avenue corridor.

The following are capsulated key issues identified during this study's Stakeholder Advisory Committee and public involvement process that should

be taken into consideration by individual jurisdictions as the recommendations of this study are carried forward through design and construction:

- Project Funding. There is currently no funding programmed for construction. It can be anticipated that area developers will participate as part of project requirements.
- Access Management Strategies. MCDOT, the Cities of Surprise and Peoria have specific expectations regarding roadway access. These strategies should be implemented to ensure a seamless roadway with efficient traffic flow, safety and good access to local land uses.
- Environmental Impacts and Noise Mitigation. Specific impacts on the local environment will require further evaluation in future project development.
- New Right-of-Way Requirements. Final roadway configuration will determine how much land will need to be acquired.
- Landscaping plans. Final project design will specify the type of landscaping to be used.
- Drainage Structures. Because the future roadway corridor crosses a number of washes and lies partly in a flood zone, it will be critical to ensure the roadway is designed to provide "all weather" crossings during major storm flows. Bridges along the new roadway will be designed during final roadway design.
- Bicycle, Pedestrian and Transit Access. Future projects will be designed to accommodate alternative modes of travel and provide access to trails and neighborhoods in the area.
- Corridor Traffic Management. ITS (Intelligent Transportation System) will control operation of traffic between jurisdictions and differing intersection configurations.
- Jurisdictional Coordination. As with the overall traffic control, implementation of different corridor improvements and access management concepts will need to be coordinated to ensure a safe, seamless and efficient transportation facility.

CONCLUSION

It is recommended that future project development build upon the public involvement program established during this study and continue as a comprehensive program progression.

For more information about the study, contact Renee Probst, MCDOT Planning at 602/506-8622 or Roberta Crowe, MCDOT Public Information Officer at 602/506-8003.

Exhibit A:
Public Meeting Notification & Newspaper Display Advertisement

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Thursday, November 2, 2006
5:00 p.m. to 7:00 p.m.

Hampton Inn
Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Public "Scoping" Meeting

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the first in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

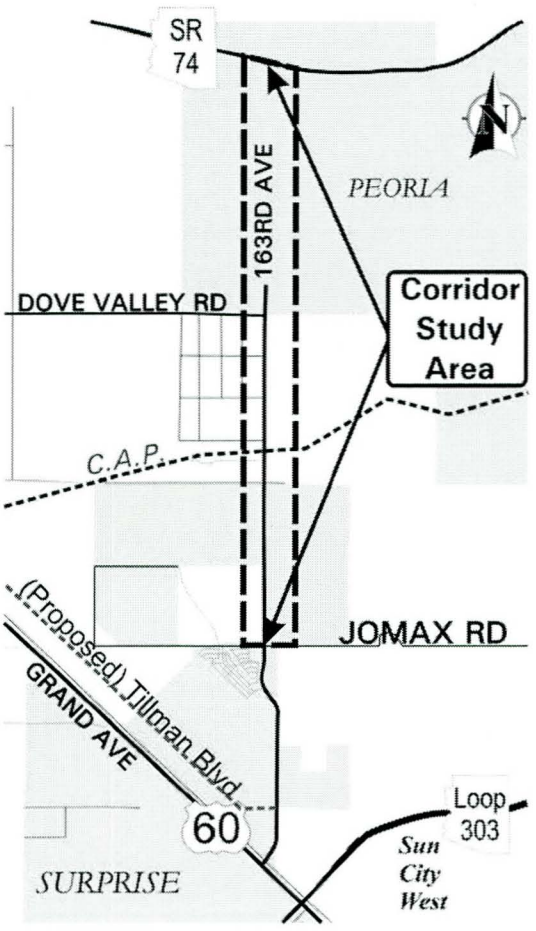
Stop by anytime between 5:00 and 7:00 p.m. to speak with MCDOT project team members.

For more information, contact Renee Probst at (602) 506-8622 or write to Probst at: MCDOT, 2910 W. Durango Street, Phoenix, AZ 85009, or e-mail at: reneeprobst@mail.maricopa.gov or contact Roberta Crowe, Public Information Officer at (602) 506-8003.

Reasonable accommodations may be made available for people with disabilities with a minimum 72-hour notice. For more information on such accommodations, contact Roberta Crowe at **(602) 506-8003**.

Si desea recibir esta información en Español, favor llamar (480) 350-9288.

Con adviso de setenta y dos horas o más, es posible obtener plans reasonables para personas con discapacidades; lo mismo para representantes que hablan Español. Si quiere más información, llamar (480) 350-9288.



District 4 Supervisor, Max Wilson
www.mcdot.maricopa.gov

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

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MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Tuesday, March 6, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn
Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Alternative Analysis Phase

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the second in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

Stop by anytime between 5:00 and 7:00 p.m. to speak with MCDOT project team members.

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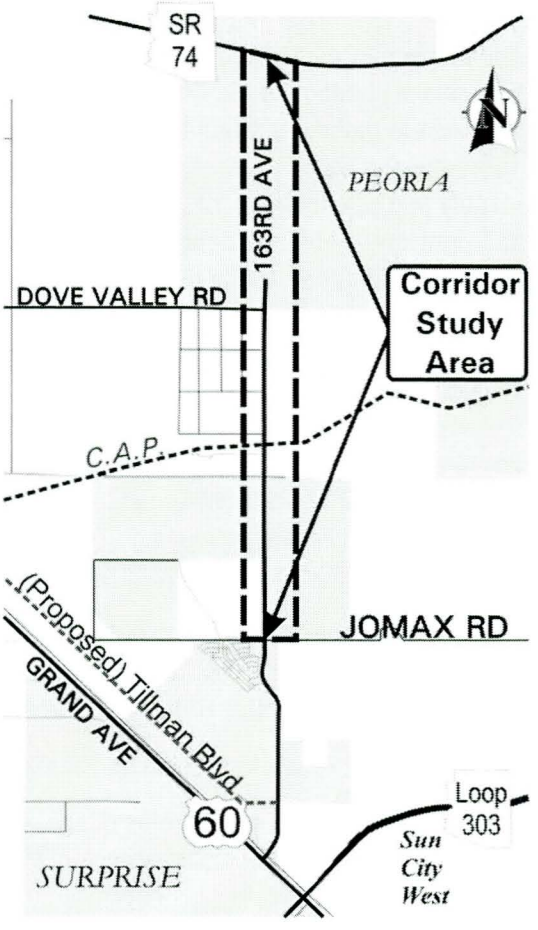

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MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Tuesday, July 17, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn
Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Findings and Recommendations

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the third in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

Stop by anytime between 5:00 and 7:00 p.m. to speak with MCDOT project team members.

For more information, contact Renee Probst at (602) 506-8622 or write to Probst at: MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: reneeprobst@mail.maricopa.gov or contact Roberta Crowe, Public Information Officer at (602) 506-8003.

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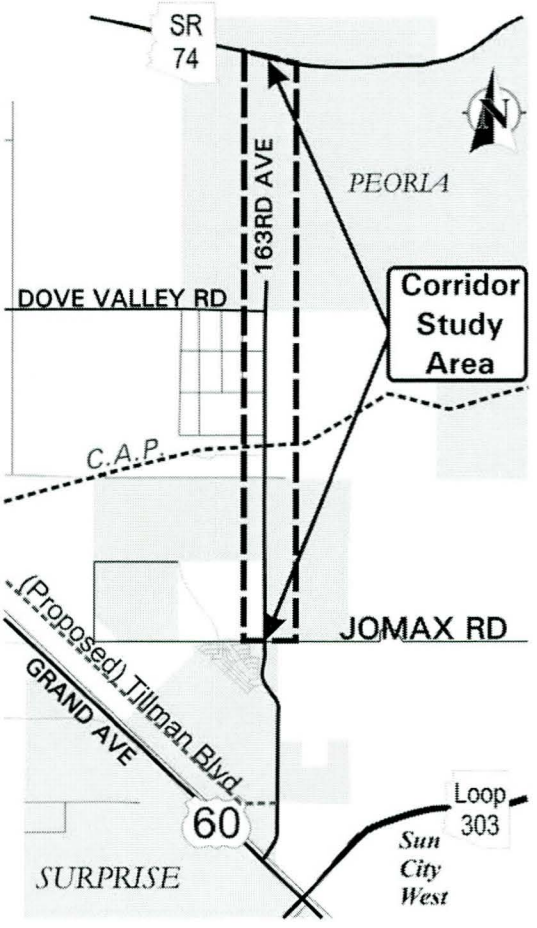

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MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

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MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Jomax Road to Dove Valley Road
Design Concept Phase

Public Open House

Wednesday, December 12, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn
Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting a public open house meeting to gather community input about conceptual design plans for potential improvements to 163rd Avenue between Jomax Road and Dove Valley Road.

Proposed plans include the future roadway type, number of lanes, intersections and access points, roadway alignment and recommended drainage improvements (bridges or culverts). Stop by anytime between 5:00 and 7:00 p.m. to learn more and speak with MCDOT project team members.

For more information, contact Renee Probst at (602) 506-8622 or write to Probst at: MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: reneeprobst@mail.maricopa.gov or contact Roberta Crowe, Public Information Officer at (602) 506-8003.

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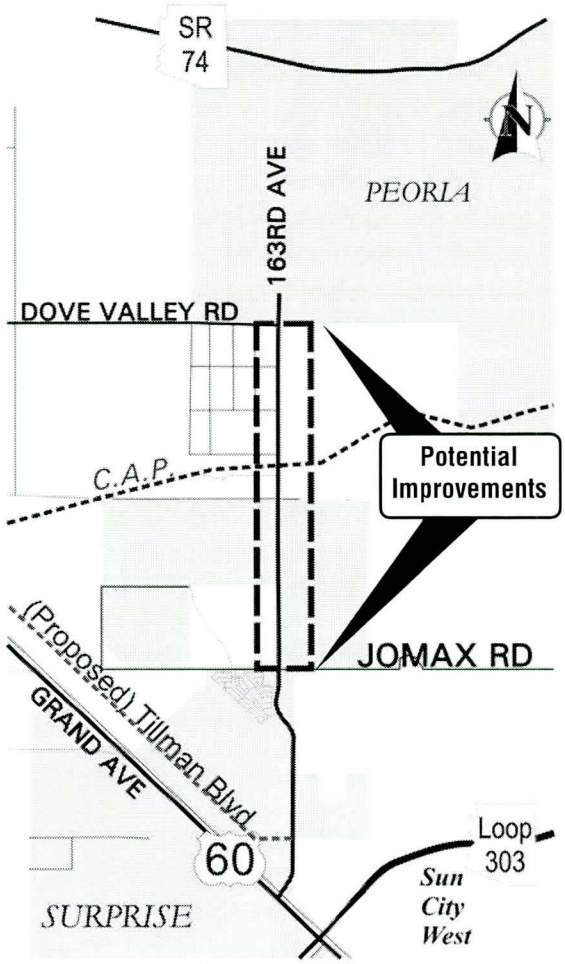

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MARICOPA COUNTY MCDOT TRANSPORTATION
Right Road Right Time Right Cost

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MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Thursday, November 2, 2006
5:00 p.m. to 7:00 p.m.

Hampton Inn Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Public "Scoping" Meeting

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the first in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

Stop by anytime between 5:00 and 7:00 p.m. to speak with MCDOT project team members.

For more information, contact Renee Probst at (602) 506-8622 or write to Probst at: MCDOT, 2910 W. Durango Street, Phoenix, AZ 85009, or e-mail at: reneeprobst@mail.maricopa.gov or contact Roberta Crowe, Public Information Officer at (602) 506-8003.

Reasonable accommodations may be made available for people with disabilities with a minimum 72-hour notice. For more information on such accommodations, contact Roberta Crowe at **(602) 506-8003**.

Si desea recibir esta información en Español, favor llamar (480) 350-9288.

Con adviso de setenta y dos horas o más, es posible obtener plans reasonables para personas con discapacidades; lo mismo para representantes que hablan Español. Si quiere más información, llamar (480) 350-9288.

District 4 Supervisor, Max Wilson
www.mcdot.maricopa.gov

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Tuesday, March 6, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Alternative Analysis Phase

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the second in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

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MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Public Open House

Tuesday, July 17, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

Findings and Recommendations

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting the third in a series of three public open house meetings to gather community input about potential improvements along 163rd Avenue between Jomax Road and SR 74. The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along the 163rd Avenue corridor to safely accommodate future traffic demand.

Stop by anytime between 5:00 and 7:00 p.m. to speak with MCDOT project team members.

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District 4 Supervisor, Max Wilson
www.mcdot.maricopa.gov

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

We Need Your Input
163rd Avenue
Jomax Road to Dove Valley Road
Design Concept Phase

Public Open House

Wednesday, December 12, 2007
5:00 p.m. to 7:00 p.m.

Hampton Inn Grand Colonnade

14783 W. Grand Avenue
Surprise, AZ
(north of Bell Road)

The Maricopa County Department of Transportation's (MCDOT) ***RightRoads* Program** is conducting a public open house meeting to gather community input about conceptual design plans for potential improvements to 163rd Avenue between Jomax Road and Dove Valley Road.

Proposed plans include the future roadway type, number of lanes, intersections and access points, roadway alignment and recommended drainage improvements (bridges or culverts). Stop by anytime between 5:00 and 7:00 p.m. to learn more and speak with MCDOT project team members.

For more information, contact Renee Probst at (602) 506-8622 or write to Probst at: MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: reneeprobst@mail.maricopa.gov or contact Roberta Crowe, Public Information Officer at (602) 506-8003.

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District 4 Supervisor, Max Wilson
www.mcdot.maricopa.gov

MARICOPA COUNTY MCDOT TRANSPORTATION
Right Road Right Time Right Cost

Exhibit B:
Media Hits

Officials begin formulating plans for 163rd Ave.

Jonathan J. Higuera
The Arizona Republic
Nov. 11, 2006 12:00 AM
It won't be long before 5,000 new homes dot the corridor along 163rd Avenue between Jomax Road and Arizona 74.

All those residents likely will spend a lot of time on 163rd Avenue getting to and from Grand Avenue, the main thoroughfare to the south.

But the condition of the road will have to improve if it is to become more than just a bottleneck, transportation officials agree.

Last week the Maricopa County Department of Transportation held a public open house on its plans to improve the road, which is paved from Jomax to Dove Valley Road, but is just a dirt road from there to Arizona 74.

Residents turned out to ask that it be built sooner rather than later, but were disappointed to learn that no funding is available for construction.

The open house was intended to gather input from the public on possible alignments of the road, which faces a number of engineering challenges ranging from washes to mountainous terrain to crossing the Central Arizona Project canal.

"We can't just say, 'Snap a line and build it here,' " said Randy Overmyer, a senior transportation planner for Surprise, which contains about four miles of the road.

Surprise has a vested interest in seeing an improved 163rd Avenue because housing developments are cropping up around the area. The city kicked in $300,000 to Maricopa County to get more engineering and design work done on the southernmost four miles of 163rd Avenue.

But the plans for improving the road are in the very early stages, said Renee Probst, a county transportation project manager. The county is gathering data, including current and projected traffic volumes, road crossings and right-of-way issues.

"Past studies have projected a high volume on this road, enough to dictate six lanes," she said.

An important step will be deciding on an exact alignment, she and others say.

"We need it before we can get down to the brass tacks," said Overmyer. "And every alignment has its pluses and minuses."

Corridor Improvement Study schedule

February - Second public input meeting.

June - Draft report.

August - Final report.

October - Draft of Design Concept Report and final public input meeting.

January 2008 - Final Design Concept Report submitted.

Source: Maricopa County Department of Transportation

County gathers input on 163rd Avenue plans

Jonathan J. Higuera
The Arizona Republic
Nov. 16, 2006 12:00 AM
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"Past studies have projected a high volume on this road, enough to dictate six lanes," she said.

The road from Jomax to Arizona 74 traverses the cities of Surprise and Peoria and also takes in unincorporated parts of the county.

A version of this story may have appeared in your community Republic.

Published: Mar 26, 2007 - 10:18:44 pm EDT

Residents talk 163rd alignment; Improvements a must for public

By Matt Loeschman, Independent Newspapers

The second public input meeting regarding the 163rd Avenue alignment drew nearly 100 Surprise residents concerned with future transportation options in the northern portion of the city.

Maricopa County Department of Transportation held the meeting earlier this month, the second public input gathering regarding the future transportation corridor.

"I would say we had about 85 people show up," reported MCDOT spokeswoman Roberta Crowe. "The interest has been pretty consistent. We presented seven different alternative alignments for this corridor and four of them were carried forward."

According to MCDOT documentation, the group's regional transportation plan identifies the need to establish an alignment for 163rd Avenue between Grand Avenue (U.S. 60) and State Route 74. The southern two-mile segment is under construction, but MCDOT is working with Surprise and Peoria transportation officials on two studies — a corridor improvement study between Jomax Road and SR 74 and a design concept report for the portion of 163rd Avenue between Jomax and Dove Valley roads.

"We're working with several entities on this project," Ms. Crowe added. "We want to get ahead of the game so this roadway will be able to handle the amount of traffic we expect to see in the future."

According to MCDOT estimates, 163rd Avenue could carry as many as 50,000 vehicles per day by 2030.

"The new roadway will eventually provide a seamless transportation route that will affect the cities of Surprise and Peoria," Ms. Crowe noted. "It will offer regional connectivity and consistent roadway features."

Recommendations include roadway type, number of lanes, right-of-way requirements and traffic control measures along with access features and drainage improvements to safely accommodate future travel need.

"We are addressing growth and development up to 25 years in the future," Ms. Crowe said.

The 163rd Avenue corridor serves northern Maricopa County through Surprise and Peoria. Land use south of Dove Valley Road is single-family residential on large lots while land is undeveloped between Dove Valley Road and SR 74.

> Presently, the 163rd Avenue corridor between Jomax and Dove Valley roads is a two-lane paved road intersected by "unimproved" cross streets, according to MCDOT documentation. North of Dove Valley Road, a dirt road provides access for vehicles performing water line construction on developments north of SR 74.

Big changes are in store, according to Surprise City Engineer Dr. Robert Maki.

"Some of this is in our city limits now and all of it is in our planning area," Dr. Maki explained. "We are looking at these alignments to see what might work best. It's a collaborative effort."

Those in attendance saw several large maps and asked questions of transportation officials.

Surprise resident Jennifer Hansen also attended the forum.

"This appears to help the people that live in the northern area. We are pretty much locked into either Bell Road or Grand Avenue and the traffic can be really horrible," she explained.

Resident Roger Werley said he is pleased to see entities working together on the study.

"It is good to see the entities getting together to address the transportation issues before the fact instead of after," he said. "We all know what kind of problems we have in Surprise. This corridor is going to be a key in the future."

A "findings and recommendations" public meeting is set for October 2007 with the final design concept report submittal tentatively scheduled for January 2008.

Post your opinions in the Public Issues Forums at newszap.com. News Editor Matt Loeschman can be reached at 972-6101 or mloeschman@newszap.com.

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Final public hearing Tuesday on plans for 163rd Ave.

Brent Whiting
The Arizona Republic
Jul. 13, 2007 02:14 PM

Transportation planners will meet in Surprise on Tuesday to gather public input on long-range plans involving 163rd Ave., projected as a major north-south road in the Northwest Valley.

It's the last of three public meetings to review plans for the thoroughfare along a nearly 7-mile stretch from Jomax Road north to Arizona 74.

The first informal open house was held Nov. 2. The second was March 6.

Construction design plans for the southern portion of the 163rd Avenue corridor are expected to be offered this fall, said Roberta Crowe, a spokeswoman for the Maricopa County Department of Transportation.

Officials are deciding, among others things, a possible future alignment, roadway type, number of lanes and right-of-way requirements to accommodate traffic demands, Crowe said.

Officials say past studies project enough traffic to justify six lanes.

Currently, 163rd Avenue is paved for the four miles from Jomax north to Dove Valley

Road to progress

Patrick Roland/Daily News-Sun
July 20, 2007 - 9:28PM
Victoria Franklin lives on a single lane dirt road in the middle of wide open desert space that may become a six-lane freeway as growth pushes west in Surprise.

The 55-year-old moved to the land four years ago because she wanted peace and quiet as she contemplated her eventual retirement.

"They're destroying our neighborhood," said Franklin, at a meeting Tuesday where Maricopa County Department of Transportation officials showed plans for what may be the new 163rd Avenue.

"This was going to be my retirement. If I lose this, I am out of Maricopa County. I can't start over at 55," she said.

"I'm a single woman. I want to be settled not starting over."

MCDOT unveiled the preferred alignment for what will become a six-lane highway at the meeting Tuesday. The path follows 163rd Avenue between Jomax Road and Quail Run, and then moves west to the 167th Avenue alignment between Quail Run and Dove Valley Road. Officials picked the alignment because it minimizes negative impacts to properties and the need for expensive bridge structures at major drainage crossings.

The roadway is half in Surprise and half in Peoria. The Surprise right of way, from Jomax to Dove Valley roads, will be 200 feet in width to accommodate "indirect left turns," which allow motorists to bypass left-turn lanes at intersections. The Peoria section runs from Dove Valley Road to State Route 74 and will be 150 feet wide.

MCDOT spokeswoman Roberta Crowe said, the the county does not have a time frame for when construction will begin, nor is there any money devoted to the plan. MCDOT will come back to the community in October with a construction priority and phasing recommendation.

"As development occurs, this study can be implemented," Crowe said. "In the meantime, the roadway corridor is preserved and protected from development and encroachment."

But most of the residents who attended the presentation Tuesday want nothing to do with

a larger 163rd Avenue.

"When I lived in Oregon, I lived on a major thoroughfare and the noise is just ridiculous," said Barbara Brown, who retired to Arizona two years ago. "When we bought out here, we did not want to be near a big road. That was one of the reasons we moved out so far. We love it the way it is out here."

Thomas Barnhill is more concerned about getting answers quickly so he can move on with his life.

"I'm in limbo as to what exactly I am going to do and I want straight answers," the retired Marine said. "If they want to buy me out, fine, but I need to go on with my life and have the peace and quiet I was seeking when I moved out here."

Others are concerned about what will happen to their livestock.

"We bought out here for horses, for our retirement," said Margaret Ruffato. "This will affect noise, the right of way. We'll have lights at night. They aren't looking at us simple folks who moved out here long ago and are happy."

Surprise Councilwoman Martha Bails sympathized with resident concerns but said growth is inevitable, and city and county leaders should have done a better job of planning for these changes 20 years ago.

"None of this was documented and it wasn't disclosed," Bails said. "We don't want to destroy people's property, but as the city grows, we have to provide roads. We have to be able to get people in and out."

Photos by Pete Pallagi/Daily News-Sun

Phil Burgess of Surprise is concerned that a proposed six-lane freeway to be built along the alignment of 163rd will not only cut through his land, but will also put his disabled child at risk.

Meeting announced on long-range plans for 163rd Avenue

Brent Whiting
The Arizona Republic
Nov. 30, 2007 10:40 AM

Transportation planners will gather in Surprise to review long-range plans for 163rd Avenue along the four-mile stretch between Jomax and Dove Valley roads, officials said Friday.

There is no definite timetable, but the thoroughfare is projected as a major north-south road in the Northwest Valley, said Roger Ball, a spokesman for the Maricopa County Department of Transportation.

A southerly portion of 163rd Avenue, the three-mile stretch between U.S. 60 and Jomax Road, has been the focus of major construction and study.

An informal meeting on the northerly portion is set for 5 to 7 p.m. Dec. 12. The open house will be at the Hampton Inn, 14783 W. Grand Ave., north of Bell Road near Dysart Road.

Currently, 163rd Avenue is paved for the four miles from Jomax north to Dove Valley Road, but the remainder is a dirt road north to Arizona 74.

Planners want to gather public input on plans for potential improvements from Jomax to Dove Valley, including additional lanes, intersections, drainage and other improvements, according to McDOT officials.

Exhibit C:

1. **Public Meeting #1 "Scoping Phase"**
   Handouts, Displays/Graphics
2. **Public Meeting #2 "Alternatives Analysis Phase"**
   Handouts, Displays/Graphics
3. **Public Meeting #3 "Findings & Recommendations Phase"**
   Handouts, Displays/Graphics
4. **Public Meeting # 4 "Preferred Alternative" Design Concept Report**
   Handouts, Displays/Graphics

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

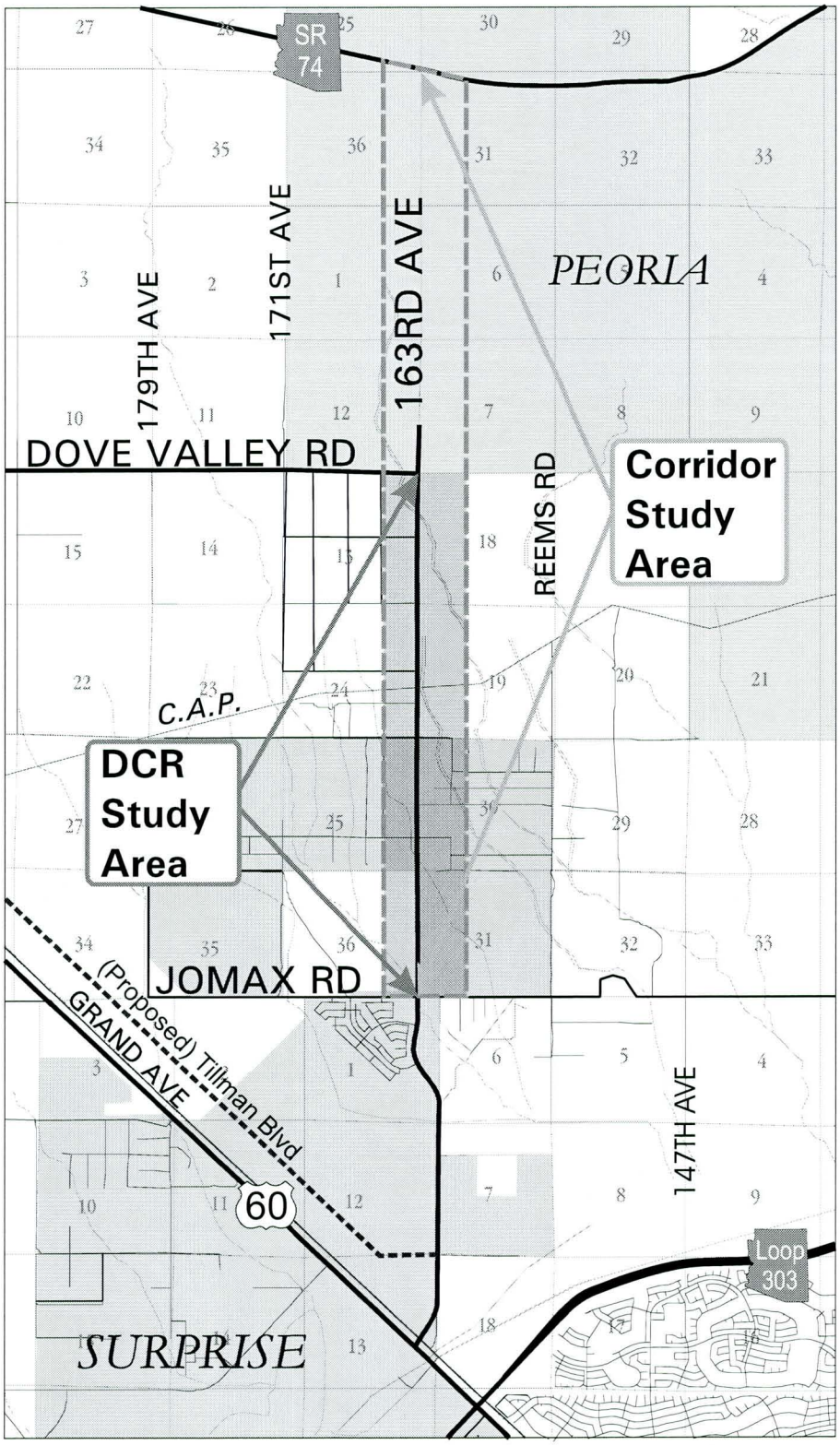
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road



11/02/2006

Maricopa County Department of Transportation

PARSONS BRINCKERHOFF

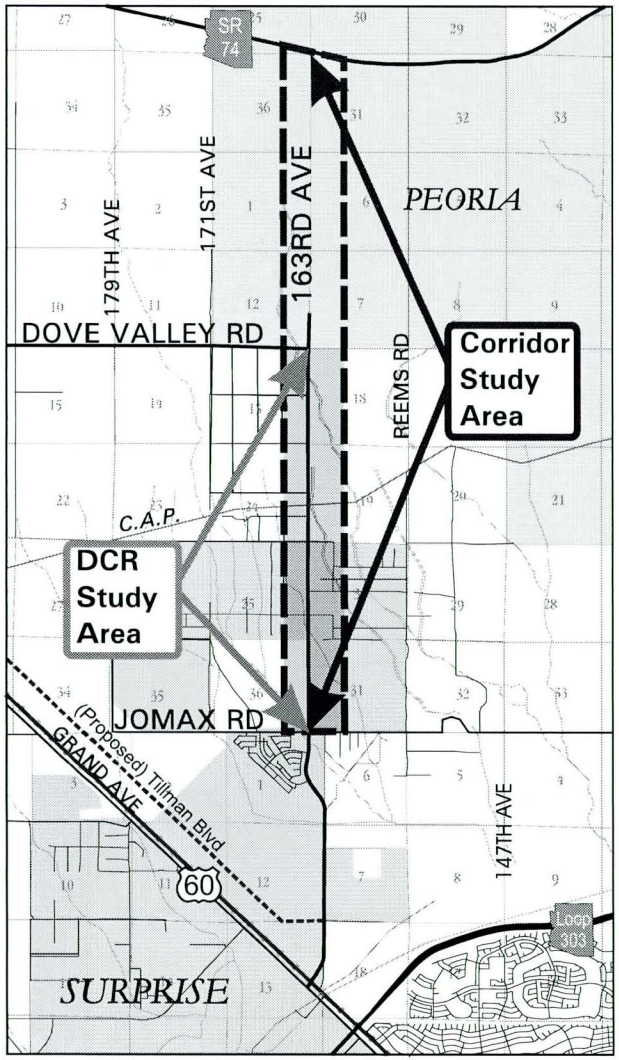
Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

11/02/2006



Maricopa County
Department of Transportation

www.mcdot.maricopa.gov

163rd Avenue

Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Scoping Phase

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

Maricopa County Department of Transportation **November 2, 2006**

Background

In 1997, Maricopa County Department of Transportation (MCDOT) completed a Comprehensive Plan and Transportation System Plan (TSP) for the unincorporated areas of the County. The TSP included recommendations to improve the existing arterial road network to meet transportation demands resulting from projected growth in the County. Recommendations contained in the TSP were considered in the development of the 2004 Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP).

Addressing rapid growth in this area, the RTP identified the need to establish an alignment for 163rd Avenue between Grand Avenue (US 60) and SR 74. The southern two-mile segment is already under construction by development. MCDOT, in cooperation with the City of Surprise, is conducting a Corridor Improvement Study (CIS) between Jomax Road and SR 74 and Design Concept Report (DCR), a more in-depth evaluation, for the portion of 163rd Avenue between Jomax Road and Dove Valley Road to address the influence of imminent development.

The new roadway will provide a seamless transportation route, regional connectivity, consistent roadway features and standards through the cities of Surprise and Peoria and ensure adequate right-of-way preservation along the entire corridor.

Study Purpose

The purpose of this study is to develop a consensus-driven plan for 163rd Avenue among partner jurisdictions between Jomax Road and SR 74. The study goal is to establish the ultimate future roadway alignment, identify existing corridor deficiencies and future requirements, establish consistent roadway design and performance criteria, and generate preliminary design plans to meet future travel demands.

The study recommendations will include roadway type, number of lanes, roadway cross-section and ultimate right-of-way requirements and traffic control measures along with access features and drainage improvements to safely accommodate future travel need. This study will provide the County, the City of Surprise and other impacted jurisdictions with a future "footprint" of 163rd Avenue along with a recommended timeframe for the phasing of roadway construction. Policies and guidelines for access management strategies developed during this study will ensure the future implementation of this roadway as a regionally significant transportation corridor.

Within the corridor's southerly four miles between Jomax Road and Dove Valley Road, the preferred corridor will develop 30% design plans to aid the City of Surprise in managing access for future area development.

Corridor Description

The 163rd Avenue corridor serves northern Maricopa County through the cities of Surprise and Peoria. Existing land use south of Dove Valley Road is single-family residential homes on large lots. Between Dove Valley Road and SR 74, the land is undeveloped.

Currently, 163rd Avenue between Jomax and Dove Valley is a two-lane paved roadway intersected by unimproved cross-streets that serve the local residential community. North of Dove Valley, the roadway is an unimproved dirt road built largely to provide access for waterline construction serving development north of SR 74.

MCDOT, City of Peoria and City of Surprise all classify 163rd Avenue as a six-lane divided roadway.

For more information, contact Renee Probst at (602) 506-8622 or write to her at:
MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: ReneeProbst@mail.maricopa.gov.

MCDOT

Study Approach

The Corridor Improvement Study (CIS) will be carried out in two phases, a planning phase and an engineering phase. The DCR for the segment between Jomax Road and Dove Valley Road will be completed following the selection of a preferred roadway alignment.

Planning Phase

The Planning Phase will gather general background information and prepare several reports (future traffic analysis, area drainage features and plans, existing utilities and future sitings and environmental reports) leading to well-founded recommendations for improvements that address longer-term need along the corridor.

During the Planning Phase, public "Scoping" meetings will be conducted with affected jurisdictions, agencies, stakeholders and the impacted public to gather information to form a broad consensus of the overall study objectives, needs and vision of the corridor.

Based on the corridor needs identified, conceptual alternatives will be developed and evaluated for technical and environmental feasibility, public acceptance and economic viability. The alternatives will be presented at a second "Alternatives Analysis" public meeting to gather additional input.

Engineering Phase

The Engineering Phase of the study follows the selection of a preferred roadway alignment alternative. Preliminary engineering design plans, right-of-way requirements and estimated construction costs will be prepared for near-term and long-term roadway design features. Priorities for roadway construction phasing, along with policies and guidelines to preserve the intended function of the roadway, will be developed.

The preliminary plans and cost estimates will be presented during a final "Findings and Recommendations" public meeting to gather input on the preferred (recommended) design alternative for 163rd Avenue.

Design Concept Report

Once the preferred alignment is known, the DCR will evaluate the southerly four miles between Jomax Road and Dove Valley Road. This report will produce 30% design plans that will specify the roadway type, size and location within the corridor and define the need for bridged crossings or culverts and access points. The DCR will also generate a more detailed cost estimate to allow accurate budgeting for project construction.

Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Issues and Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

Study Milestone Schedule

Field Review	September 2006
Scoping Public Input Meeting	**November 2, 2006**
Alternatives Analysis Public Input Meeting	**February 2007**
Planning/Engineering CIS	March 2007
Design Features CIS	May 2007
Draft Report Submittal CIS	June 2007
Final Report Submittal CIS	August 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
Draft Report Submittal DCR	October 2007
Findings and Recommendations Public Input Meeting	**October 2007**
Final Report Submittal DCR	January 2008

Public Involvement

Gaining consensus among the agencies and the public is critical to the success of the study and implementation of its recommendations to provide an efficient roadway for the long term. Three public input meetings are held during the course of the study process. This first "Public Scoping" meeting provides the public with an opportunity to inform project team members about the study area and their transportation needs. It also provides project team members an opportunity to discuss and elicit feedback from the public regarding study purpose/need/goals.

The second "Alternatives Analyses" public meeting, currently scheduled for February 2007, will present preliminary findings and roadway alternatives or options for public review. The final public information meeting (currently slated for October 2007) will present study findings and a recommended roadway and corridor selection along with access management strategies. Your input during each phase of study development is very important.

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

11/02/2006

Maricopa County Department of Transportation

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Study Milestone Schedule

Field Review	September 2006
Scoping	
Public Input Meeting	**November 2, 2006**
Alternatives Analysis	
Public Input Meeting	**February 2007**
Planning/Engineering CIS	March 2007
Design Features CIS	May 2007
Draft Report Submittal CIS	June 2007
Final Report Submittal CIS	August 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
Draft Report Submittal DCR	October 2007
Findings and Recommendations	
Public Input Meeting	**October 2007**
Final Report Submittal DCR	January 2008

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Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

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163rd Avenue
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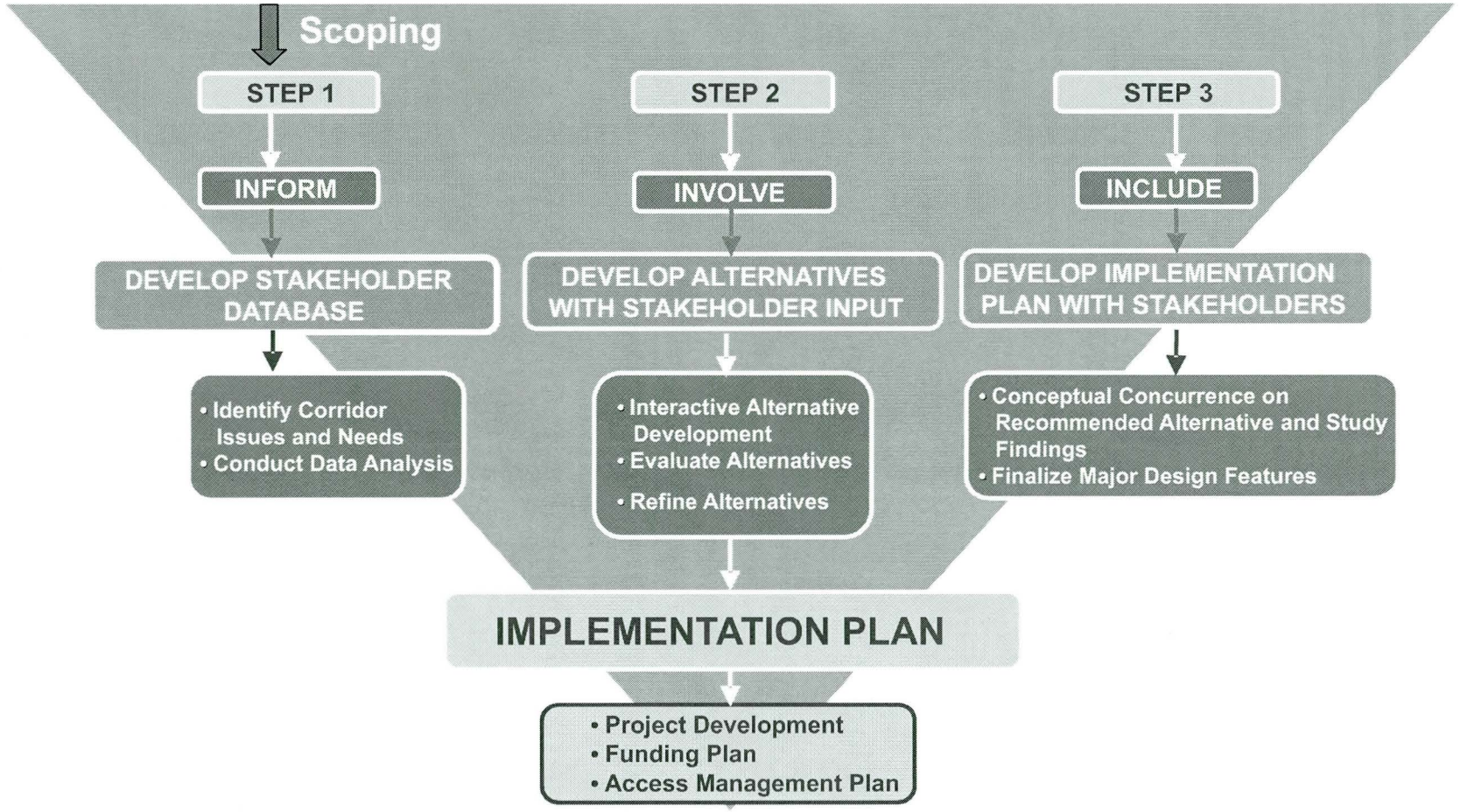
Interactive Study Process



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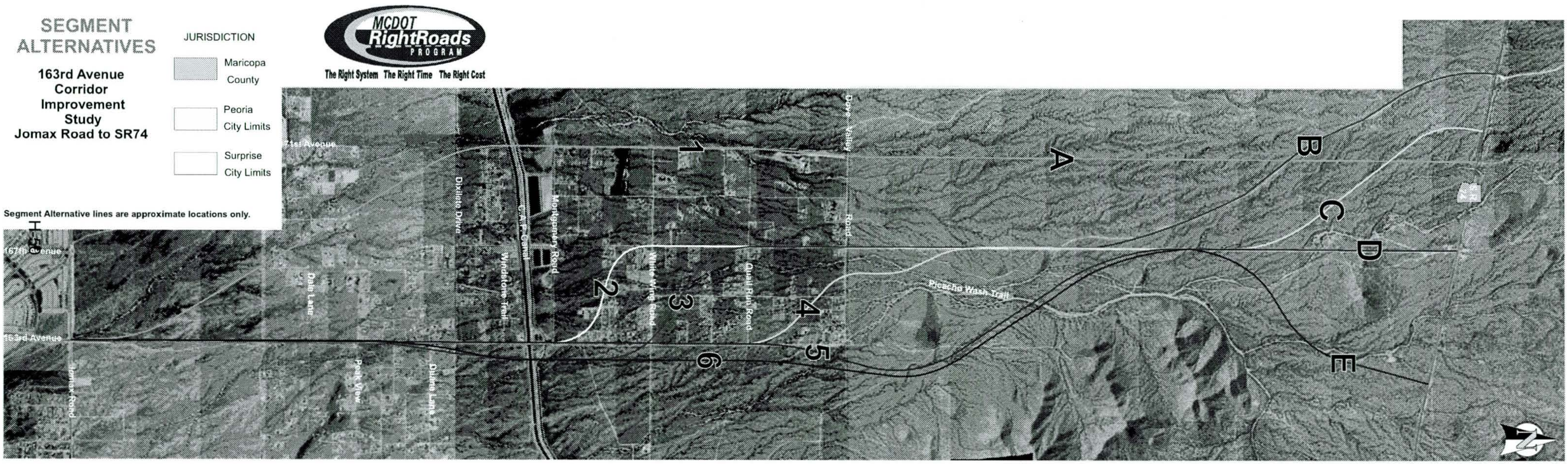
SEGMENT ALTERNATIVES
163rd Avenue Corridor Improvement Study
Jomax Road to SR74
JURISDICTION
Maricopa County
Peoria City Limits
Surprise City Limits
Segment Alternative lines are approximate locations only.
MCDOT RightRoads PROGRAM
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171st Avenue
167th Avenue
163rd Avenue
Jomax Road
Dixilea Drive
C.A.P. Canal
Montgomery Road
Windstone Trail
Dale Lane
White Wing Road
Quail Run Road
Dove Valley Road
Picacho Wash Trail
Peak View
A
B
C
D
E
1
2
3
4
5
6

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163rd Avenue

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163rd Avenue

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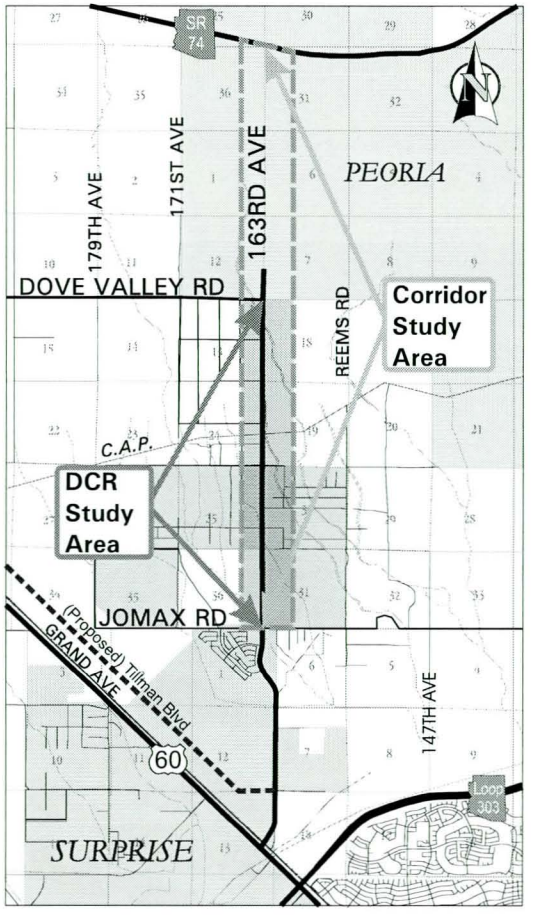
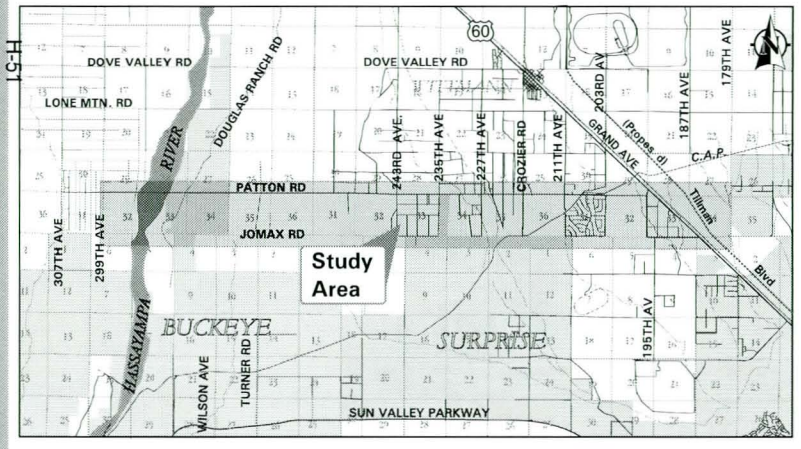
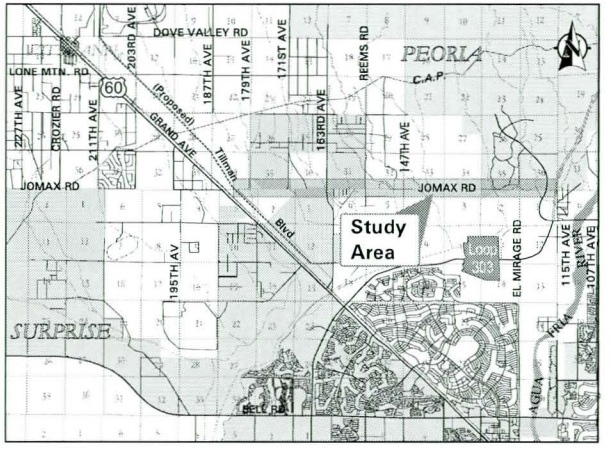




Patton/Jomax

Corridor Improvement Study

299th Avenue to 179th Avenue



Jomax East

Corridor Improvement Study

Tillman Boulevard to SR Loop 303

Maricopa County Department of Transportation

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Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Resident

Public Involvement

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This second "Alternatives Analyses" public meeting will present preliminary findings and roadway alternatives or options for public review. The final public information meeting (currently slated for October 2007) will present study findings and a recommended roadway and corridor selection along with access management strategies. Your input during each phase of study development is very important.

Study Milestone Schedule

Field Review	September 2006
Scoping Public Input Meeting	**November 2, 2006**
Alternatives Analysis	
Public Input Meeting	**March 6, 2007**
Planning/Engineering CIS	April 2007
Design Features CIS	May 2007
Draft Report Submittal CIS	July 2007
Final Report Submittal CIS	September 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
Draft Report Submittal DCR	November 2007
Findings and Recommendations Public Input Meeting	**October 2007**
Final Report Submittal DCR	January 2008

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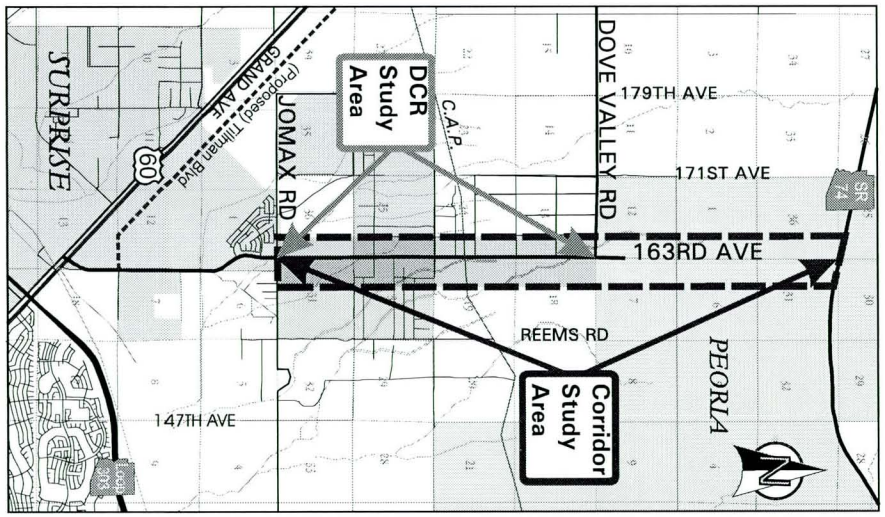

163rd Avenue

Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

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Alternatives Analysis Phase

Maricopa County Department of Transportation — March 6, 2007

BACKGROUND

In 1997, Maricopa County Department of Transportation (MCDOT) completed a Comprehensive Plan and Transportation System Plan (TSP) for the unincorporated areas of the County. The TSP included recommendations to improve the existing arterial road network to meet future transportation demands resulting from projected growth and development countywide. MCDOT's TSP recommendations were considered in the development of the 2004 Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP).

In direct response to the rapid growth being experienced in northwestern Maricopa County, the RTP identified the need to designate the future roadway alignment for 163rd Avenue between Grand Avenue (US 60) and SR 74.

163rd Avenue is classified as a future Principal Arterial by MCDOT, a future Parkway by Surprise and as an arterial by Peoria (all six-lane divided roadways).

Roadway construction, funded by private development, is already underway on the southern two-mile segment of 163rd Avenue between Grand Avenue and Jomax Road. MCDOT is conducting this current Corridor Improvement Study (CIS) in cooperation with the City of Surprise, for the portion of 163rd Avenue between Jomax Road and SR 74 (beyond the private development improvements) and a more detailed Design Concept Report (DCR) is being conducted on the segment of 163rd Avenue between Jomax Road and Dove Valley Road to address imminent development.

CORRIDOR DESCRIPTION

The 163rd Avenue corridor serves northwestern Maricopa County through the cities of Surprise and Peoria. Existing land use south of Dove Valley Road is single family residential on large lots. Between Dove Valley Road and SR 74, the land is undeveloped.

Currently, 163rd Avenue between Jomax Road and Dove Valley Road is a two-lane paved roadway that is intersected by unimproved cross-streets that serve the local residential development. North of Dove Valley Road, the roadway is an unimproved dirt road that was built largely to provide access for construction of a waterline to a development north of SR 74.

STUDY PURPOSE

An agreed-upon plan for this future roadway corridor will ensure regional connectivity, consistent roadway features and standards through the cities of Surprise and Peoria, and ensure adequate right-of-way preservation along the entire corridor.

The purpose of this study is to develop a consensus-driven vision among partner jurisdictions for 163rd Avenue between Jomax Road and SR 74. The study goal is to establish the ultimate roadway alignment, identify existing corridor deficiencies and future requirements and to determine consistent roadway design and performance criteria to meet the established future needs.

Recommended corridor improvements will include future roadway type, number of lanes, roadway cross-section and ultimate right-of-way requirements, traffic control measures, an access management plan, and drainage improvements to safely accommodate future travel demands. This study will provide the County and other responsible jurisdictions with a future "footprint" of 163rd Avenue along with a recommended time for the implementation and phasing of roadway improvements.

The DCR for the four-mile segment between Jomax Road and Dove Valley Road will identify the preferred corridor and develop 30% design plans to help the City of Surprise in managing current development access issues

Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

For more information, contact Renee Probst at (602) 506-8622 or write to her at:
MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: ReneeProbst@mail.maricopa.gov.

MCDOT

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Issues and Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

STUDY APPROACH

The 163rd Avenue Corridor Improvement Study is being carried out in two phases: a Planning Phase and an Engineering Phase. The Design Concept Report will be completed once the CIS selects the preferred roadway alignment.

CIS Planning Phase: The Planning Phase gathers general background information and prepares several reports (traffic analysis, drainage, utilities, environmental) leading to well-founded recommendations for improvements and longer-term needs along 163rd Avenue. During the Planning Phase, meetings are conducted with affected jurisdictions, agencies, stakeholders and the impacted public to form a broad consensus of the overall needs and vision of the corridor.

Based on the needs identified, alternatives will be developed and evaluated for technical and environmental feasibility, public acceptability and economic viability.

CIS Engineering Phase: The Engineering Phase of the study will begin following the selection of a preferred alternative. Preliminary engineering design plans, right-of-way requirements and estimated construction costs will be prepared for near-term and long-term roadway improvements. Roadway construction phasing priorities, along with policies and guidelines to preserve the intended function of the future roadway, will be developed.

The DCR portion of the study evaluating the segment between Jomax Road and Dove Valley Road will develop 30% design plans that specify roadway type, alignment, access points and define the need for bridged crossings/culverts. The DCR will also generate a more detailed cost estimate to allow accurate budgeting for construction.

Current Activities and Key Technical Findings

Since the first public "Scoping" meeting (November 2006) and following completion of required technical analyses, the 163rd Avenue Corridor Study has defined and begun evaluation of future roadway alternatives.

Drainage Report

A drainage report was prepared to study the impact of roadway alignments on known flood areas. The report also addressed potential drainage structures/features where the alternative roadway alignments crossed a known flood location.

Environmental Overview

The potential environmental impact of the roadway alignment alternatives was studied. The analysis looked at plants and animals, hazardous materials, cultural resources such as ancient burial grounds, existing land uses, and other environmental features in the area. The report found that no endangered species were evidenced within the project area and the likelihood of the existence of sensitive species in the project area was found to be very low.

Utilities Overview

Identifying the best place to locate a future roadway requires a good understanding of the present and planned utilities in the area. Few major utilities are present at this time and impacts associated with roadway development can be readily accommodated. The Central Arizona Project (CAP)canal is the most significant utility and will be addressed according to CAP requirements.

Traffic Overview

Traffic volumes in the area today are nominal. There is little traffic in the developed areas and a large portion of the corridor traverses vacant land. Year 2030 traffic volumes, based on anticipated development and growth, are projected to be high and will require a roadway that can safely accommodate 50,000 or more vehicles a day. Intersections at major cross-streets should also be designed to carry high traffic volumes.

Consideration of "In-Direct Left Turn" at Major Intersections

In both Peoria and Surprise General Plans, 163rd Avenue is designated as a future six-lane divided "parkway" with provision for right and left turns at major intersections. The Peoria parkway right-of-way width requirement is 150 feet. Peoria uses standard intersections with all turn lanes concentrated at the intersection and managed by traffic signal.

The Surprise parkway right-of-way width is 200 feet. The additional roadway right-of-way width (50') is necessary to accommodate the "in-direct left turn". This traffic control measure is under evaluation for implementation on portions of the 163rd Avenue corridor.

Under this traffic control measure, left-turn movement is eliminated at the intersection. Motorists travel through the intersection and make a U-turn at a point beyond the intersection and return to the intersection from the opposite direction to make a right turn toward the desired direction.

Advanced Roadway Alignment Alternatives

The 163rd Avenue corridor alignment alternatives cover a broad area extending generally along the 175th Avenue alignment on the west side of the corridor to the 163rd Avenue alignment on the east side of the corridor and several potential alignments in-between. The primary basis for the selection of a preferred roadway alignment is to identify a efficient "path" through the area that also has the least possible impact on existing development and homes, drainage paths, utilities and environmentally-sensitive areas and is also economically feasible (affordable to build).

Each of the advanced alignment alternatives balance corridor attributes and impacts in different ways and to varying degrees. In effect, they "trade off" impact in one area for the impact in another. The final recommended alignment will be the alternative that best minimizes, mitigates or avoids negative impacts and is economically viable. The recommended alignment alternative may reflect a combination of different advanced alternative roadway segments.

- **Alternative 7C -** Travels westward to the 171st Avenue alignment just north of Jomax Road and continues northward to SR 74.
- **Alternative 1A -** Follows the 163rd Avenue alignment to Patton Road, travels west to 171st Avenue alignment north of Dove Valley Road and returns to 167th Avenue alignment at SR 74.
- **Alternative 2D** - Travels along the 163rd Avenue alignment and shifts west to the 167th Avenue alignment at Montgomery Road and continues northward to SR 74.
- **Alignment 4C** (Similar to Alternative 2D) Travels along the 163rd Avenue alignment and shifts west to the 167th Avenue alignment at White Wing/Lone Mountain Road and continues northward to SR 74.
- **Alignment 3B** Travels northward beginning just east of the 163rd Avenue alignment and shifts to 167th Avenue alignment at Quail Run, continuing northward, and midway between Dove Valley Road and SR 74 shifts to the 175th Avenue alignment and continues northward on 175th Avenue alignment to SR 74.

Alternatives 5D and 6E, located east of the163rd Avenue alignment, were eliminated due to significant topographic and drainage conflicts.

Evaluation of Roadway Alignment Alternatives

Advanced alternatives are evaluated based upon the following criteria:

Roadway

- Roadway cross-section (number of lanes/right-of-way requirements)
- New drainage structure requirements
- Earthwork (Cut/Fill Requirements

Traffic and Access Management

- Traffic Circulation Element
- Access Management

Environmental Impacts

- Negative impact on biological resources
- Evidence of hazardous materials
- Impact to 4f properties
- Presence of recorded cultural sites

Utility and Right-of-Way Considerations

- Utility relocation or accommodation
- New public ROW requirements

Socio-Economic Factors

- Impact to State Land
- Impact to improved properties
- Impact to proposed development
- Existing & Future Land Use/Zoning Compatibility

Public Acceptability

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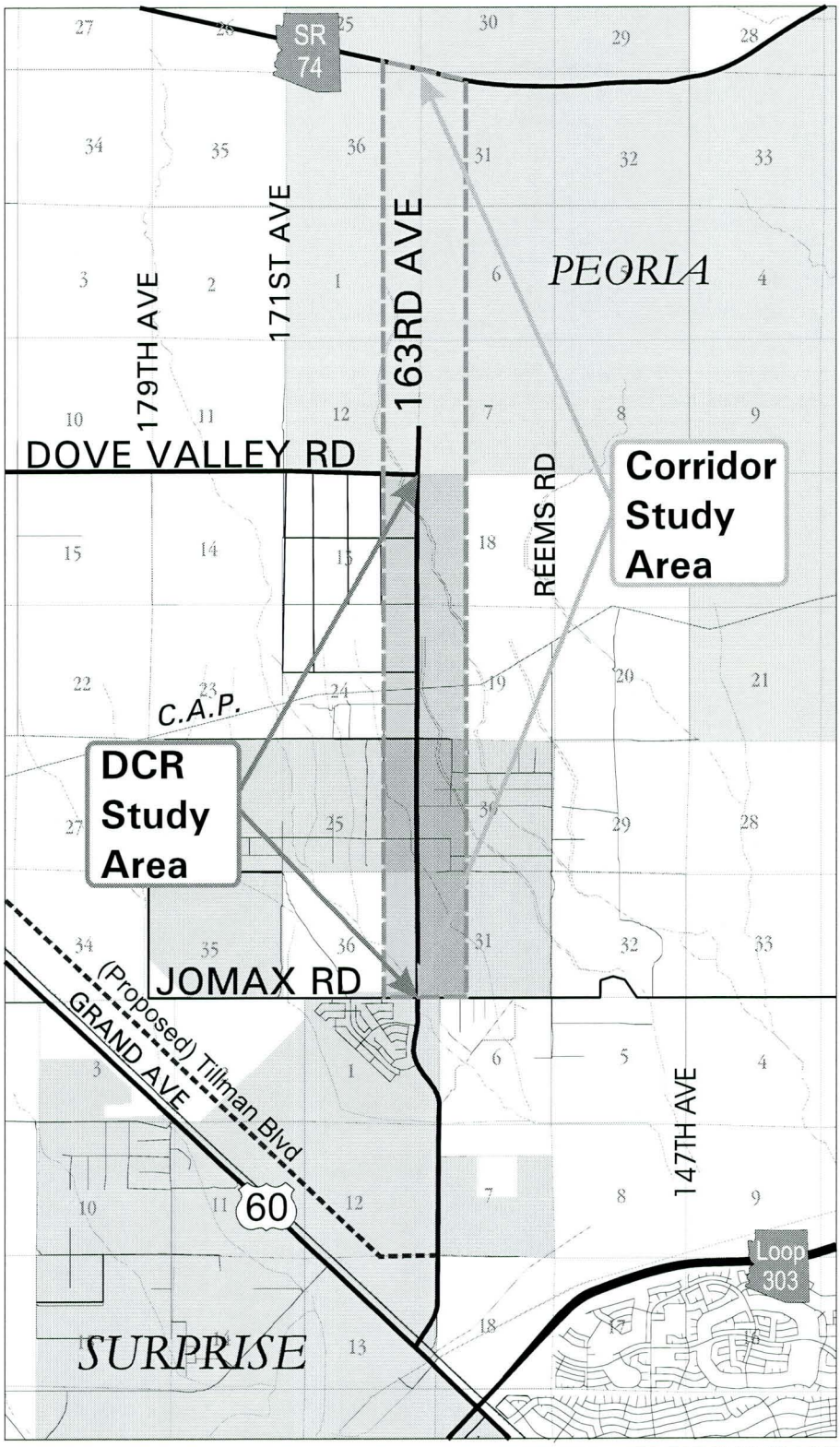

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Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

3/06/2007

Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
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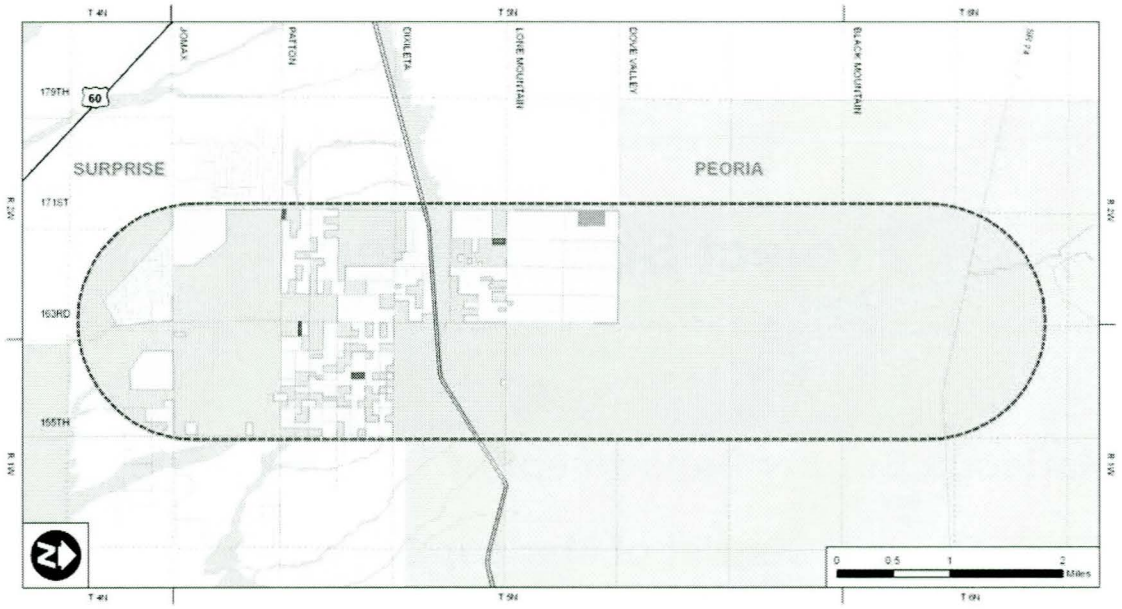
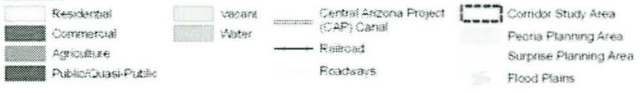
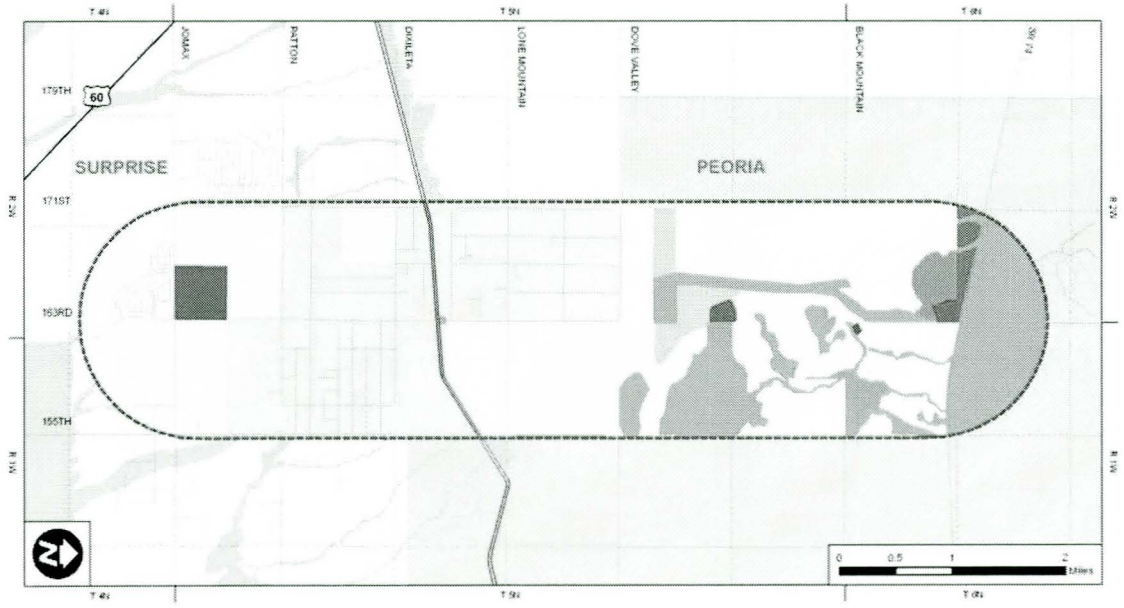


Existing Land Use

Sources: MAG and PB





Future Land Use

Sources: City of Peoria and City of Surprise

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163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 1: Jomax Road to CAP Canal
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	● 6 Minor Crossings 1 Major Crossing
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Approach to Dale Rd & Dixileta Rd Intersections	● 163rd is NW-SE Consider skew	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South
Traffic /Transportation Planning					
City of Surprise Traffic Circulation Element	⊗ Significant diversion from 163rd Ave	○ On or near 163rd Ave	○ On or near 163rd Ave	○ On or near 163rd Ave	⊗ Significant diversion from 163rd Ave
Access Mgmt Strategies Required	◑ Local access needs	◑ Local access needs	◑ Local access needs	◑ Local access needs	◑ Local access needs
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified. Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified
Impact to 4f Properties	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ New CAP Crossing Overhead Power, Underground Tele.	◑ New CAP Crossing Overhead Power, Underground Tele	◑ New CAP Crossing Overhead Power, Underground Tele.	◑ New CAP Crossing Overhead Power, Underground Tele.	● New CAP Crossing Most Overhead Power Relocation
Right-of-Way (ROW) Requirements					
New Public ROW Requirements	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)
Socio-Economic					
Impact to State Land	● South of Dale Rd	○ Minimal	◑ North of Dixileta Rd	○ Minimal	○ None
Impact to Improved Properties	◑ 3 Residential Impacts	○ Zero Residential Impacts	◑ 1 Residential Impact	○ Zero Residential Impacts	◑ 2 Residential Impacts
Impact to Proposed Development	● Sierra Norte (Preliminary Plat)	○ No adjacent developments	○ No adjacent developments	○ No adjacent developments	◑ Tierra Rico (Final Plat)
Existing & Future Land Use/Zoning Compatibility	⊗ Not Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans
Public Opinion					
Public Acceptance					

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊗ Fatal Flaw

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163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 2: CAP Canal to Dove Valley Road North
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	◑ 4 Minor Crossings	● 1 Minor Crossings 1 Bridge	● 2 Minor Crossings 1 Bridge	● 4 Minor Crossings 1 Bridge	◑ 4 Minor Crossings
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Approach to Dove Valley Rd Intersection	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South	● 163rd is NW-SE Consider skew	○ 163rd is North-South
Intersection Compatibility with Future Lone Mountain Road	○ 163rd is North-South	○ 163rd is North-South	● 163rd is NW-SE Consider skew	○ 163rd is North-South	○ 163rd is North-South
Traffic /Transportation Planning					
City of Peoria General Plan	⊗ Significant diversion	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	⊗ Significant diversion
City of Surprise Traffic Circulation Element	⊗ Diversion needed	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	⊗ Diversion needed
Access Mgmt Strategies Required	◑ Local access needs	● Significant access	◑ Local access needs	◑ Local access needs	◑ Local access needs
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified
Impact to 4f Properties	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts.	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ Overhead Power	◑ Overhead Power,Water	◑ Overhead Power,Water	◑ Overhead Power,Water	◑ Overhead Power
Right-of-Way (ROW) Requirements					
New Public ROW Requirements	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)
Socio-Economic					
Impact to State Land	○ Minimal	○ None	◑ S/O Marisol Ranch	○ Minimal	○ None
Impact to Improved Properties	◑ 1 Residential Impact	● 17 Residential Impacts	◑ 6 Residential Impacts	○ Zero Residential Impacts	◑ 1 Residential Impacts
Impact to Proposed Development	◑ Does not abut Marisol Ranch	◑ Does not abut Marisol Ranch	◑ Does not abut Marisol Ranch	○ Direct access to Marisol Ranch	◑ Does not abut Marisol Ranch
Land Use/Zoning Compatibility	⊗ Not Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans
Public Opinion					
Public Acceptance					

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊗ Fatal Flaw

3/06/2007

Maricopa County Department of Transportation

PB PARSONS BRINCKERHOFF

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 3: Dove Valley Road North to SR 74
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	● 5 Minor Crossings 2 Major Crossings	● 2 Minor Crossings 2 Major Crossings	○ 0 Crossings	● 3 Minor Crossings 2 Major Crossings	● 2 Minor Crossings 2 Major Crossings
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	● Significant Excavation Cuts into hill	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Quintero Rd Access	○ No Impact	○ No Impact	● Realign or add TI on SR 74	No Impact	● Realign or add TI on SR 74
Traffic /Transportation Planning					
Meets Existing SR 74 Connection Plans	○ Yes	○ Yes	● No; Poor SR 74 TI spacing	○ Yes	◑ No; Requires adjustment
City of Peoria General Plan	○ OK	○ OK	⊗ Poor SR 74 spacing	○ OK	⊗ Requires adjustment
Access Mgmt Strategies Required	○ No access	○ No access	○ No access	○ No access	○ No access
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	○ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified
Impact to 4f Properties	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts.	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Future water & wastewater coordination
Right-of-Way (ROW) Requirements					
New Public ROW Requirements	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)
Socio-Economic					
Impact to State Land	○ Minimal	○ None	◑ S/O Marisol Ranch	○ Minimal	○ None
Impact to Improved Properties	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts
Impact to Proposed Development	◑ ¼ mile west of developments	○ Direct access to developments	● ½ mile+ west of developments	◑ ¼ mile west of developments	● ½ mile west of developments
Land Use/Zoning Compatibility	○ Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans
Public Opinion					
Public Acceptance					

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊗ Fatal Flaw

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Maricopa County Department of Transportation

PB PARSONS BRINCKERHOFF

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

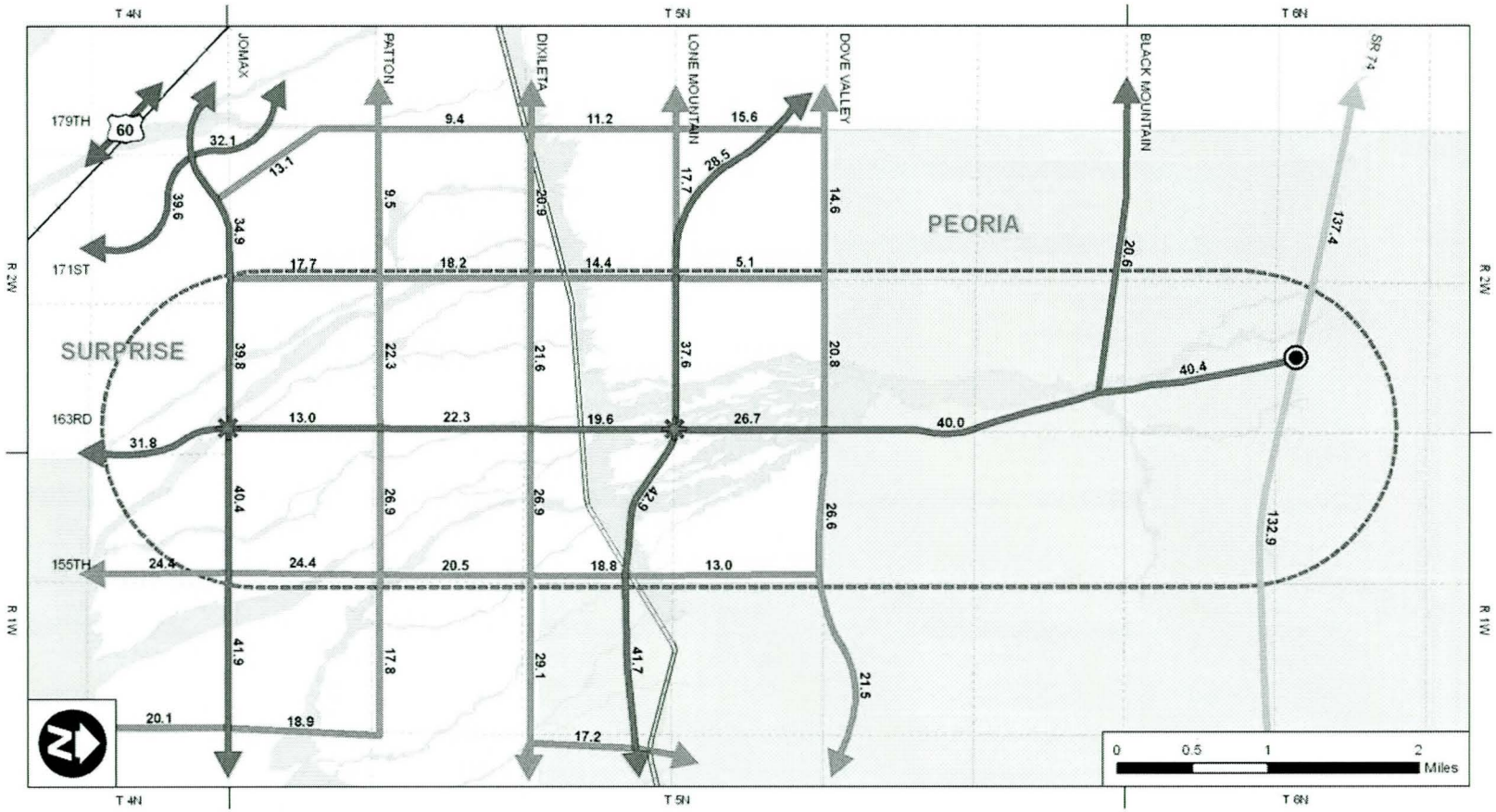
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road



Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.

Sources: MCDOT, MAG, and the CK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Major Design Feature
- Traffic Interchange
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area

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Maricopa County Department of Transportation

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MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

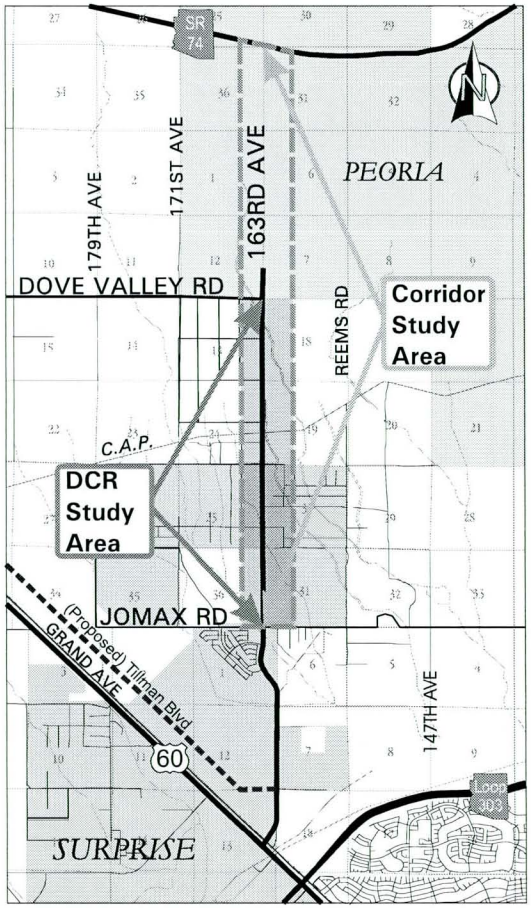
163rd Avenue

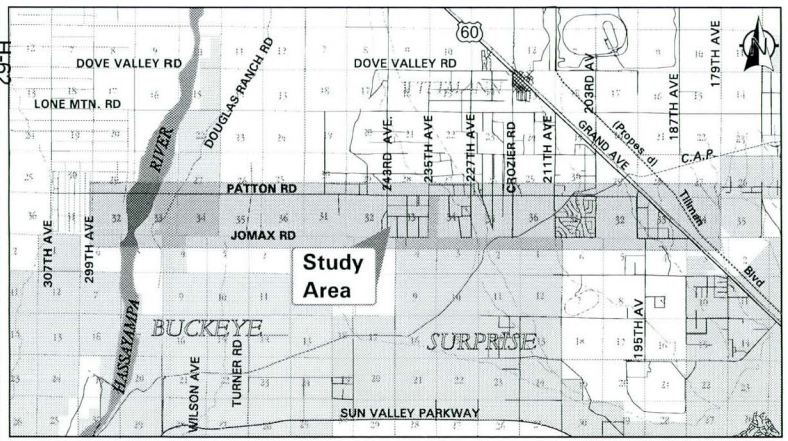
Corridor Improvement Study

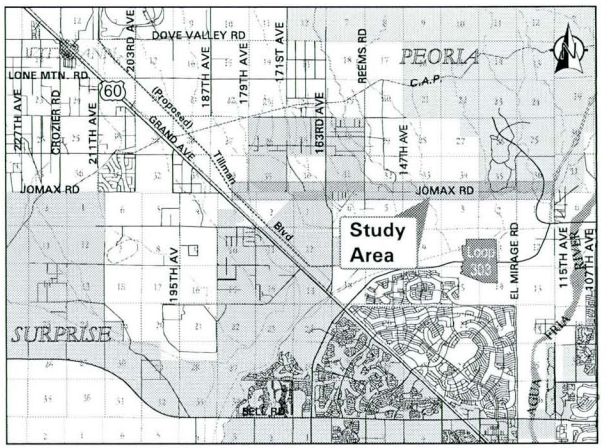
Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road







Patton/Jomax

Corridor Improvement Study

299th Avenue to 179th Avenue

Jomax East

Corridor Improvement Study

Tillman Boulevard to SR Loop 303

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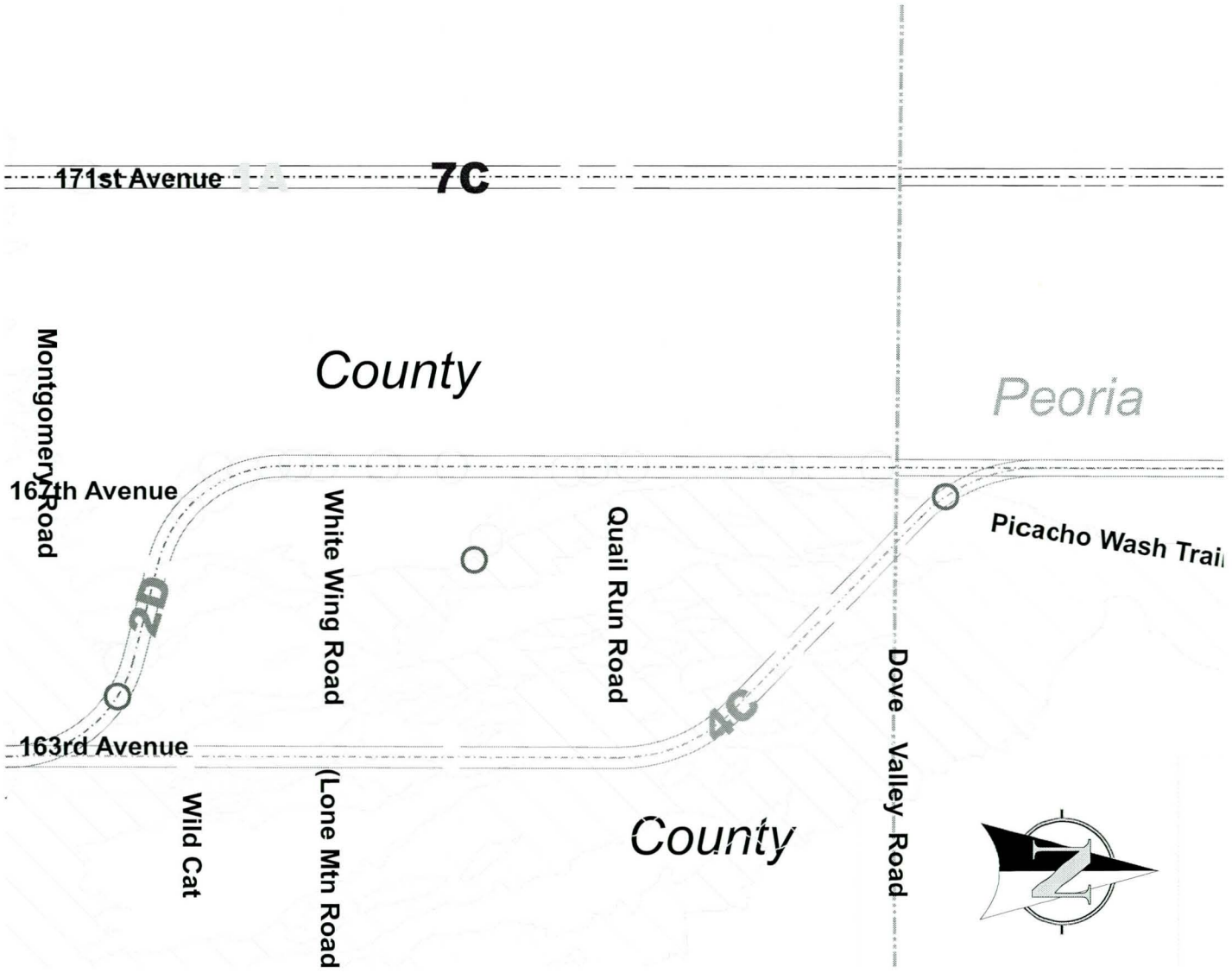
Maricopa County Department of Transportation

PB PARSONS BRINCKERHOFF

SEGMENT ALTERNATIVES

163rd Avenue Corridor Improvement Study Jomax Road to SR74



MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

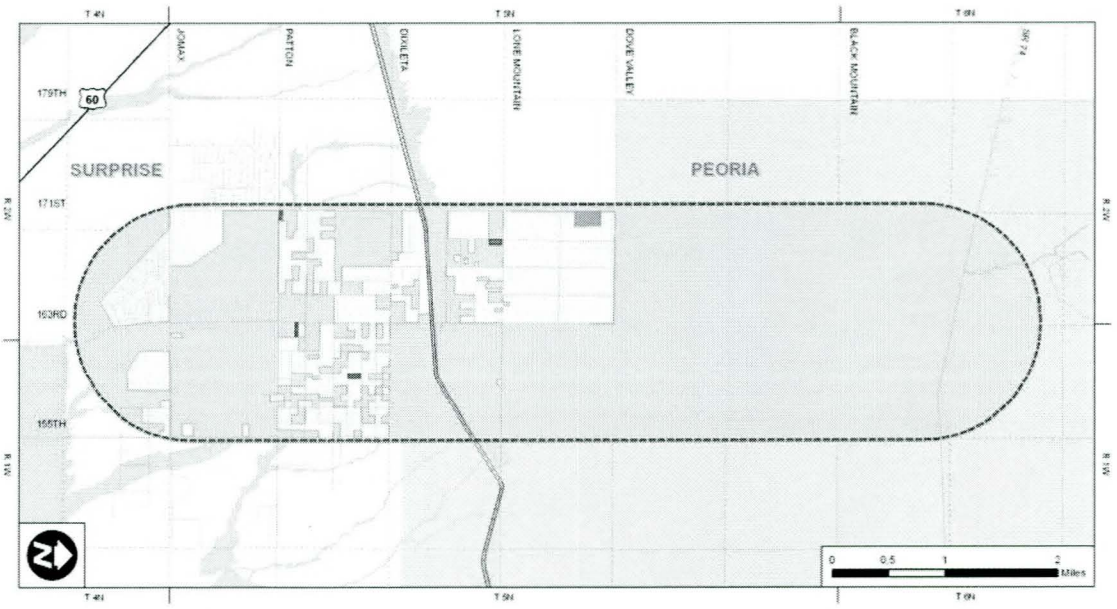
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

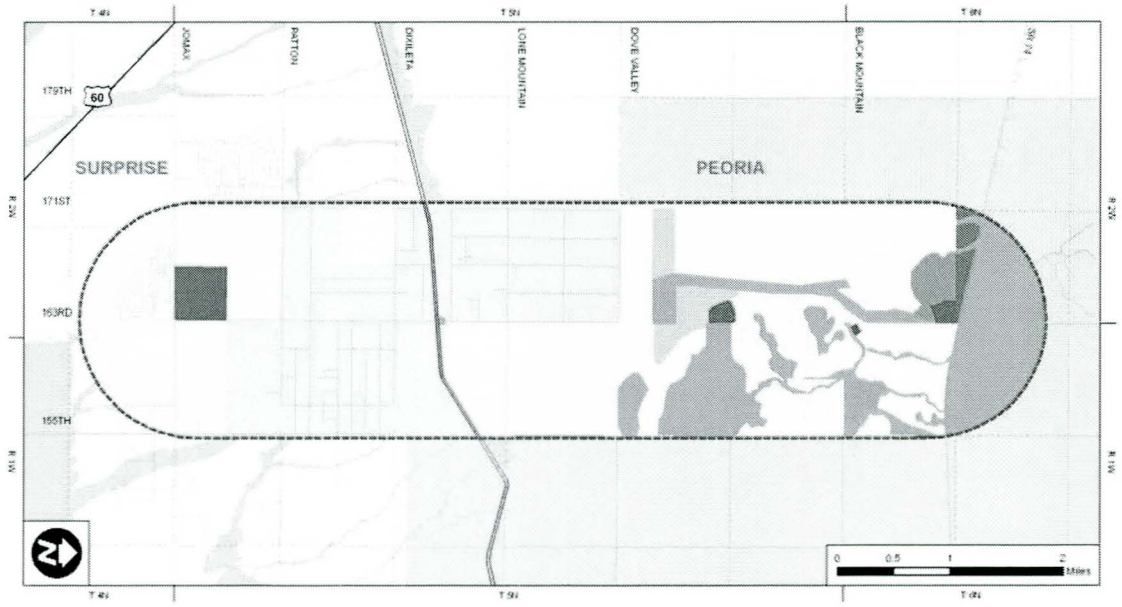


Existing Land Use

Sources: MAG and PB

Legend

- Residential
- Commercial
- Agriculture
- Public/Quasi-Public
- Vacant
- Water
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains



Future Land Use

Sources: City of Peoria and City of Surprise

Legend

Peoria Land Use

- Residential/Estate
- Residential/Low
- Residential/Medium
- Residential/Medium High
- Mixed Use
- Business Park/Industrial
- Community Commercial
- Park/Open Space
- Public/Quasi-Public

Surprise Land Use

- Rural Residential
- Low Density Residential
- Suburban Residential
- Commercial
- Open Space
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains

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MCDOT RightRoads PROGRAM

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163rd Avenue

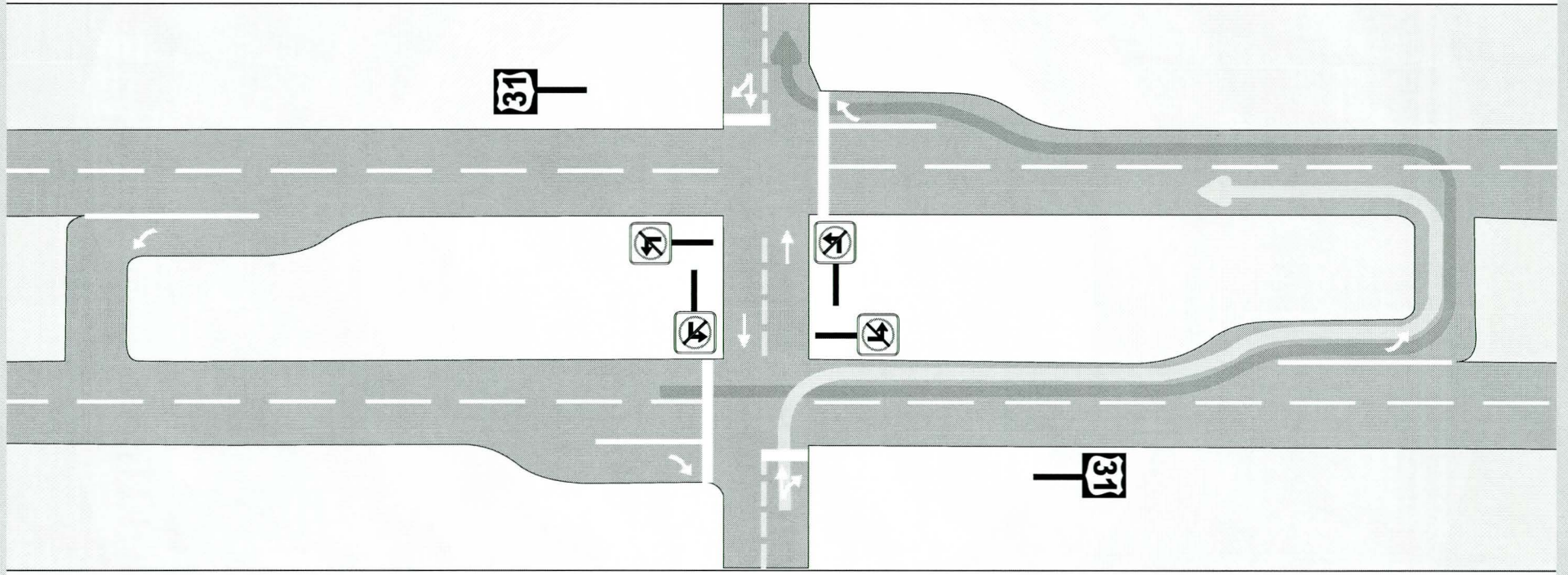
Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

In-Direct left Turn



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PB PARSONS BRINCKERHOFF

SEGMENT ALTERNATIVES

163rd Avenue Corridor Improvement Study
omax Road to SR74

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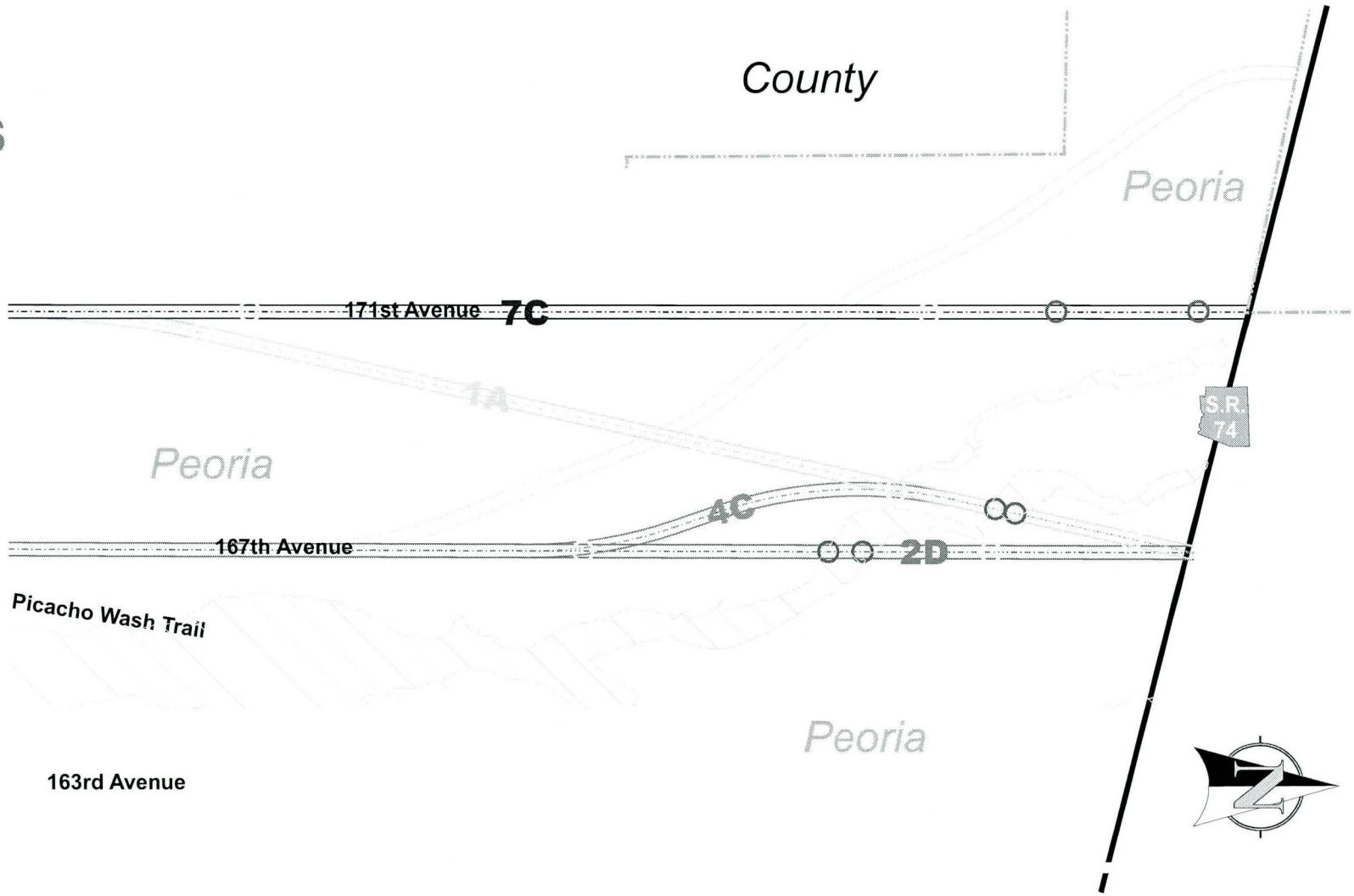

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

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MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

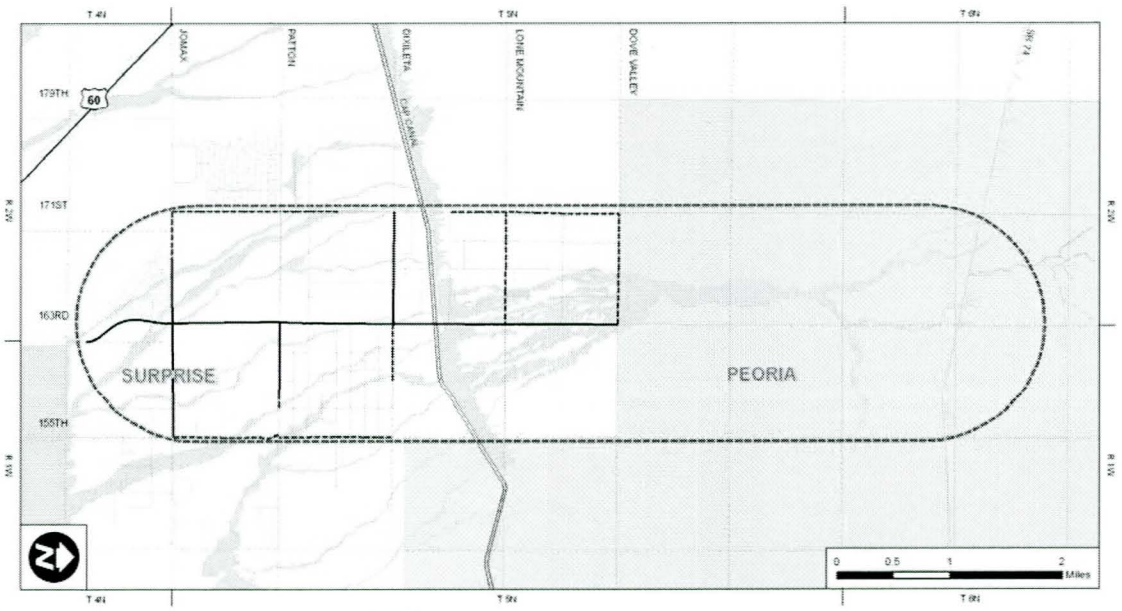
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

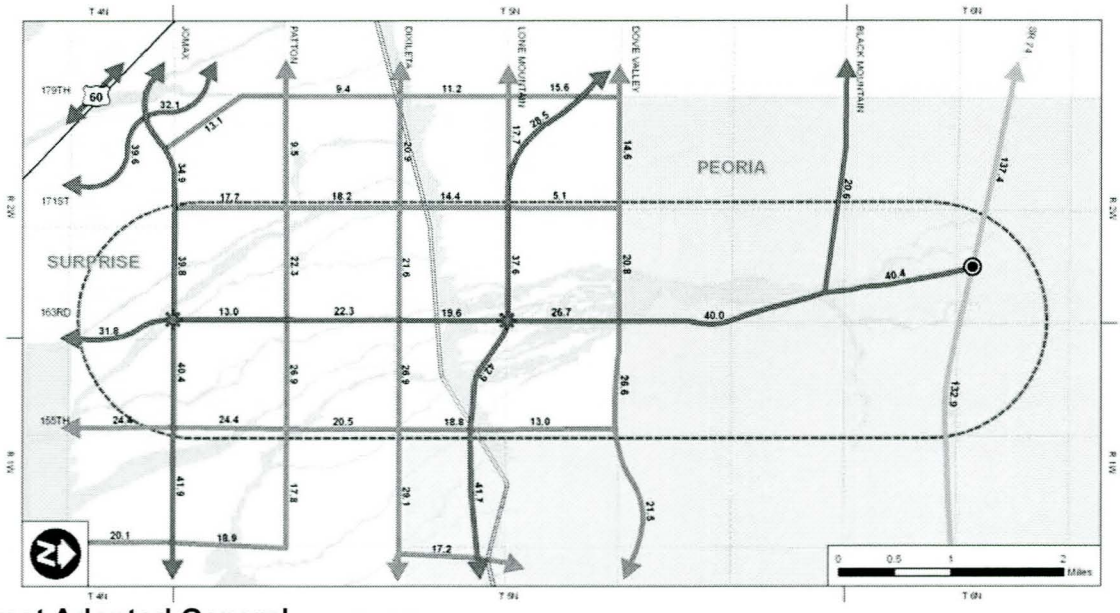
Jomax Road to Dove Valley Road



Existing Roadway Network

Legend

- Paved Roadway
- Unpaved Roadway
- Unpaved Residential
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area



Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.

Sources: MCDOT, MAG, and the CK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Major Design Feature
- Traffic Interchange
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area

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Maricopa County Department of Transportation

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Study Milestone Schedule

Field Review	September 2006
Scoping	
Public Input Meeting	**November 2, 2006**
Alternatives Analysis	
Public Input Meeting	**March 6, 2007**
Planning/Engineering CIS	March 2007
Design Features CIS	May 2007
Draft Report Submittal CIS	June 2007
Final Report Submittal CIS	August 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
Draft Report Submittal DCR	October 2007
Findings and Recommendations	
Public Input Meeting	**October 2007**
Final Report Submittal DCR	January 2008

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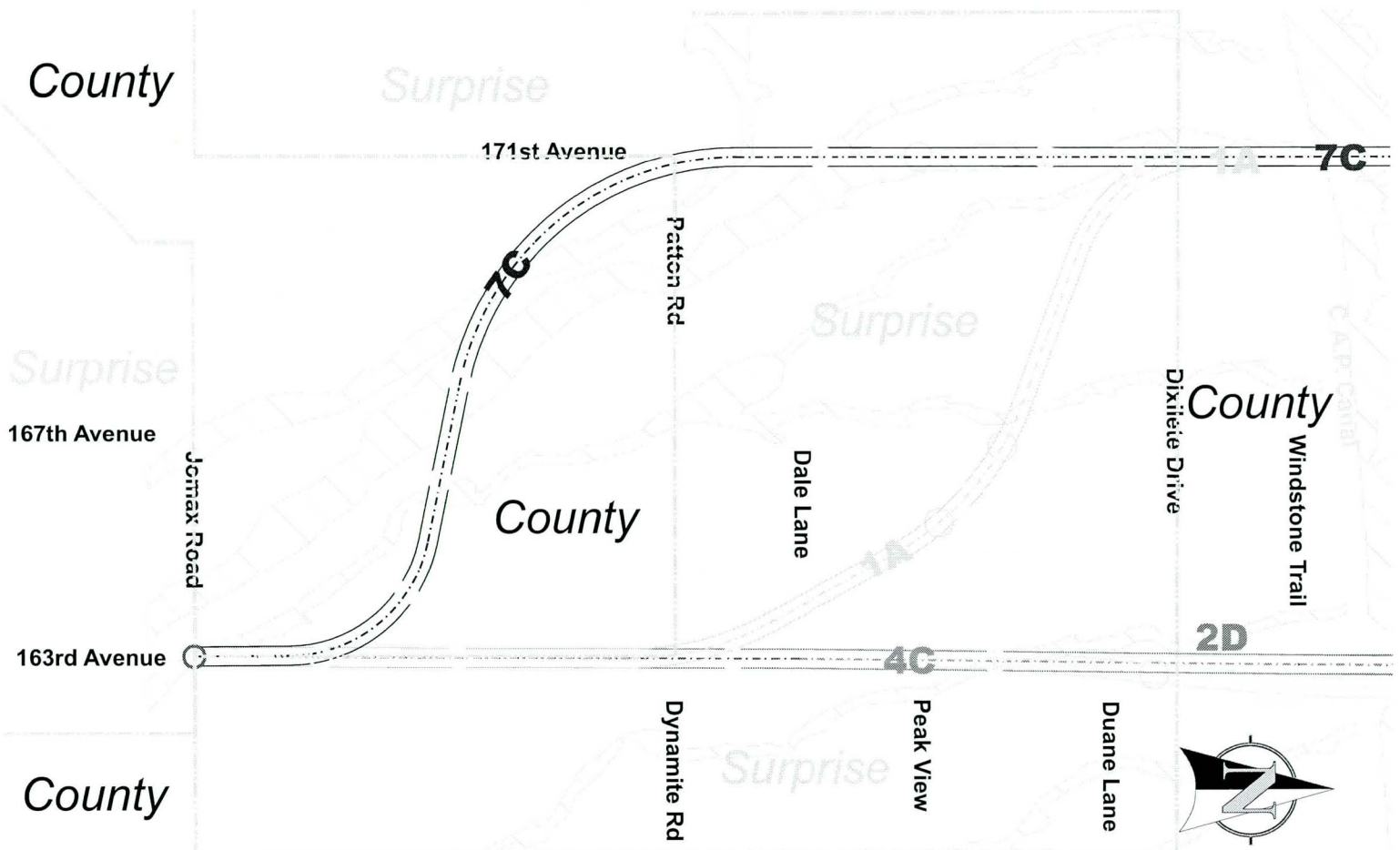
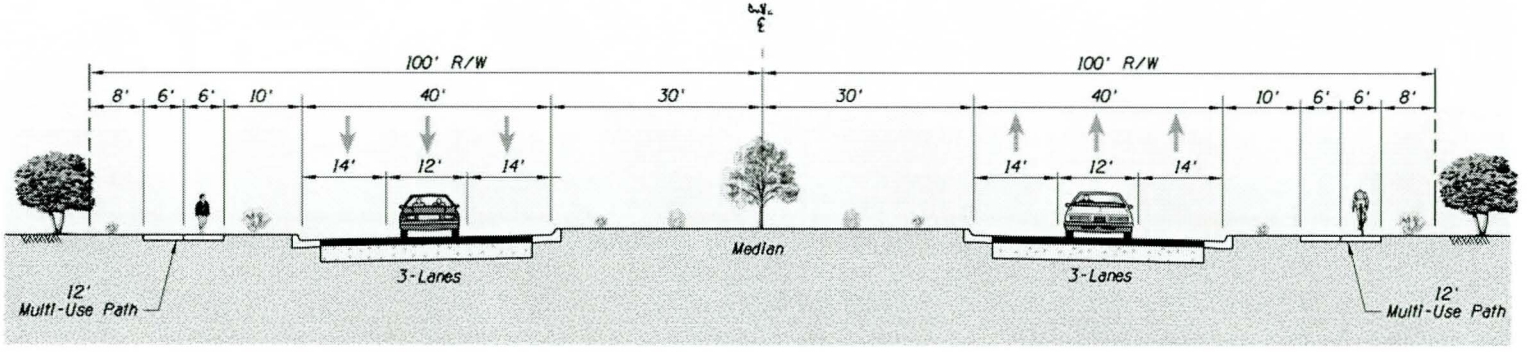
SEGMENT ALTERNATIVES

163rd Avenue Corridor Improvement Study Jomax Road to SR74



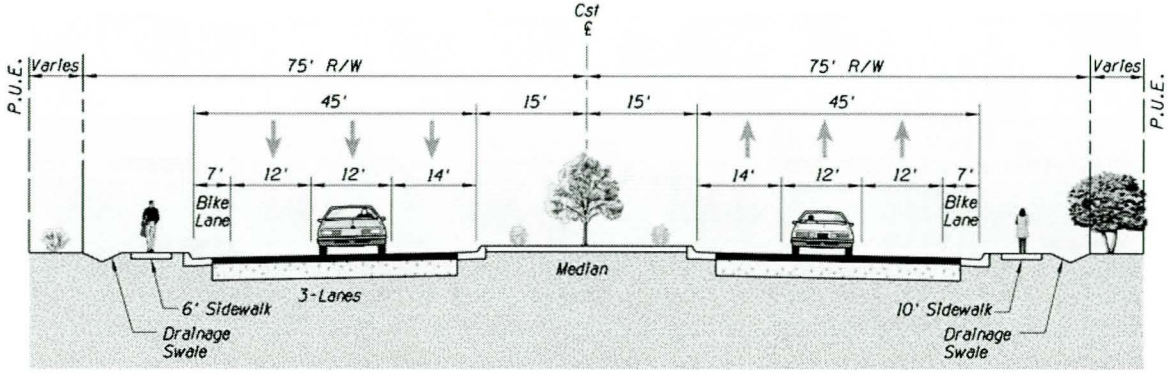
163rd Avenue

Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road



CITY OF SURPRISE
PARKWAY

Jomax Road to Dove Valley Road



CITY OF PEORIA
PARKWAY

Dove Valley Road to SR 74

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MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

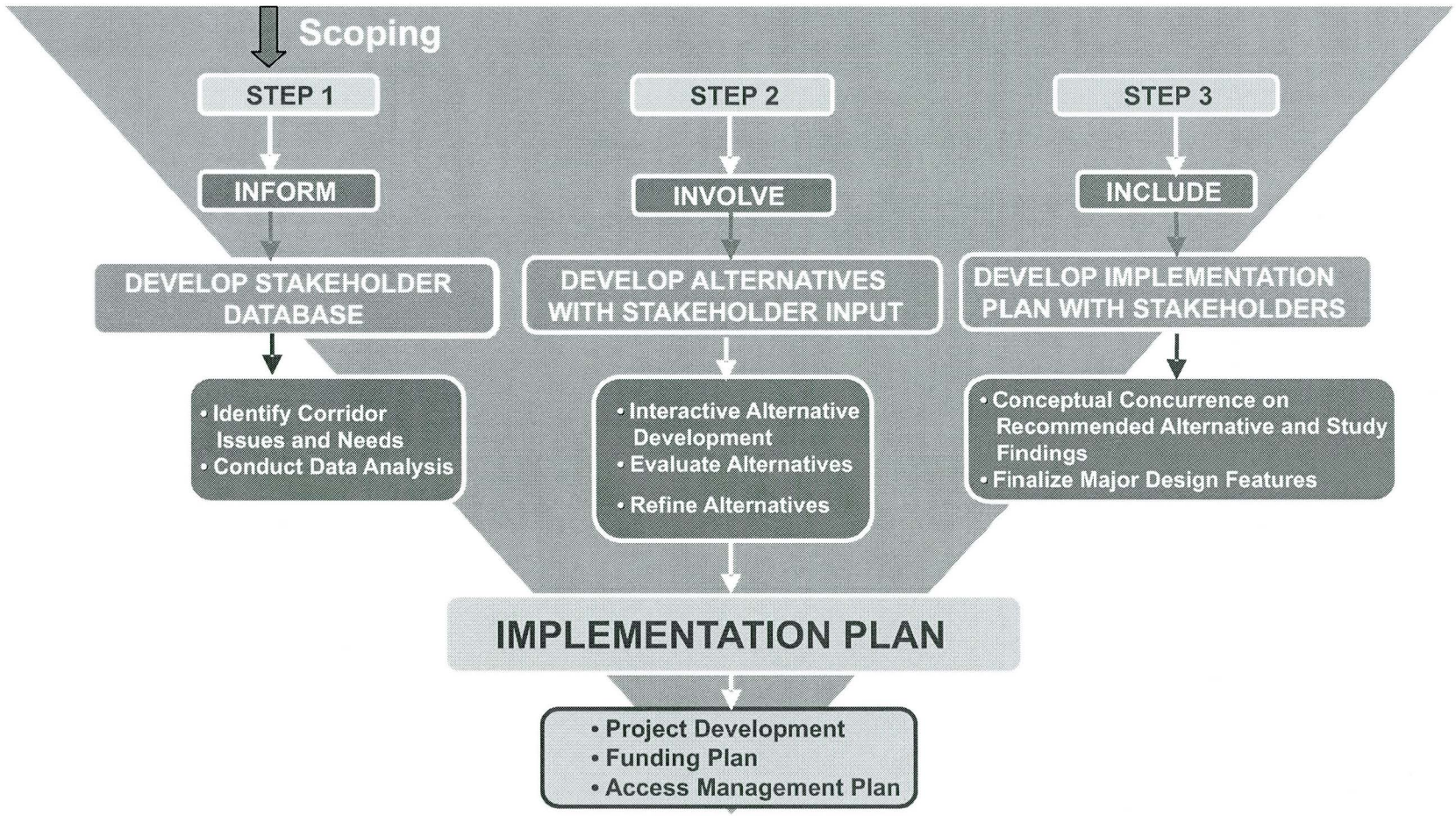
Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Interactive Study Process



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Maricopa County Department of Transportation

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MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 1: Jomax Road to CAP Canal
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment (RECOMMENDED)	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	◑ 4 Minor Crossings 1 Major Crossing	● 6 Minor Crossings 1 Major Crossing
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Approach to Dale Rd & Dixileta Rd Intersections	● 163rd is NW-SE Consider skew	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South
Traffic /Transportation Planning					
City of Surprise Traffic Circulation Element	⊠ Significant diversion from 163rd Ave	○ On or near 163rd Ave	○ On or near 163rd Ave	○ On or near 163rd Ave	⊠ Significant diversion from 163rd Ave
Access Mgmt Strategies Required	◑ Local access needs	◑ Local access needs	◑ Local access needs	◑ Local access needs	◑ Local access needs
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified. Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified
Impact to 4f Properties	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property	◑ CAP Trail is 4(f) property
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ New CAP Crossing Overhead Power, Underground Tele.	◑ New CAP Crossing Overhead Power, Underground Tele	◑ New CAP Crossing Overhead Power, Underground Tele.	◑ New CAP Crossing Overhead Power, Underground Tele.	● New CAP Crossing Most Overhead Power Relocation
Right-of-Way (ROW) Requirements					
New Public ROW Requirements	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)	● 200 ft ROW (Surprise)
Socio-Economic					
Impact to State Land	● South of Dale Rd	○ Minimal	◑ North of Dixileta Rd	○ Minimal	○ None
Impact to Improved Properties	◑ 3 Residential Impacts	○ Zero Residential Impacts	◑ 1 Residential Impact	○ Zero Residential Impacts	◑ 2 Residential Impacts
Impact to Proposed Development	● Sierra Norte (Preliminary Plat)	○ No adjacent developments	○ No adjacent developments	○ No adjacent developments	◑ Tierra Rico (Final Plat)
Existing & Future Land Use/Zoning Compatibility	⊠ Not Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	⊠ Not Compatible with General Plans
Public Opinion					
Public Acceptance	○	○	○	○	○

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊠ Fatal Flaw

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Maricopa County Department of Transportation

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 2: CAP Canal to Dove Valley Road North
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment (RECOMMENDED)	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	◑ 4 Minor Crossings	● 1 Minor Crossings 1 Bridge	● 2 Minor Crossings 1 Bridge	● 4 Minor Crossings 1 Bridge	◑ 4 Minor Crossings
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Approach to Dove Valley Rd Intersection	○ 163rd is North-South	○ 163rd is North-South	○ 163rd is North-South	● 163rd is NW-SE Consider skew	○ 163rd is North-South
Intersection Compatibility with Future Lone Mountain Road	○ 163rd is North-South	○ 163rd is North-South	● 163rd is NW-SE Consider skew	○ 163rd is North-South	○ 163rd is North-South
Traffic /Transportation Planning					
City of Peoria General Plan	⊠ Significant diversion	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	⊠ Significant diversion
City of Surprise Traffic Circulation Element	⊠ Diversion needed	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	○ Compatible with 163rd Ave alignment	⊠ Diversion needed
Access Mgmt Strategies Required	◑ Local access needs	● Significant access	◑ Local access needs	◑ Local access needs	◑ Local access needs
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified	○ No hazardous materials identified
Impact to 4f Properties	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts.	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ Overhead Power	◑ Overhead Power, Water	◑ Overhead Power, Water	◑ Overhead Power, Water	◑ Overhead Power
Right-of-Way (ROW) Requirements					
New Public ROW Requirements	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)	● 200 ft ROW (Surprise) 150 ft ROW (Peoria)
Socio-Economic					
Impact to State Land	○ Minimal	○ None	◑ S/O Marisol Ranch	○ Minimal	○ None
Impact to Improved Properties	◑ 1 Residential Impact	● 17 Residential Impacts	◑ 6 Residential Impacts	○ Zero Residential Impacts	◑ 1 Residential Impacts
Impact to Proposed Development	◑ Does not abut Marisol Ranch	◑ Does not abut Marisol Ranch	◑ Does not abut Marisol Ranch	○ Direct access to Marisol Ranch	◑ Does not abut Marisol Ranch
Land Use/Zoning Compatibility	⊠ Not Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	○ Compatible with General Plans	⊠ Not Compatible with General Plans
Public Opinion					
Public Acceptance	○	●	◑	○	○

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊠ Fatal Flaw

7/17/2007

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Maricopa County Department of Transportation

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

Segment 3: Dove Valley Road North to SR 74
Roadway Alignment Alternatives

Criterion	1A West Alignment	2D CAR Alignment	3B East Alignment	4C 163rd Ave Alignment (RECOMMENDED)	7C 171st Ave Alignment
Engineering Features					
Typical Section	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway	● 6-Lane Parkway
New Drainage Structures Requirements	● 5 Minor Crossings 2 Major Crossings	● 2 Minor Crossings 2 Major Crossings	○ 0 Crossings	● 3 Minor Crossings 2 Major Crossings	● 2 Minor Crossings 2 Major Crossings
Earthwork Requirements	○ Minimal Cut and Fill Level Terrain	● Significant Excavation Cuts into hill	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain	○ Minimal Cut and Fill Level Terrain
Quintero Rd Access	○ No Impact	○ No Impact	● Realign or add TI on SR 74	No Impact	● Realign or add TI on SR 74
Traffic /Transportation Planning					
Meets Existing SR 74 Connection Plans	○ Yes	○ Yes	● No; Poor SR 74 TI spacing	○ Yes	◑ No; Requires adjustment
City of Peoria General Plan	○ OK	○ OK	⊗ Poor SR 74 spacing	○ OK	⊗ Requires adjustment
Access Mgmt Strategies Required	○ No access	○ No access	○ No access	○ No access	○ No access
Environmental Impacts					
Negative Impact on Biological Resources	◑ No federally listed species identified Desert tortoise may be present	○ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present	◑ No federally listed species identified Desert tortoise may be present
Evidence of Hazardous Materials	○ No hazardous materials identified	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified Household waste dumping on 167th Ave	○ No hazardous materials identified
Impact to 4f Properties	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified	○ No 4(f) properties identified
Presence of Recorded Cultural Sites	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts.	◑ Numerous sites in area Class III survey needed to determine impacts	◑ Numerous sites in area Class III survey needed to determine impacts
Utility Considerations					
Utility Relocation or Accommodation	◑ Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Existing water; Future water & wastewater coordination	◑ Future water & wastewater coordination
Right-of- Way (ROW) Requirements					
New Public ROW Requirements	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)	● 150 ft ROW (Peoria)
Socio-Economic					
Impact to State Land	○ Minimal	○ None	◑ S/O Marisol Ranch	○ Minimal	○ None
Impact to Improved Properties	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts	○ Zero Residential Impacts
Impact to Proposed Development	◑ ¼ mile west of developments	○ Direct access to developments	● ½ mile+ west of developments	◑ ¼ mile west of developments	● ½ mile west of developments
Land Use/Zoning Compatibility	○ Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans	○ Compatible with General Plans	⊗ Not Compatible with General Plans
Public Opinion					
Public Acceptance	○	○	○	○	○

LEGEND: ○ No/Minimal Impact/Issue ◑ Modest Impact/Issue ● Significant Impact/Issue ⊗ Fatal Flaw

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Maricopa County Department of Transportation

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

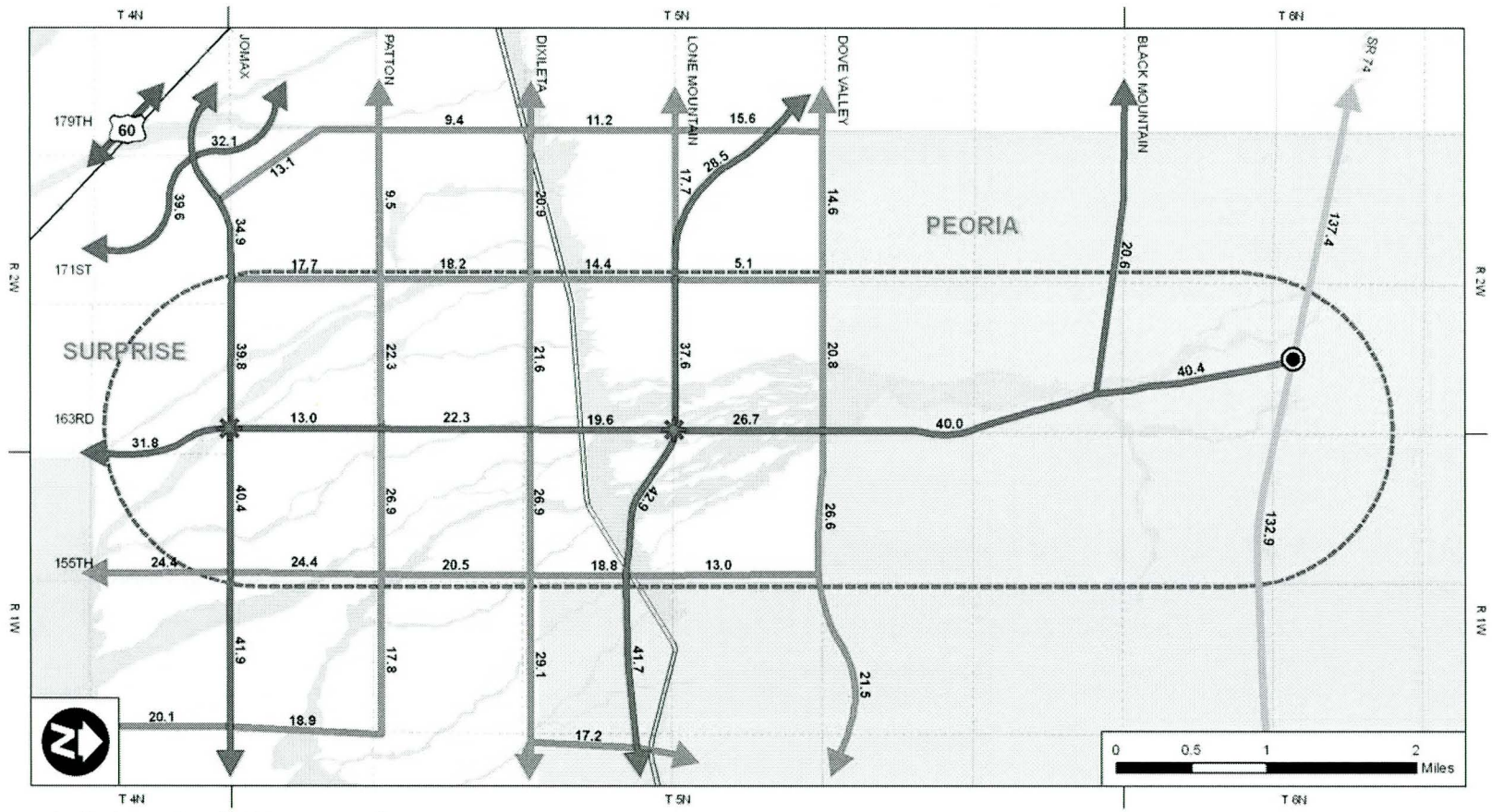
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road



Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.

Sources: MCDOT, MAG, and the CK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Major Design Feature
- Traffic Interchange
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area

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Maricopa County Department of Transportation

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163rd Avenue

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Jomax Road to Dove Valley Road

163rd Avenue

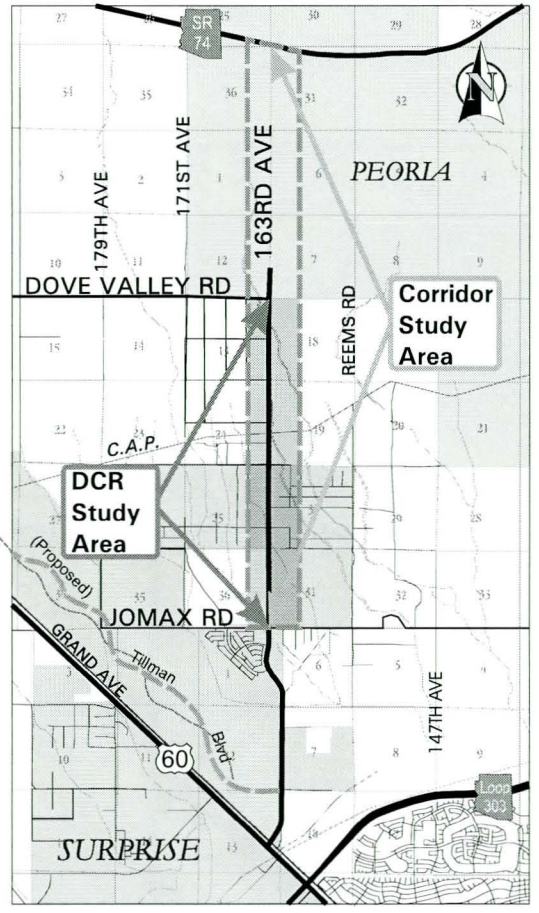
Corridor Improvement Study

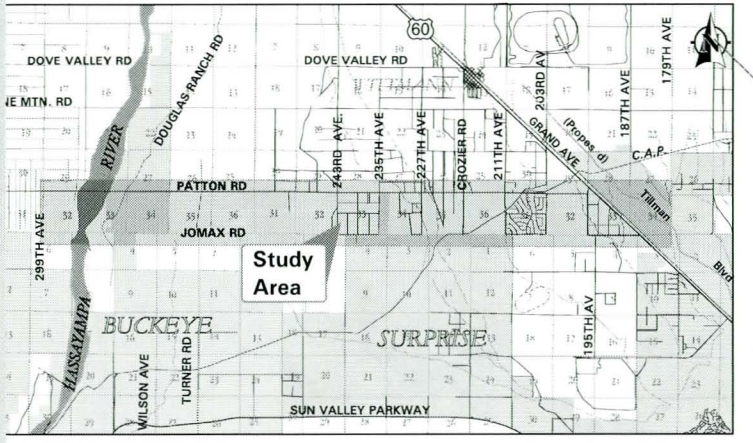
Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

(50% Complete)



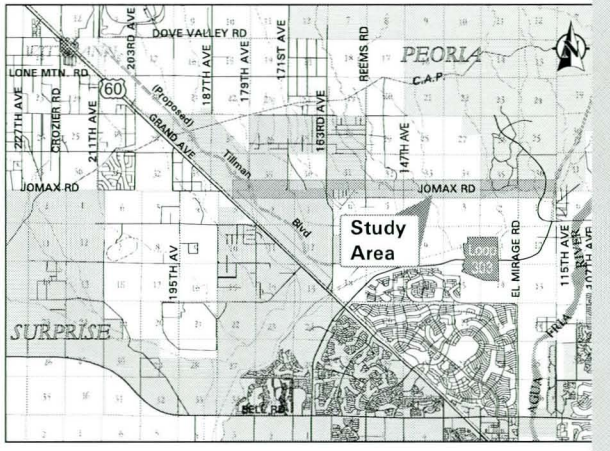


Patton/Jomax

Corridor Improvement Study

299th Avenue to 179th Avenue

(90% Complete)



Jomax East

Corridor Improvement Study

Tillman Boulevard to SR Loop 303

(65% Complete)

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Maricopa County

Department of Transportation

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The Right System The Right Time The Right Cost

163rd Avenue

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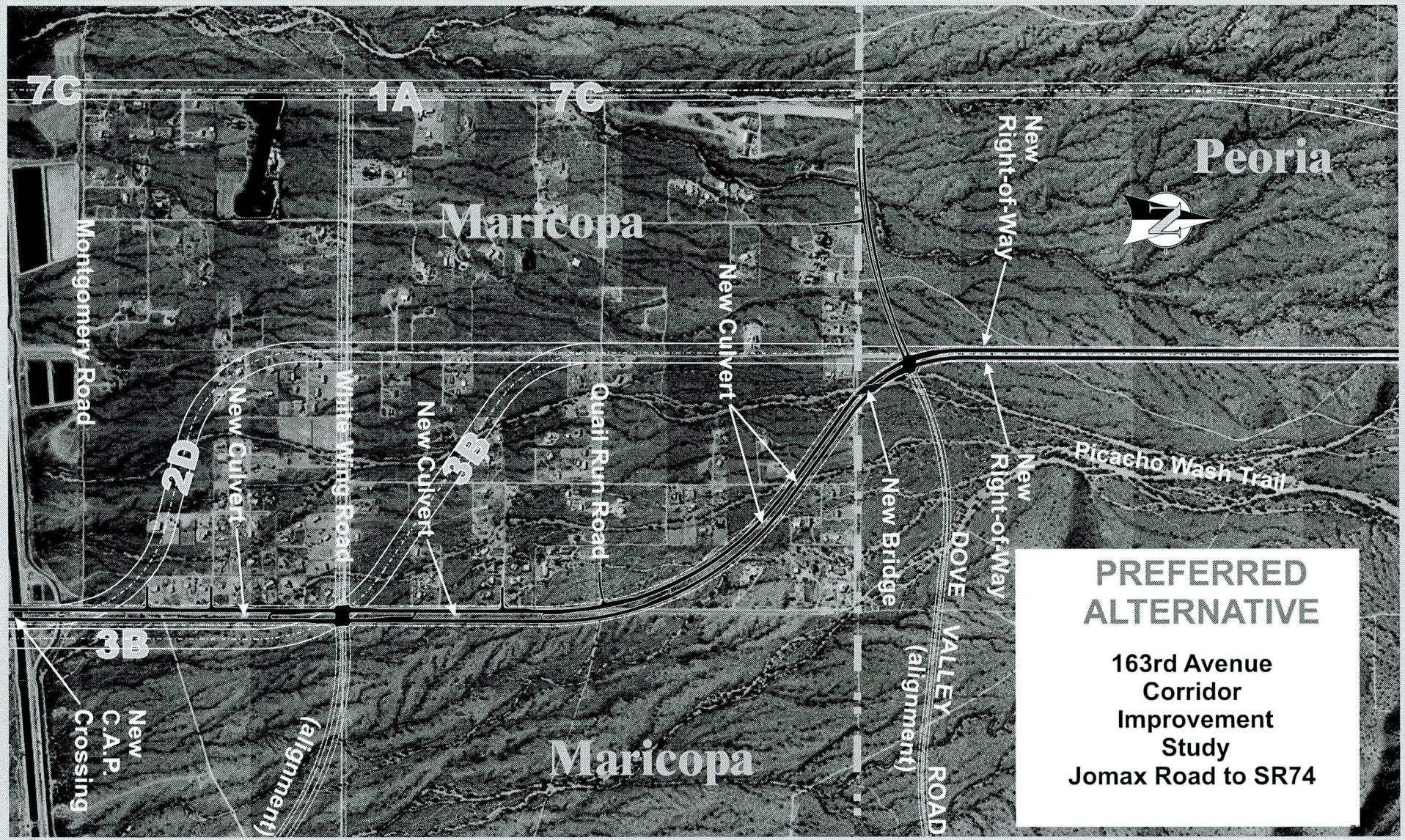

PREFERRED ALTERNATIVE

163rd Avenue Corridor Improvement Study Jomax Road to SR74

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Department of Transportation

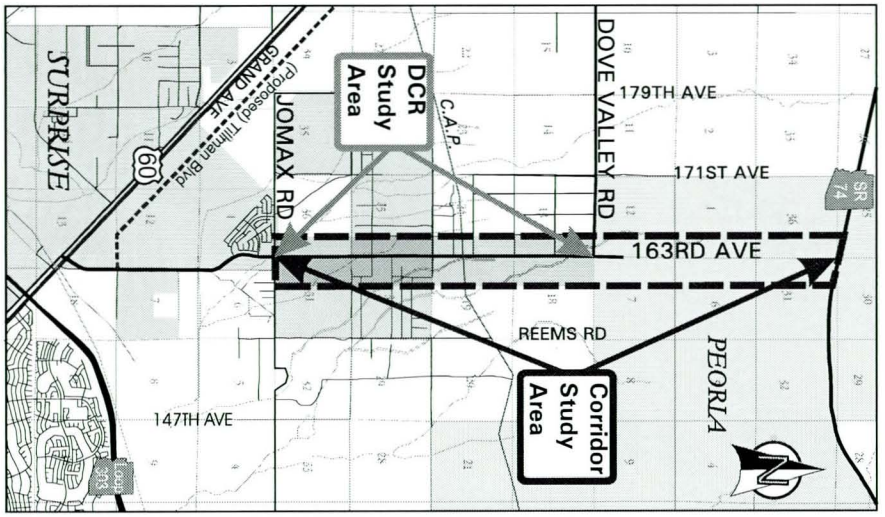
Future Activities and Considerations for Future Corridor Development

The DCR will develop 30% design plans for the segment between Jomax Road and Dove Valley Road. This work is now underway and focusing on the preferred alignment with completion slated for the end of 2007.

As the preferred alternative becomes better defined through more in-depth phases of project development, additional elements will be addressed that more fully account for the needs and impacts of future projects within the context of the current and future settings along the 163rd Avenue corridor.

The following are key issues identified during this study's public involvement process that should be taken into consideration by individual jurisdictions as the recommendations of this study are carried forward into design and implementation:

- **Project Funding.** There is currently no funding programmed for construction. It can be anticipated that area developers will participate as part of project requirements.
- **Access Management Strategies**. MCDOT, the cities of Surprise and Peoria have specific expectations regarding roadway access. Specific strategies should be implemented to ensure a seamless roadway with efficient traffic flow, safety and good access to local land uses.
- **Environmental Impacts and Noise Mitigation**. Specific impacts on the local environment will require further evaluation in future project development.
- **New Right-of-Way Requirements**. Final roadway configuration will determine how much land will need to be acquired.
- **Landscaping plans**. Final project design will specify the type of landscaping to be used.
- **Drainage Structures**. Because the future roadway corridor crosses a number of washes and lies partly in a flood zone, it will be critical to ensure the roadway is designed to provide "all weather" crossings during major storm flows. Bridges along the new roadway will be designed during final roadway design.
- **Bicycle, Pedestrian and Transit Access**. Future projects will be designed to accommodate alternative modes of travel and provide access to trails and neighborhoods in the area.
- **Corridor Traffic Management.** ITS (Intelligent Transportation System) will control operation of traffic between jurisdictions and differing intersection configurations.
- **Jurisdictional Coordination.** As with the overall traffic control, implementation of different corridor improvements and access management concepts will need to be coordinated to ensure a safe, seamless and efficient transportation facility.



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163rd Avenue

Corridor Improvement Study
Jomax Road to SR 74
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MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

"Findings/Recommendations" Public Meeting

Maricopa County Department of Transportation — July 17, 2007

BACKGROUND

In 1997, Maricopa County Department of Transportation (MCDOT) completed a Comprehensive Plan and Transportation System Plan (TSP) for the unincorporated areas of the County. The TSP included recommendations to improve the existing County arterial road network to meet future transportation demands resulting from projected growth and development county-wide. MCDOT's TSP recommendations were considered in the development of the 2004 Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP).

In direct response to the rapid growth being experienced in northwestern Maricopa County, the RTP identified the need to designate the future roadway alignment for 163rd Avenue between Grand Avenue (US 60) and SR 74.

MCDOT is conducting this current Corridor Improvement Study (CIS) for the portion of 163rd Avenue between Jomax Road and SR 74 (beyond the private development improvements). As part of this study, a more detailed Design Concept Report (DCR) is being conducted on the segment of 163rd Avenue between Jomax Road and Dove Valley Road to address imminent development.

The study segment of 163rd Avenue being evaluated includes three different jurisdictional planning areas and is classified as a future Principal Arterial by MCDOT, a future Parkway by Surprise and as an Arterial by Peoria (all six-lane divided roadways). Roadway construction funded by private development is currently underway on the southern two-mile segment of 163rd Avenue between Grand Avenue and Jomax Road.

CORRIDOR DESCRIPTION

The 163rd Avenue corridor serves northwestern Maricopa County through the cities of Surprise and Peoria. Existing land use south of Dove Valley Road is single family residential on large lots. Between Dove Valley Road and SR 74, the land is primarily undeveloped.

Currently, 163rd Avenue between Jomax Road and Dove Valley Road is a two-lane paved roadway that is intersected by unimproved cross-streets that serve local residential development. North of Dove Valley Road, the roadway is an unimproved dirt road built largely to provide access for waterline construction to development north of SR 74.

STUDY PURPOSE

An agreed-upon plan for this future roadway corridor will ensure regional connectivity, consistent roadway features and standards through the cities of Surprise and Peoria, and ensure adequate right-of-way preservation along the entire corridor.

The purpose of this study is to develop a consensus-driven vision among partner jurisdictions for 163rd Avenue between Jomax Road and SR 74. The study goal is to establish the ultimate roadway alignment, identify existing corridor deficiencies and future requirements and to determine the parameters for consistent roadway design and performance criteria that meet established future needs.

The recommended corridor improvements include future roadway type, number of lanes, roadway cross-section and ultimate right-of-way requirements, traffic control measures with an access management plan, and drainage improvements to safely accommodate future travel demands.

This study will provide the County and other responsible jurisdictions with a future "footprint" of 163rd Avenue along with a recommended timeframe for the implementation and phasing of roadway improvements.

The DCR for the four-mile segment between Jomax Road and Dove Valley Road will identify the preferred roadway alignment and develop 30% design plans to help the City of Surprise in managing current development access issues. The draft DCR will also be presented to the public for input during a public meeting currently scheduled for October 2007.

For more information, contact Renee Probst at (602) 506-8622 or write to her at:
MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: ReneeProbst@mail.maricopa.gov.

Study Need
- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals
- Create a "footprint" for 163rd Avenue and develop an implementation plan
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

Study Objectives
- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish future roadway design criteria
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road (DCR)
- Coordinate with other current ongoing area studies to ensure an integrated roadway network system

Study Issues and Challenges
- Incorporate regional and local travel
- Achieve optimum mobility/access balance for operational efficiency
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

STUDY APPROACH

The 163rd Avenue CIS is being carried out in two phases: a Planning Phase and an Engineering Phase.

The CIS Planning Phase:

The Planning Phase gathers general background information and prepares several reports (traffic analysis, drainage, utilities, environmental) leading to well-founded recommendations for improvements and longer-term needs along 163rd Avenue. During the Planning Phase, meetings are conducted with affected jurisdictions, agencies, stakeholders and the impacted public to form a broad consensus of the overall needs and vision of the corridor.

Based on the needs identified, alternatives are developed and evaluated for technical and environmental feasibility, public acceptability and economic viability.

CIS Engineering Phase:

The Engineering Phase of the study followed the selection of a preferred alternative. Preliminary engineering design plans, right-of-way requirements and estimated construction costs are prepared for near-term and long-term roadway improvements. Roadway construction phasing priorities, along with policies and guidelines to preserve the intended function of the future roadway, are developed.

With the selection of the preferred roadway alignment, the more detailed DCR phase of the study will proceed to evaluate 163rd Avenue between Jomax Road and Dove Valley Road. The report will develop 30% design plans that specify roadway type, alignment and access points. The DCR will also define crossing drainage ways (bridges or culverts) and generate a more detailed cost estimate to allow accurate budgeting for construction.

Project Stakeholders
- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

Study Milestone Schedule

Field Review	September 2006
Scoping Public Input Meeting	November 2, 2006
Alternatives Analysis	
Public Input Meeting	**March 6, 2007**
Planning/Engineering CIS	April 2007
Design Features CIS	May 2007
Findings & Recommendations (Preferred Alignment)	
Public Input Meeting	**July 2007**
Draft Report Submittal CIS	July 2007
Final Report Submittal CIS	September 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
DCR Public Input Meeting	**October 2007**
Draft Report Submittal DCR	November 2007
Final Report Submittal DCR	January 2008

Public Involvement

Gaining consensus amongst the agencies and the public is critical to the success of the study and future implementation of its recommendations to provide a safe and efficient roadway for the long term. Four public input meetings are held during the course of the study process. The first "Public Scoping" meeting, held in November last year, provided the public with an opportunity to inform the project team about the study area and local transportation needs. The "Alternatives Analysis" public input meeting held in March this year presented the corridor alternatives advanced for further evaluation for public review and comment. The third "Findings & Recommendations - Preferred Alignment" public input meeting (July 17, 2007) presents the study findings and a recommended roadway and corridor selection along with generalized access management strategies for public review. A fourth and final public input meeting will be conducted to gather input on the draft DCR for the segment of 163rd Avenue between Jomax Road and Dove Valley Road in October 2007. Your input during each phase of study development is very important.

CIS Draft Findings & Recommendations:

Current Activities and Key Technical Findings

Since the "Alternatives Analysis" public input meeting (March 2007) which presented possible corridor alternatives (options), the 163rd Avenue CIS team has completed the necessary technical analyses, evaluated the findings, and based upon the previously identified objectives, has selected a preferred roadway alignment. This alignment is now being carried forward as the basis of more detailed design efforts in the DCR phase (Jomax Road to Dove Valley Road).

In both Peoria and Surprise General Plans, 163rd Avenue is designated as a future six-lane divided "Parkway" with provision for right and left turns at major intersections. The Peoria parkway right-of-way width requirement is 150-feet. Peoria uses standard intersections with all turn lanes concentrated at the intersection and managed by traffic signal.

The required Surprise parkway right-of-way width is 200-feet, 50-feet greater than City of Peoria's parkway right-of-way width requirement. The additional roadway right-of-way width (50') requirement within the City of Surprise jurisdiction is necessary to accommodate the "indirect left turn" traffic control measure currently under evaluation for implementation on portions of the 163rd Avenue corridor within Surprise. Under this access plan, left-turn movement is eliminated at the intersection. Instead, motorists make a U-turn at a point beyond the intersection then return to the intersection from the opposite direction and turn right in the desired direction.

Selection of the "Preferred Alignment"

The 163rd Avenue corridor alignment alternatives cover a broad area bounded by 175th Avenue alignment on the west side of the corridor and 163rd Avenue alignment on the east side of the corridor. The primary basis for the selection of a preferred roadway alignment is to identify an efficient "path" through the area that has the least possible impact on existing development and homes, drainage paths, utilities and environmentally sensitive areas. The preferred alignment must also be economically feasible (affordable to build).

Each of the advanced alignment alternatives sought to balance corridor attributes and impacts (positive or negative). Through additional analysis of the advanced alternatives, the preferred alignment alternative emerged as the option that minimized, mitigated or avoided negative impacts.

The preferred alternative follows the general alignment of 163rd Avenue between Jomax Road and Quail Run, then moves westerly to the 167th Avenue alignment between Quail Run and Dove Valley Road. This preferred alternative minimizes negative impacts to private properties and the need for expensive bridge structures at major drainage crossings.

Within the City of Surprise, between Jomax Road and Dove Valley Road, the roadway should consist of six travel lanes (three lanes each direction) in a 200-foot right-of-way corridor (to accommodate "indirect left-turn traffic control measure). Roadway widening will occur east of the existing western right-of-way line to avoid potential acquisition of improved properties. This alignment also avoids environmentally sensitive areas near the CAP canal.

North of Dove Valley Road to SR 74, within the City of Peoria, the future roadway should also consist of six travel lanes (three lanes each direction) in a 150-foot right-of-way corridor. As of yet there is no development in this reach and the primary concern is the most efficient traversing of major drainage courses such as the Padelford Wash. The preferred alignment along 167th Avenue at this point also aligns with the entrance to the Quintero development, a future grade separated traffic interchange at SR 74 under ADOT's plan.

Access Management Guidelines

Access Management strategy for 163rd Avenue will be further refined in the DCR currently underway as part of this study for the 163rd Avenue segment between Jomax Road and Dove Valley Road. In general, it will use a variety of techniques to manage roadway access. In Surprise, intersection treatments will incorporate the "indirect left-turn" concept. In Peoria, signalized intersections with traditional left-turn lanes will be implemented. In some cases, a frontage road system may be appropriate to augment local access. Throughout the corridor, left turns may be restricted to maintain roadway efficiency and enhance traffic safety.

Future Activities and Considerations for Future Corridor Development

The following are key issues identified during this study's public involvement process that should be taken into consideration by individual jurisdictions as the recommendations of this study are carried forward into design and implementation:

- **Project Funding.** There is currently no funding programmed for construction. It can be anticipated that area developers will participate as part of project requirements.
- **Access Management Strategies**. MCDOT, the cities of Surprise and Peoria have specific expectations regarding roadway access. Specific strategies should be implemented to ensure a seamless roadway with efficient traffic flow, safety and good access to local land uses.
- **Environmental Impacts and Noise Mitigation**. Specific impacts on the local environment will require further evaluation in future project development.
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- **Jurisdictional Coordination.** As with the overall traffic control, implementation of different corridor improvements and access management concepts will need to be coordinated to ensure a safe, seamless and efficient transportation facility.

MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

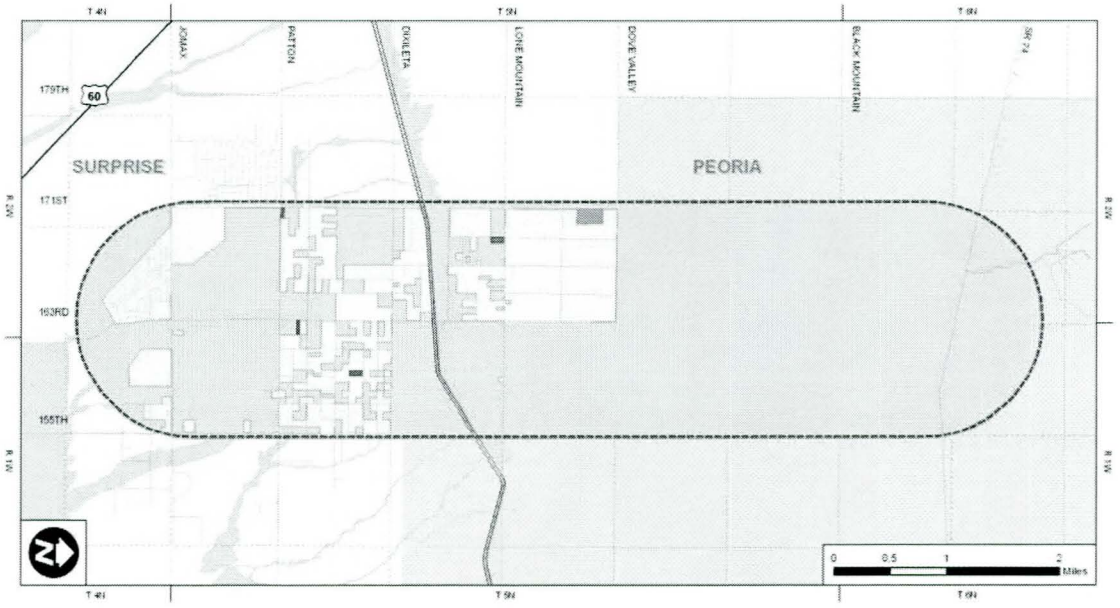
163rd Avenue

Corridor Improvement Study

Jomax Road to SR 74

Design Concept Report

Jomax Road to Dove Valley Road

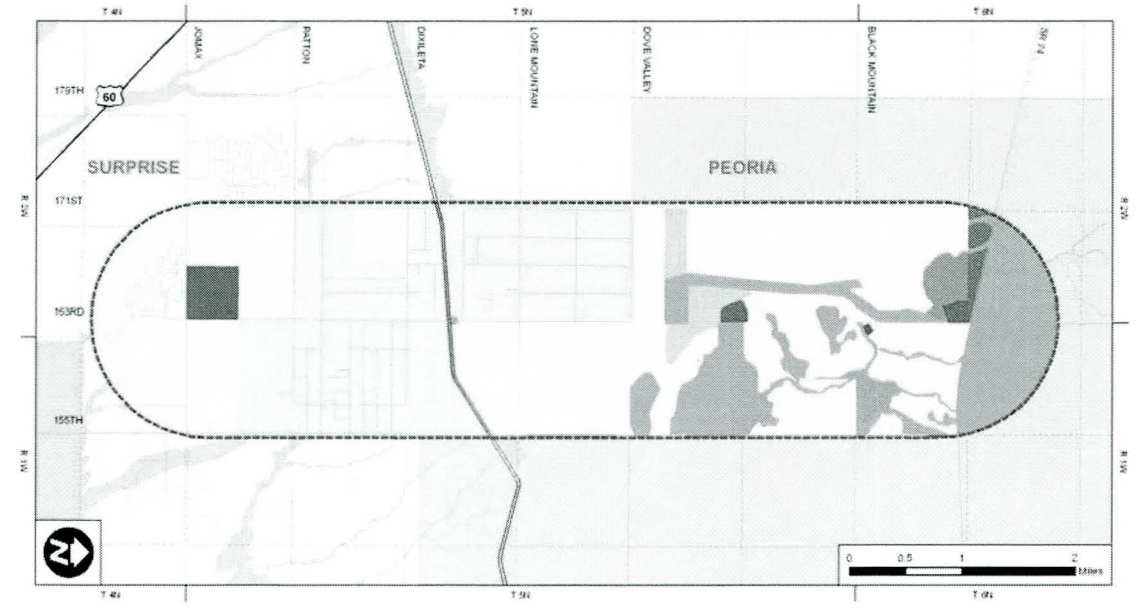


Existing Land Use

Sources: MAG and PB

Legend

- Residential
- Commercial
- Agriculture
- Public/Quasi-Public
- Vacant
- Water
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains



Future Land Use

Sources: City of Peoria and City of Surprise

Legend

Peoria Land Use

- Residential/Estate
- Residential/Low
- Residential/Medium
- Residential/Medium High
- Mixed Use
- Business Park/Industrial
- Community Commercial
- Park/Open Space
- Public/Quasi-Public

Surprise Land Use

- Rural Residential
- Low Density Residential
- Suburban Residential
- Commercial
- Open Space
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains

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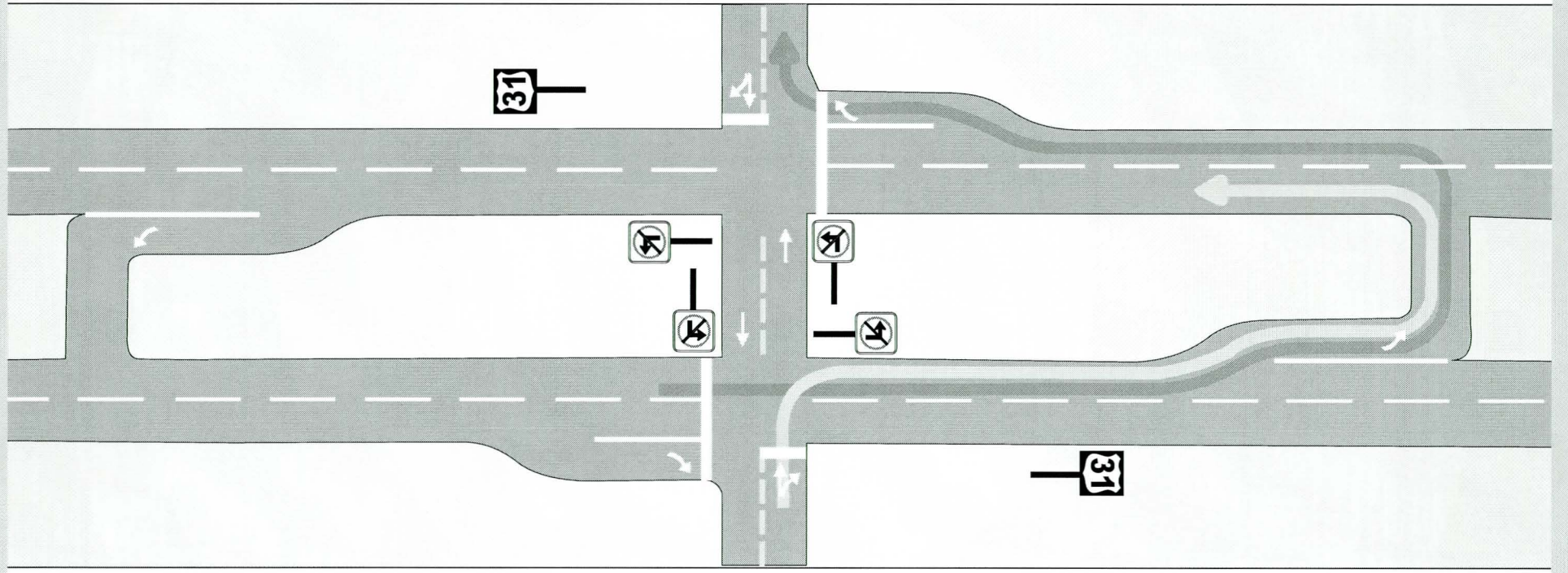
In-Direct left Turn



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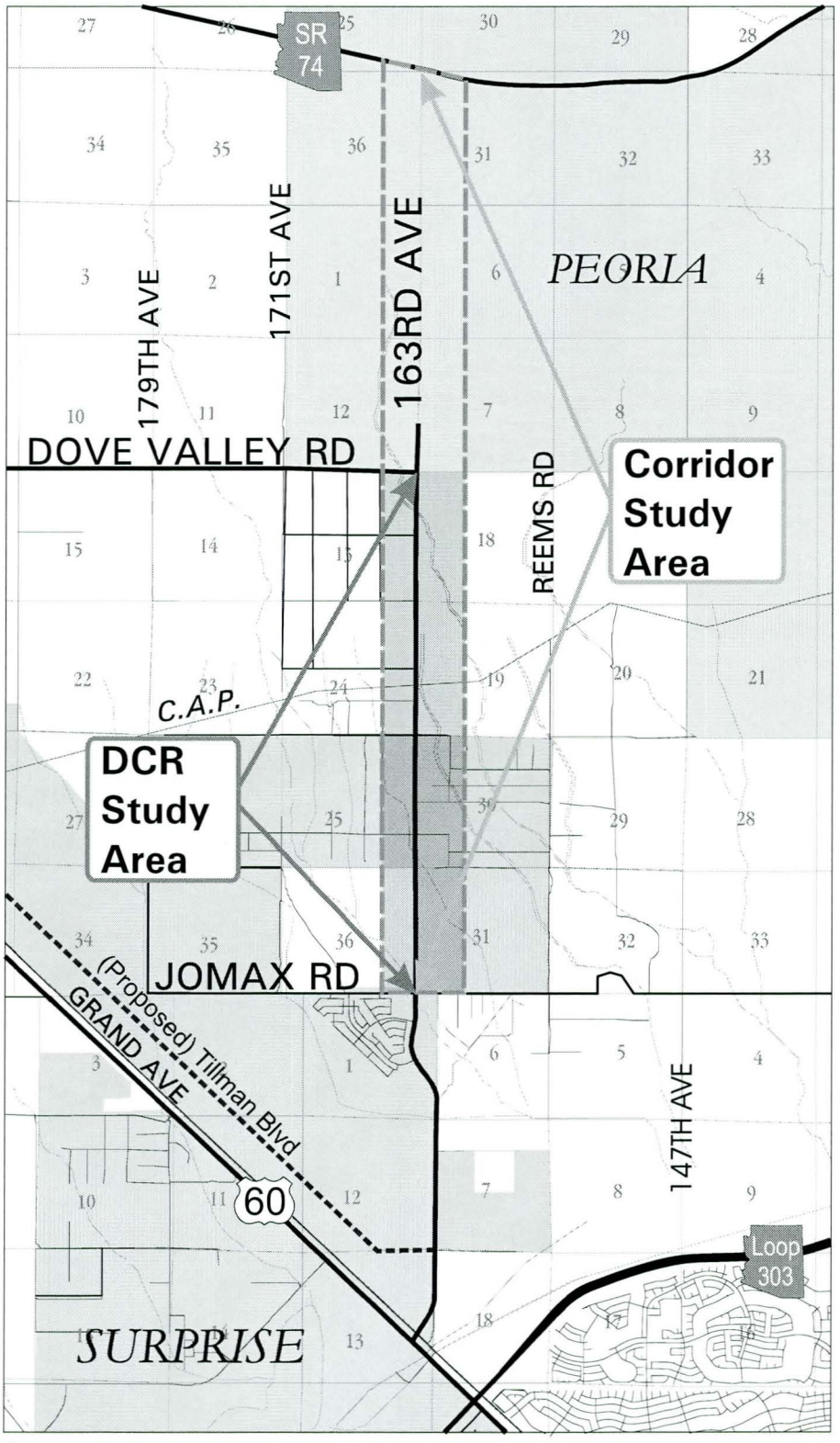

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Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

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The Right System The Right Time The Right Cost

163rd Avenue

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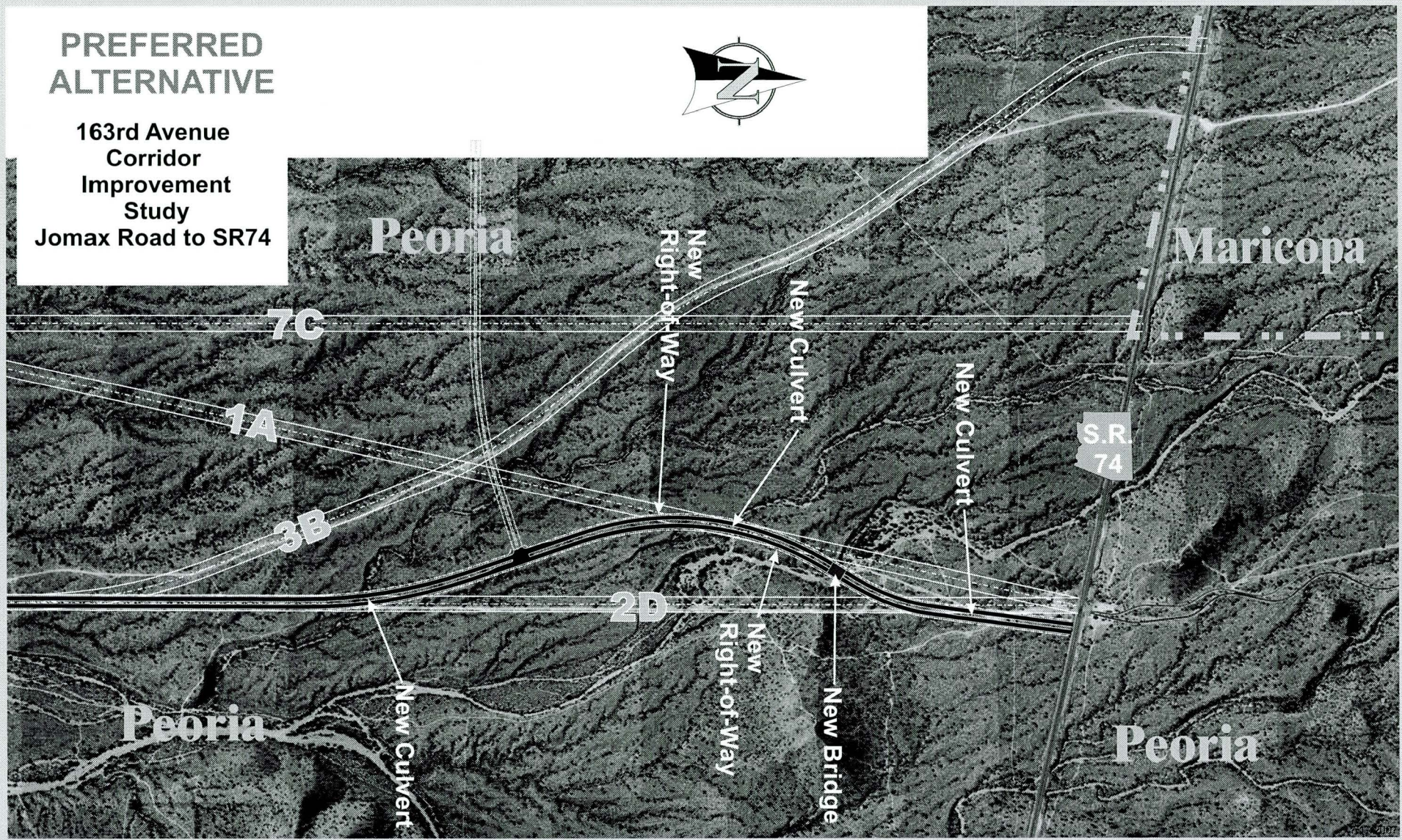
PREFERRED ALTERNATIVE

163rd Avenue Corridor Improvement Study Jomax Road to SR74



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163rd Avenue

Corridor Improvement Study

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Design Concept Report

Jomax Road to Dove Valley Road

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

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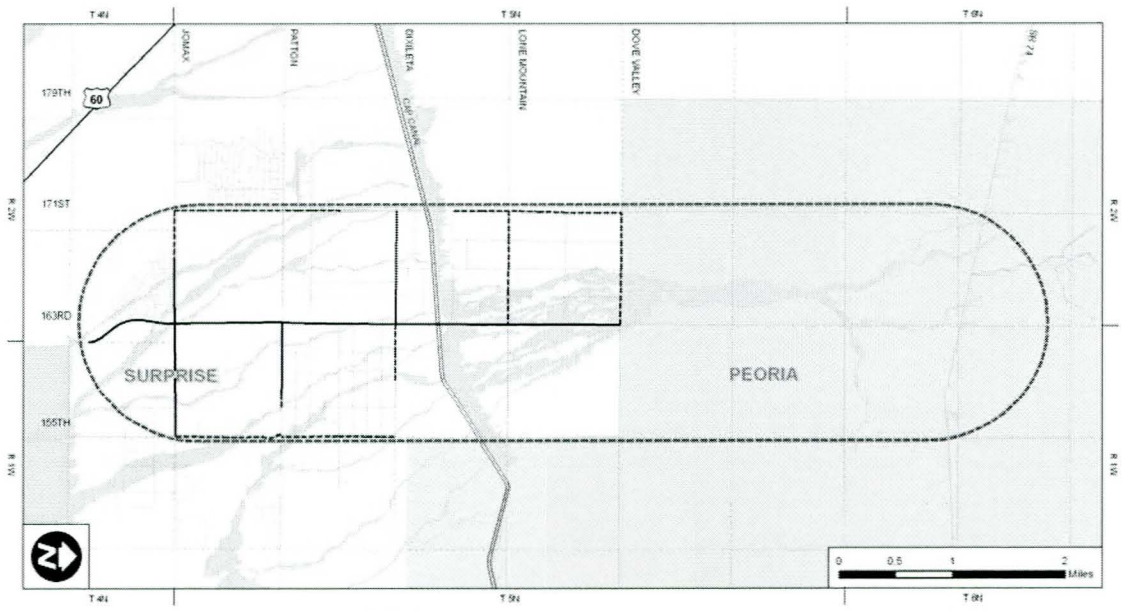
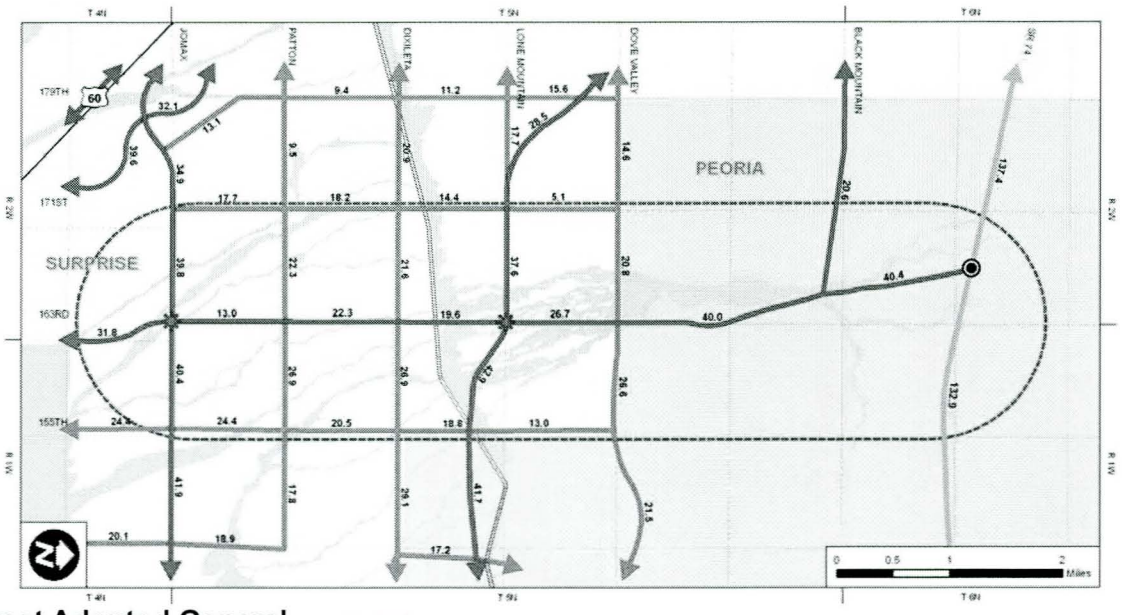


Existing Roadway Network

Legend

- Paved Roadway
- Unpaved Roadway
- Unpaved Residential
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area



Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.

Sources: MCDOT, MAG, and the CK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
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- Major Design Feature
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Study Milestone Schedule

Field Review	September 2006
Scoping Public Input Meeting	**November 2, 2006**
Alternatives Analysis Public Input Meeting	**March 6, 2007**
Planning/Engineering CIS	March 2007
Design Features CIS	May 2007
Draft Report Submittal CIS	June 2007
Findings and Recommendation Public Meeting	**July 17, 2007**
Final Report Submittal CIS	August 2007
Planning/Engineering DCR	September 2007
Design Features DCR	October 2007
Draft Report Submittal DCR	October 2007
Design Concept Report (DCR) Public Input Meeting	**October 2007**
Final Report Submittal DCR	January 2008

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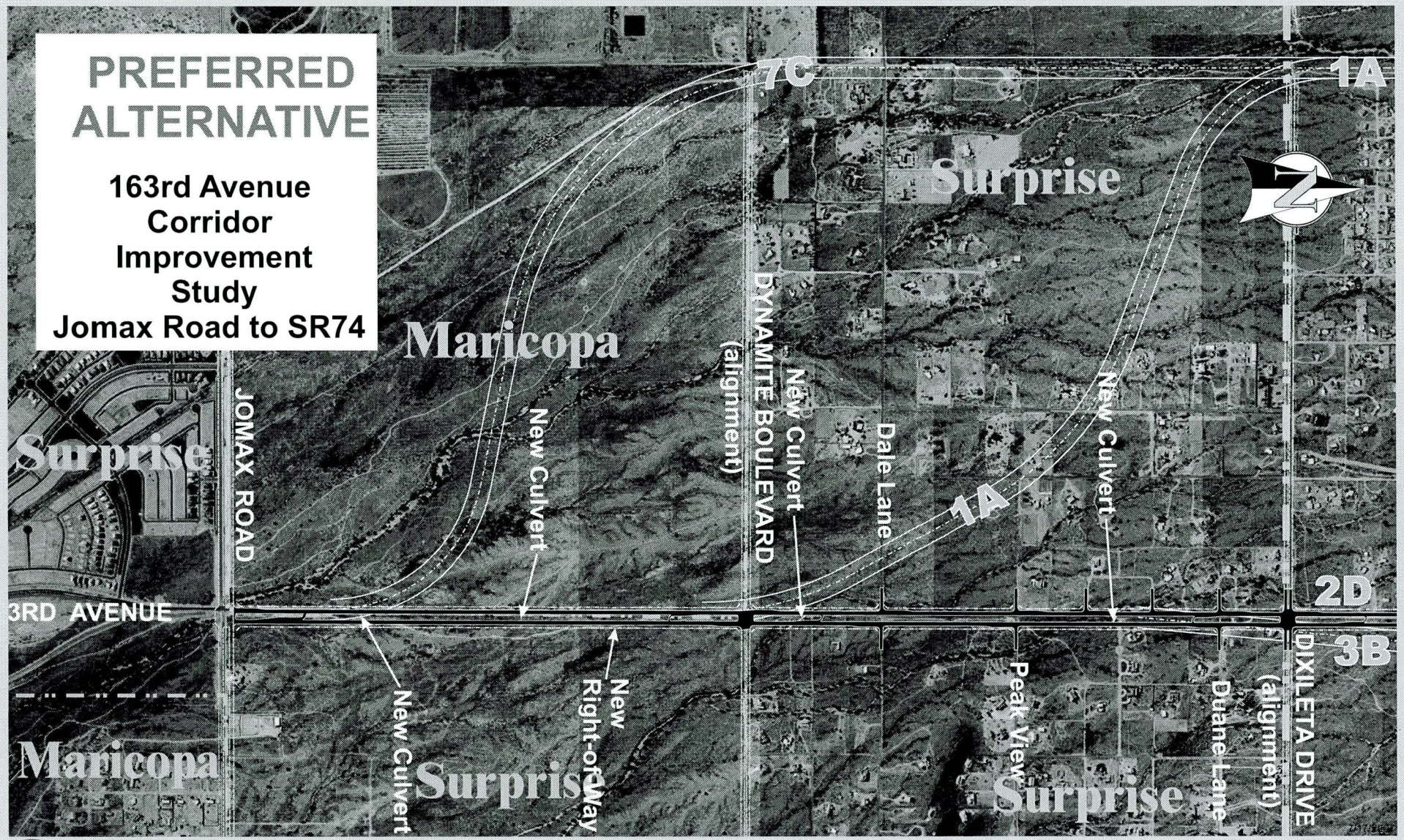

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Maricopa County
Department of Transportation

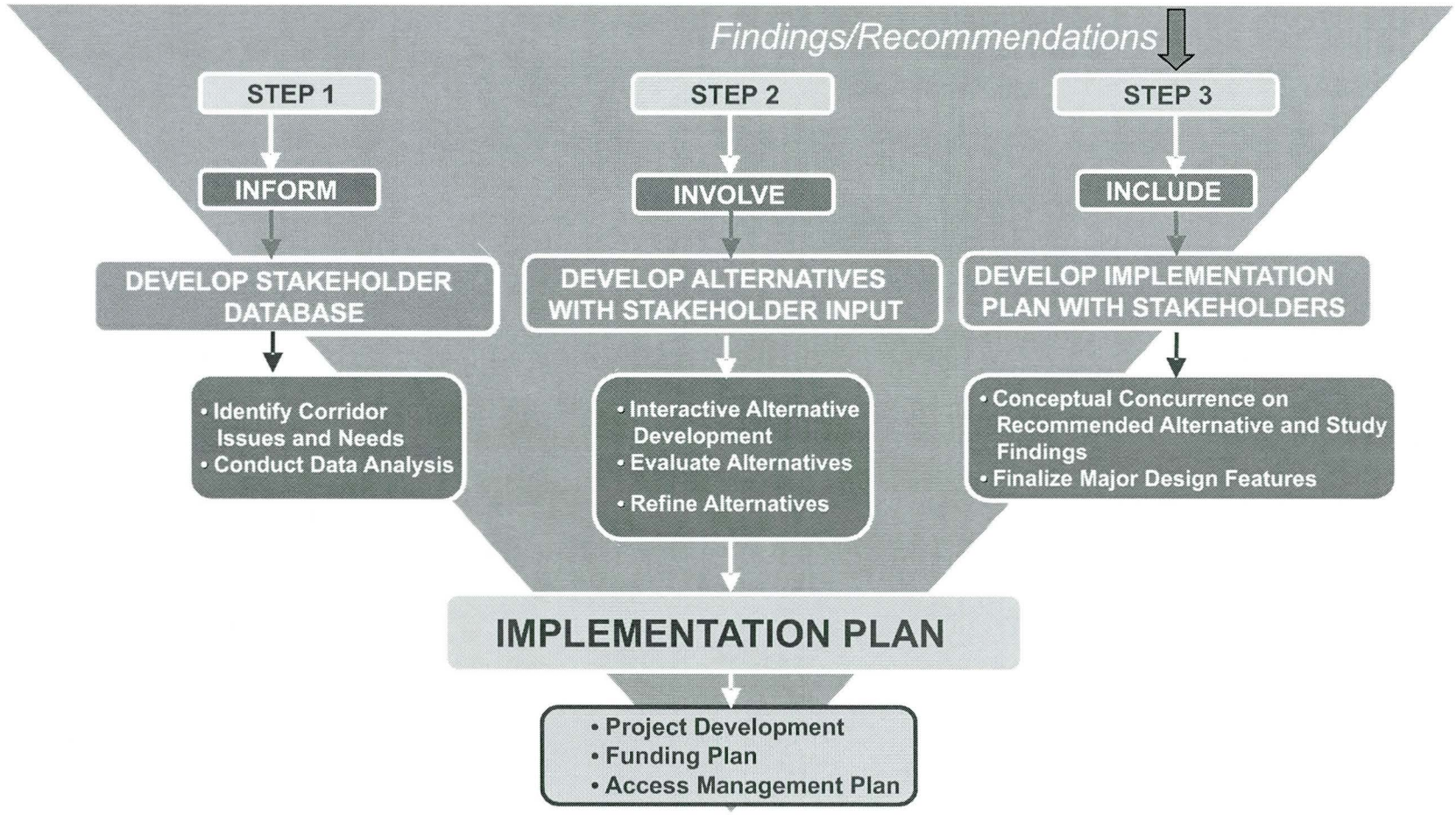
Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

MCDOT RightRoads PROGRAM
The Right System The Right Time The Right Cost

163rd Avenue
Corridor Improvement Study
Jomax Road to SR 74
Design Concept Report
Jomax Road to Dove Valley Road

Interactive Study Process



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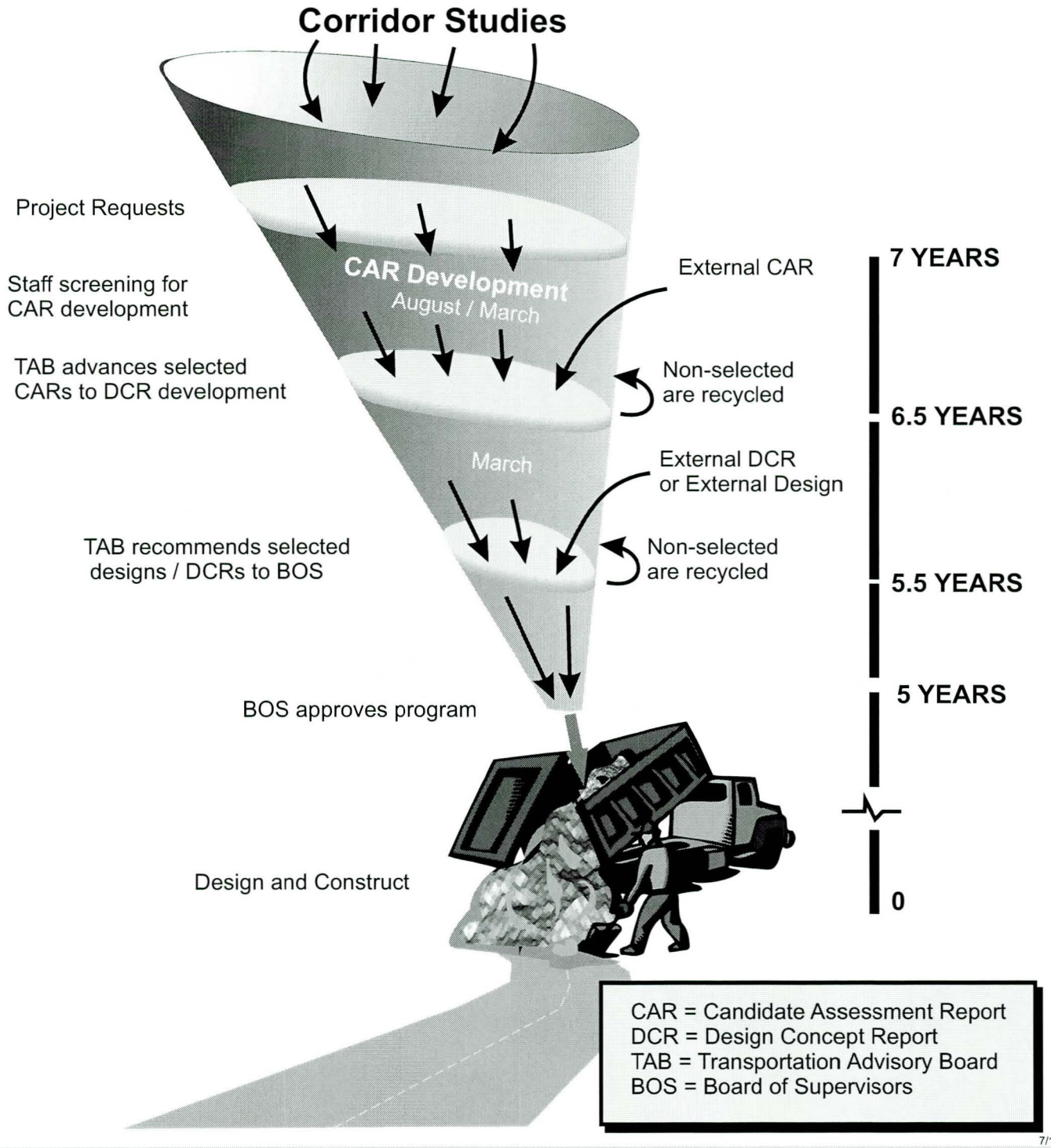
Department of Transportation

Transportation Improvement Program (TIP)



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MCDOT RightRoads PROGRAM

The Right System The Right Time The Right Cost

163rd Avenue

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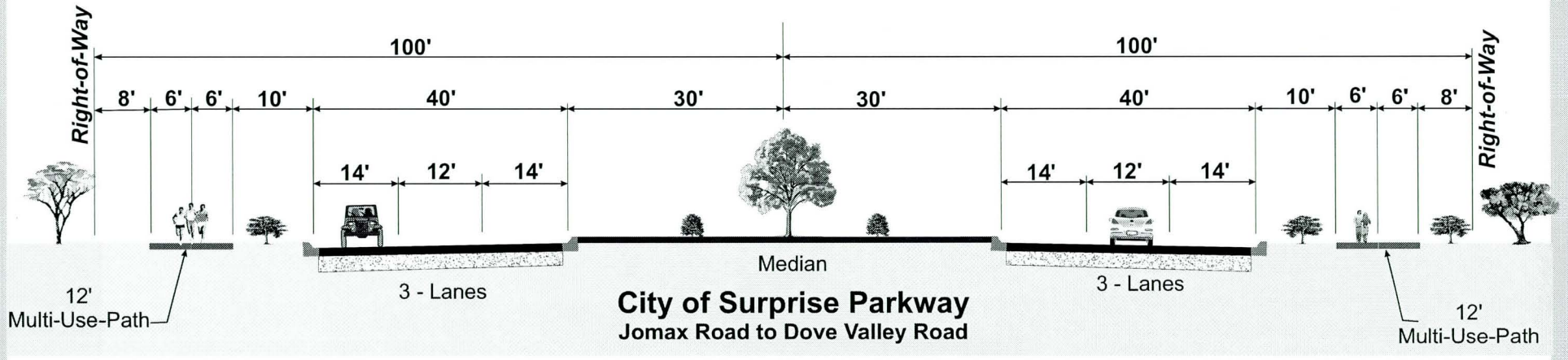
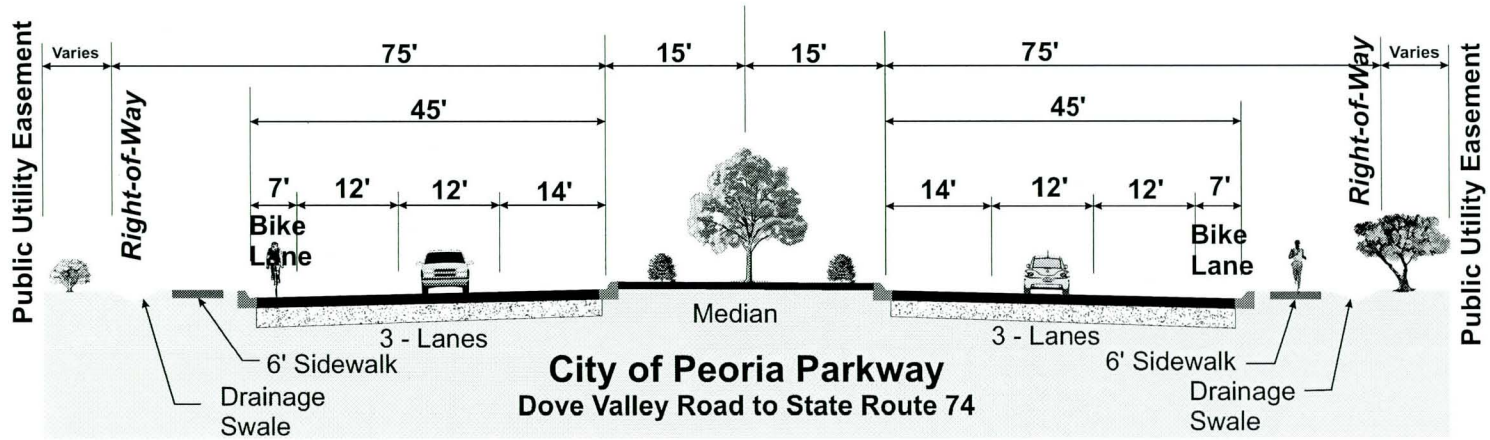


City of Surprise Parkway

Jomax Road to Dove Valley Road



City of Peoria Parkway

Dove Valley Road to State Route 74

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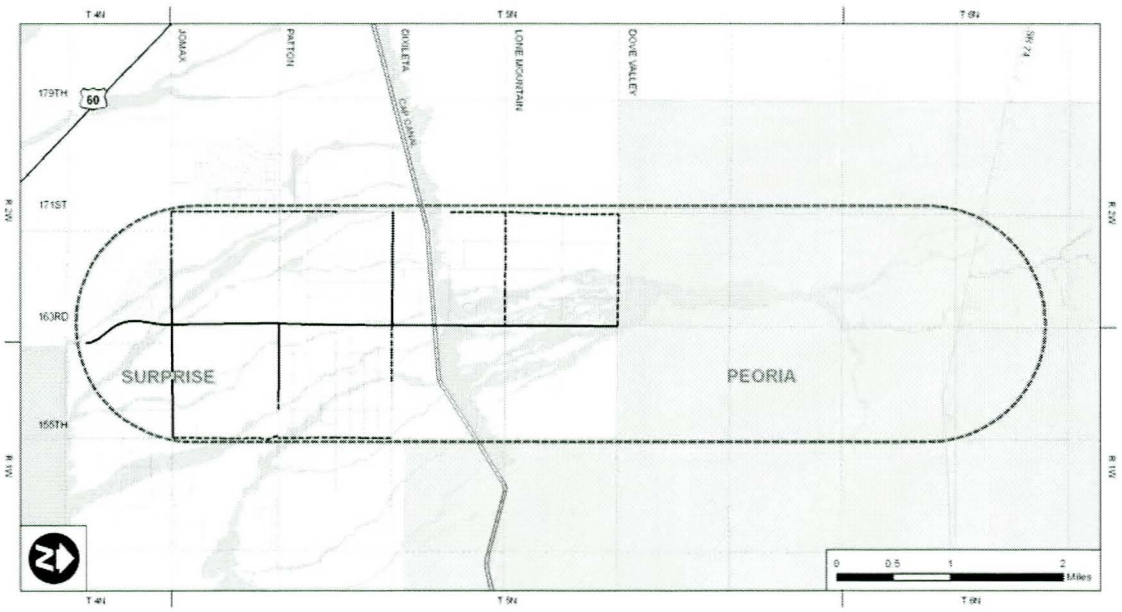
Maricopa County
Department of Transportation

163rd Avenue

Jomax Road to Dove Valley Road

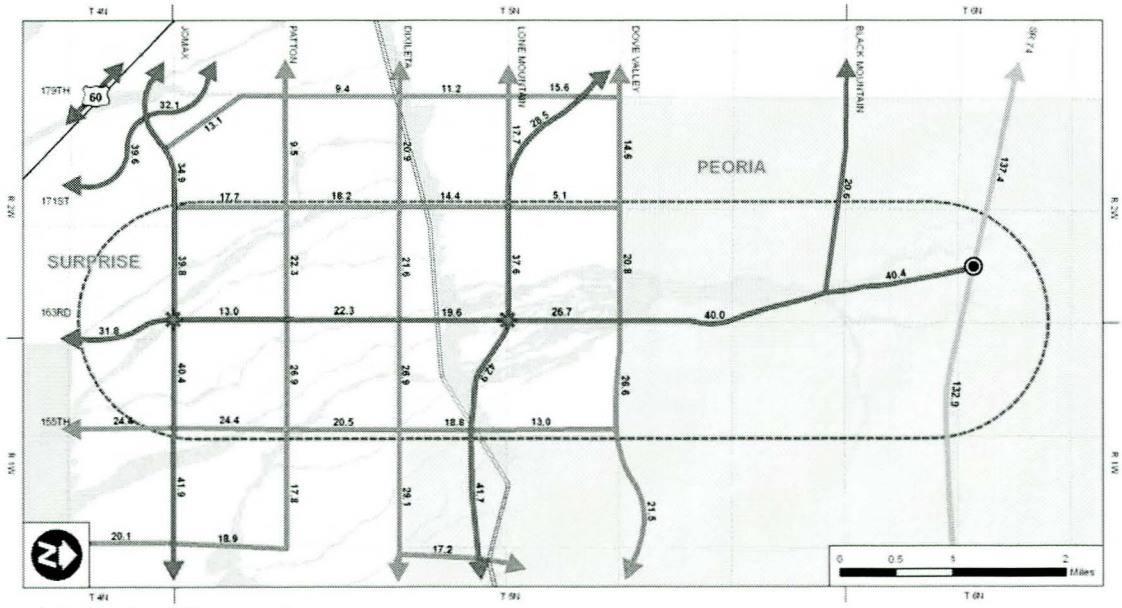
Design Concept Report



Existing Roadway Network

Legend

- Paved Roadway
- Unpaved Roadway
- Unpaved Residential
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area



Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.
Sources: MCDOT, MAG, and the DK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Major Design Feature
- Traffic Interchange
- Flood Plains
- Peoria Planning Area
- Surprise Planning Area

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Milestone Schedule

Corridor Improvement Study (CIS)

Field Review	September 2006
Scoping and Data Collection Phase	
Public Input Meeting	**November 2006**
Alternatives Analysis Phase	
Public Input Meeting	February 2007
Planning/Engineering	April 2007
Design Features	May 2007
Findings & Recommendations Phase	
Public Input Meeting	**July 2007**
Design Concept Report (DCR)	
Planning/Engineering	September 2007
Design Features	October 2007
Draft Report Submittal CIS & DCR	December 2007
DCR	
Public Input Meeting	**December 2007**
Final Report Submittal CIS & DCR	January 2008

12/12/2007

Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Central Arizona Project
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

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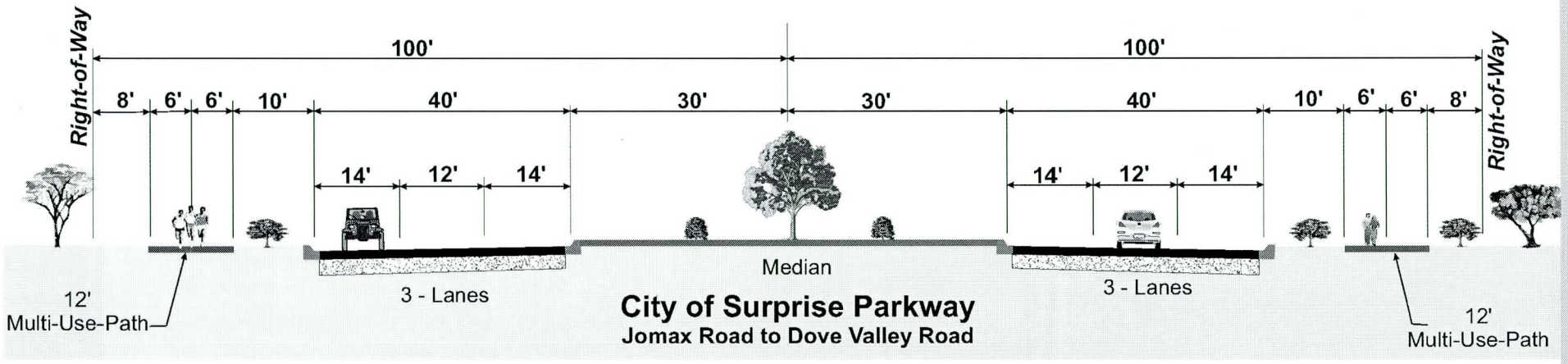
MARICOPA COUNTY
MCDOT
TRANSPORTATION
Right Road Right Time Right Cost

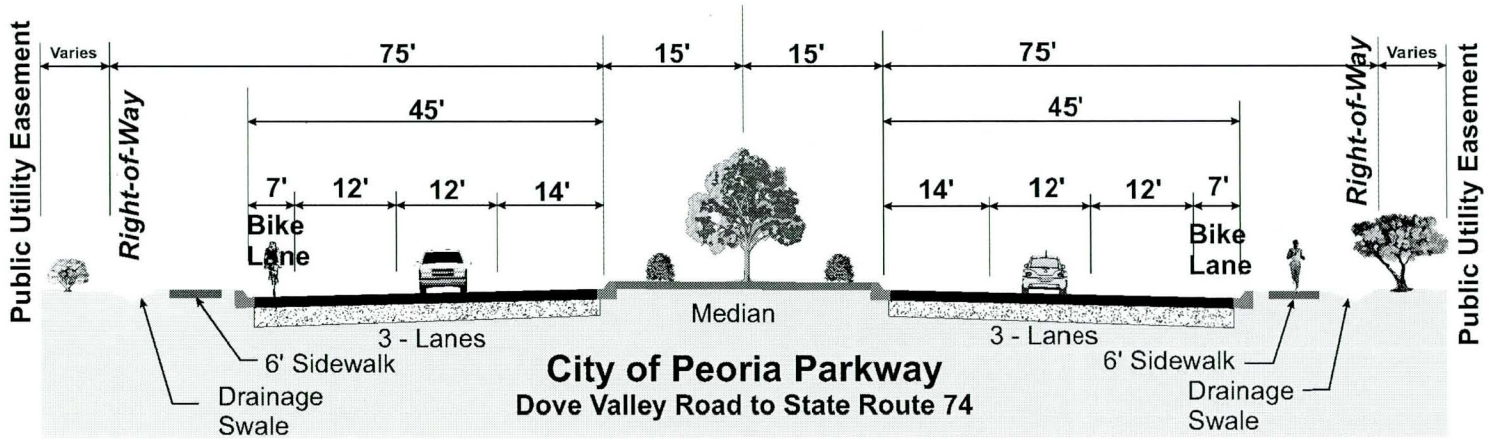
163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report



City of Surprise Parkway
Jomax Road to Dove Valley Road



City of Peoria Parkway
Dove Valley Road to State Route 74

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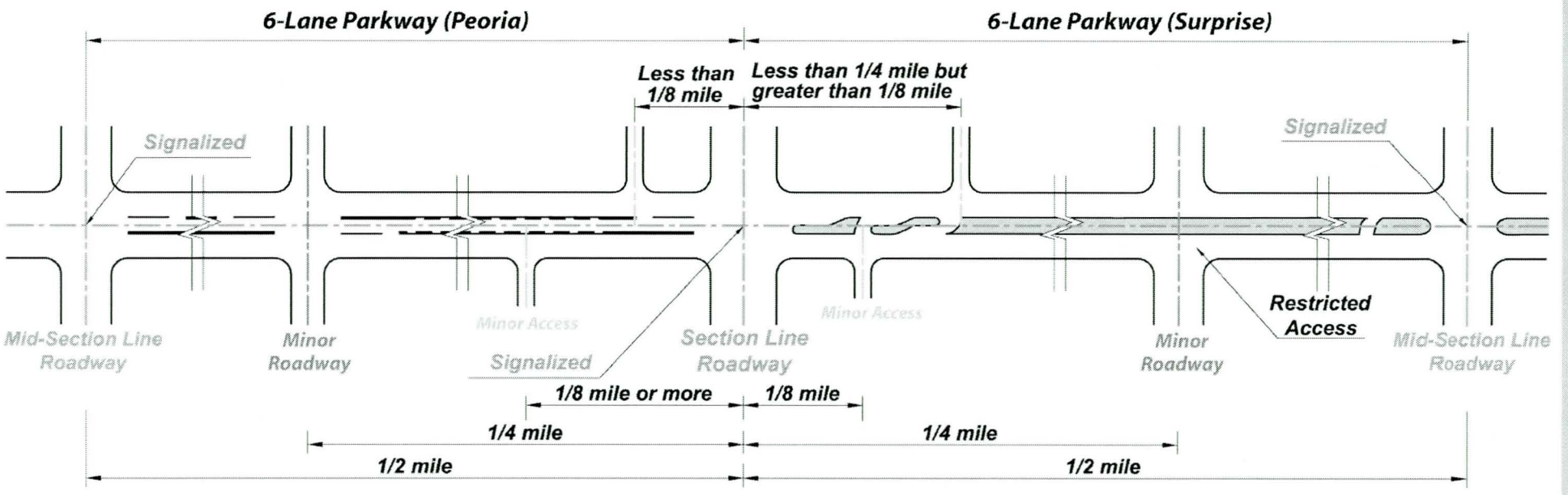
Maricopa County
Department of Transportation

Future Access Management



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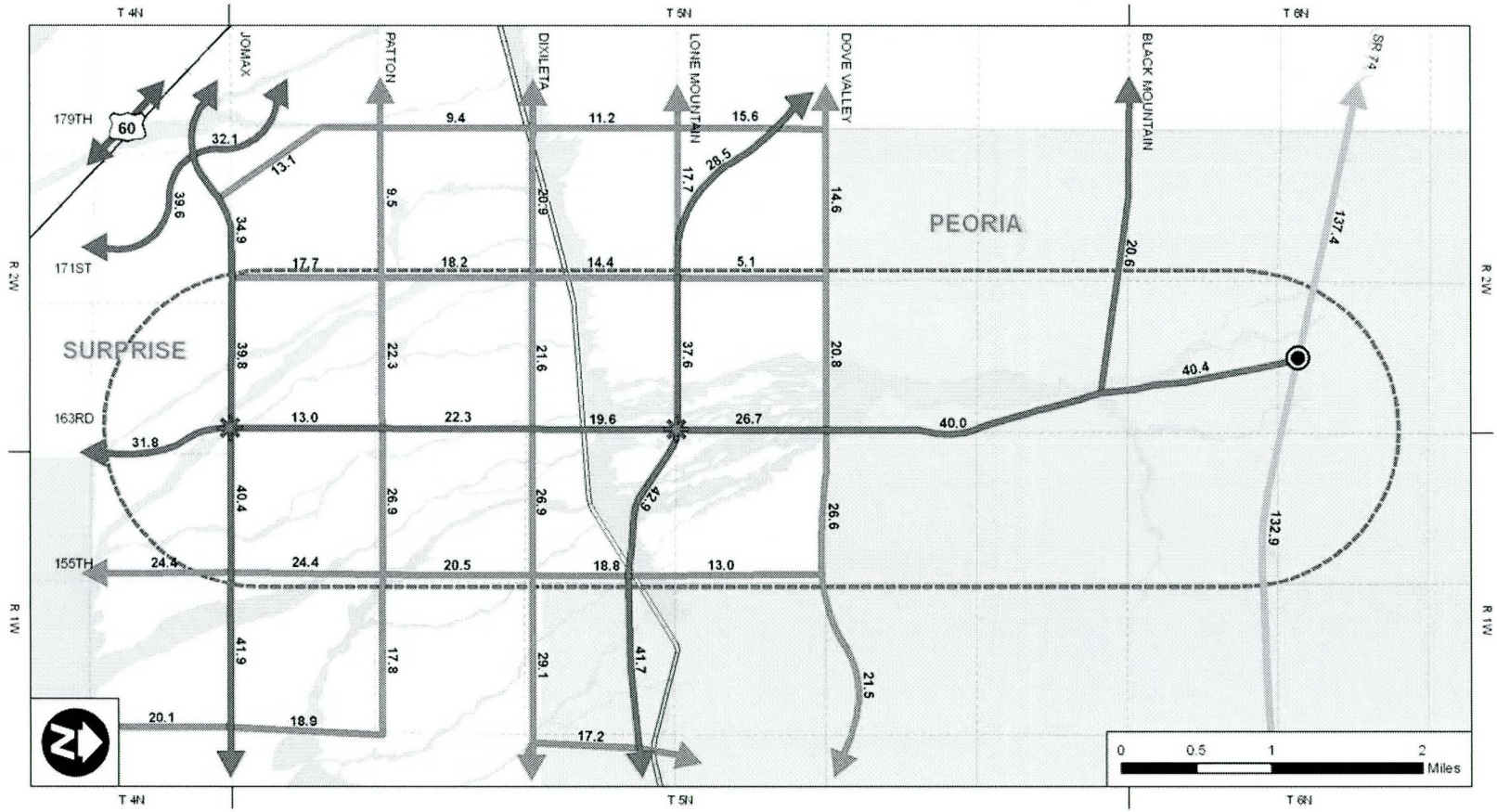
MARICOPA COUNTY MCDOT TRANSPORTATION

Right Road Right Time Right Cost

163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report



H-100

Northwest Adopted General Plans Roadway Network Projected Traffic Volumes

Note: Volumes are shown in thousands.

Sources: MCDOT, MAG, and the CK Group Inc.

Legend

- 6 Lane Freeway
- 6 Lane Expressway
- 6 Lane Parkway
- 6 Lane Major Arterial
- 4 Lane Minor Arterial
- Central Arizona Project (CAP) Canal
- Railroad
- Corridor Study Area
- Major Design Feature
- Traffic Interchange
- Flood Plains
- Peoria Planning Area
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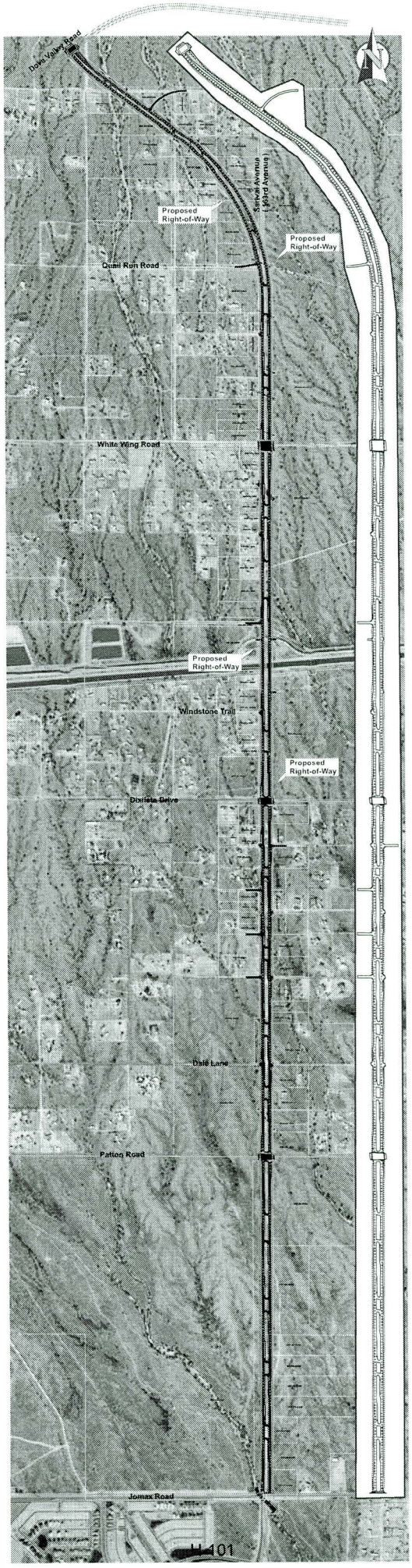

Dove Valley Road
Serva Avenue
(aka Serva Avenue)
Proposed
Right-of-Way
Proposed
Right-of-Way
Quail Run Road
White Wing Road
Proposed
Right-of-Way
Windstone Trail
Proposed
Right-of-Way
Division Drive
Dale Lane
Patton Road
Jomax Road

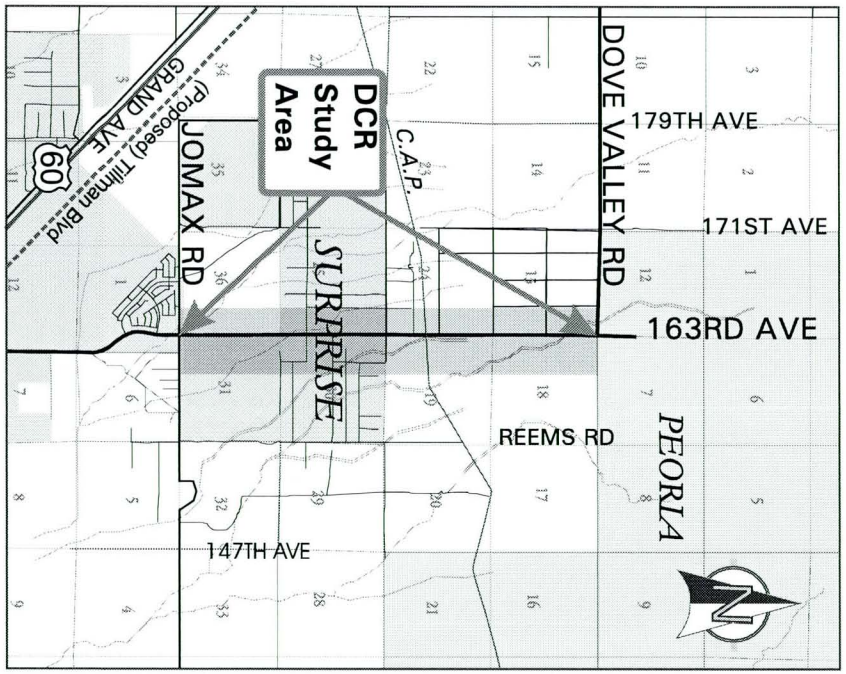
Project Funding

Funding for final design and construction of 163rd Avenue between Jomax Road and Dove Valley Road has not yet been identified. The DCR recommendations will be evaluated for inclusion in the MCDOT Transportation Improvement Program and the City of Surprise Capital Improvement Program. A portion of the funding is expected to come from adjacent developments as part of project requirements.

Public Involvement

Gaining consensus among the agencies and the public is critical to the success of the study and implementation of its recommendations to provide an efficient roadway for the long term. This is the final in a series of four public input meetings held during the course of this study process. The first "Public Scoping" meeting, held November 2006, provided the public with an opportunity to inform the project team about the study area and local transportation needs. The second meeting, held March 2007, presented corridor alignment alternatives for public review and comment. The third "Findings & Recommendations" (Preferred Alignment) public meeting, held July 2007, presented the CIS findings and a recommended roadway and corridor selection along with generalized access management strategies for public review.

This final meeting summarizes the findings of the DCR and presents the proposed corridor improvements. Your input during each phase of study development is very important.



www.mcdot.maricopa.gov

163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report Phase (DCR)

"Preferred Alternative" Public Meeting

MARICOPA COUNTY MCDOT TRANSPORTATION

Right Road Right Time Right Cost

Maricopa County Department of Transportation **December 12, 2007**

Corridor Description

This segment of 163rd Avenue corridor serves northwestern Maricopa County through the City of Surprise. Currently, 163rd Avenue between Jomax Road and Dove Valley Road is a two-lane paved roadway that is intersected by unimproved cross-streets that serve the local residential development. Existing land use south of Dove Valley Road is single family residential on large lots. Further north, between Dove Valley Road and SR 74, the land is primarily undeveloped and the existing roadway is an unimproved dirt road that was built largely to provide access for construction of a waterline to a development north of SR 74.

Roadway construction, funded by private development, is already underway on the two-mile segment of 163rd Avenue between Grand Avenue and Jomax Road.

Background

This roadway is classified as a future Principal Arterial by MCDOT, a future Parkway by Surprise and as an Arterial Roadway by Peoria (all six-lane divided roadways). The Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP) further established a need to identify and designate the future 163rd Avenue alignment for the entire corridor connecting Grand Avenue (US 60) and SR 74 traversing all three jurisdictions.

In September 2006, MCDOT, the City of Surprise and the City of Peoria initiated the 163rd Avenue Corridor Improvement Study (Jomax Road to SR 74) to address the rapid growth being experienced along this corridor in northwestern Maricopa County. This study's findings and recommendations were presented during a public meeting held earlier this summer.

As the final phase of this study, MCDOT, in coordination with Surprise, is conducting this more detailed Design Concept Report (DCR) for the four-mile segment between Jomax Road and Dove Valley Road (beyond the private development improvements).

The DCR has developed 30% design plans for the preferred roadway alignment recommended in the CIS phase specifically to help the City of Surprise guide traffic control, access-related issues and right-of-way requirements for new development.

Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Objectives

- Address current corridor deficiencies
- Address future traffic demand and safety
- Develop / evaluate alternatives
- Implement access management guidelines (intersection spacing/median breaks, locations)
- Develop 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road

Study Issues and Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

For more information, contact Renee Probst at (602) 506-8622 or write to her at:
MCDOT, 2901 W. Durango Street, Phoenix, AZ 85009, or e-mail at: ReneeProbst@mail.maricopa.gov.

Project Stakeholders

- Maricopa County Department of Transportation
- Flood Control District of Maricopa County
- City of Surprise
- City of Peoria
- Arizona State Land Department
- Arizona Department of Transportation
- Central Arizona Project
- Impacted Utilities
- Area Developers
- Affected Business, Property Owners and Residents

Design Concept Report (DCR) Phase

The 163rd Avenue DCR has evaluated the segment between Jomax Road and Dove Valley Road and developed 30% design plans that specify roadway type, alignment, access points and crossing drainage ways (bridges/culverts). The DCR has also identified new right-of-way needs and generated a more detailed cost estimate to allow accurate budgeting for construction.

Current Activities and Key Technical Findings

Since the "Findings and Recommendations" public meeting held in July 2007, which presented the preferred alignment corridor, the 163rd Avenue CIS study team has completed the required technical analyses and is concluding documentation. As part of the DCR, several alternatives within the preferred alignment corridor (established through the CIS process) were developed between Jomax Road and Dove Valley Road. Each alternative consists of a six-lane divided "parkway" with provision for right and left turns at major intersections. The alternatives differed according to alignment, median width and intersection treatment. Of the studied alternatives, three were selected for more detailed investigation as described below.

Alternative 1 - Indirect Left-Turns:

This alternative utilizes the City of Surprise 200-foot, six-lane Parkway typical roadway cross section (Indirect Lefts) with a 60 foot median width. The roadway alignment follows the existing 163rd Avenue roadway for the majority of the project limits. At the northern limit the alignment is shifted to 167th Avenue.

Alternative 2 Indirect Left Turns on Dixileta Drive:

This alternative also utilizes the City of Surprise 200-foot, six-lane Parkway typical roadway cross section (Indirect Lefts) with a 60 foot median width. However, a narrower median width is used at Dixileta Drive. To compensate for the narrower median, indirect left crossovers are used on Dixileta Drive to provide for left-turning traffic on 163rd Avenue.

The roadway alignment follows the existing 163rd Avenue roadway except at Dixileta Drive where the alignment shifts approximately 29-feet to the west. At the northern limit the alignment shifts to 167th Avenue. The median width is 10-feet at the intersection and then flares to 60-feet through the remaining project limit.

Alternative 3 Standard Left Turns:

This alternative utilizes a conventional signalized intersection configuration with a 30-feet median for the project limit. The roadway alignment follows the existing 163rd Avenue roadway for the majority of the project limits. At the northern limit the alignment is shifted to 167th Avenue.

Evaluation of Alternatives

The benefits and disadvantages of each alternative were evaluated among the project partners. Considerations included safety, private property impacts, drainage issues, operational characteristics, roadway corridor consistency, public input and project costs.

All of the alternatives impacted at least two private residences. Alternative 2 complicated the Indirect Left-Turn concept by placing the u-turn crossovers on Dixileta Drive. This alternative also has greater impacts to drainage ways. Alternative 3 did not support the City of Surprise's vision for a "Parkway" classification. It also did not achieve the same higher projected safety benefits as Alternative 1.

DCR Recommendations and Conclusions

The 163rd Avenue DCR recommends Alternative 1 "Indirect Left-Turns" as the preferred option. Alternative 1 is consistent with the vision of the City of Surprise for future parkways, which utilizes the Indirect Left-Turns concept. Alternative 1 consists of a six-lane roadway with three lanes in each direction divided by a 60 foot median. The right-of-way width is 200 feet. Proposed improvements to 163rd Ave include the installation of drainage culverts to provide an all-weather roadway, multi-use paths for pedestrian, bicycle and equestrian traffic, and access management strategies (Median breaks, intersection spacing and locations) to enhance safety and improve traffic flow.

Milestone Schedule

Corridor Improvement Study (CIS)

Field Review	September 2006
Scoping and Data Collection Phase **Public Input Meeting**	**November 2006**
Alternatives Analysis Phase **Public Input Meeting**	**February 2007**
Planning/Engineering	April 2007
Design Features	May 2007
Findings & Recommendations Phase **Public Input Meeting**	**July 2007**

Design Concept Report (DCR)

Planning/Engineering	September 2007
Design Features	October 2007
Draft Report Submittal CIS & DCR	December 2007
DCR Public Input Meeting	December 2007
Final Report Submittal CIS & DCR	January 2008

Recommended Future Implementation & Roadway Construction Schedule Based on Project Need

(Forecasted traffic volumes, area growth and development)

- **163rd Avenue: Jomax Road to Dove Valley Road**

Interim Four-Lane Divided Roadway with Indirect Left Turn Intersection Treatment

Final Design	Year 2017
Construction	Year 2018 to 2020

Construction of segments of this roadway may be advanced by the City of Surprise and/or adjacent developers. It is recommended that the traffic analysis for this area be reevaluated Upon approval and adoption of traffic impact studies of adjacent developments,.

Ultimate Six-Lane Parkway with Indirect Left Turn Intersection Treatment

Final Design & Construction "Build Out"

Build-Out Year is beyond 2030 and dependent on local development.

- **163rd Avenue: Dove Valley Road to SR 74**

Interim *Four-Lane Divided Roadway* Ultimate Six-Lane Parkway with Conventional Intersection Treatment

The City of Peoria has no current plans to advance this segment of 163rd Avenue. The need for additional study and design work will be evaluated on an annual basis as part of the City's Capital Improvement Program.

Project Funding

Funding for final design and construction of 163rd Avenue between Jomax Road and Dove Valley Road has not yet been identified. The DCR recommendations will be evaluated for inclusion in the MCDOT Transportation Improvement Program and the City of Surprise Capital Improvement Program for 163rd Avenue between Jomax Road and Dove Valley Road. A portion of the funding is expected to come from adjacent developments as part of project requirements.

Recommended Future Implementation & Roadway Construction Schedule Based on Project Need

(Forecasted traffic volumes, area growth and development)

- **163rd Avenue:**
  Jomax Road to Dove Valley Road

  Interim Four-Lane Divided Roadway

Final Design	Year 2017
Construction	Year 2018 to 2020

Construction of segments of this roadway may be advanced by the City of Surprise and/or adjacent developers. It is recommended that the traffic analysis for this area be reevaluated Upon approval and adoption of traffic impact studies of adjacent developments,.

Ultimate Six-Lane Parkway

Final Design & Construction	"Build Out"

Build-Out Year is beyond 2030 and dependent on local development.

- **163rd Avenue:**
  Dove Valley Road to SR 74

  Interim *Four-Lane Divided Roadway*
  Ultimate Six-Lane Parkway

The City of Peoria has no current plans to advance this segment of 163rd Avenue. The need for additional study and design work will be evaluated on an annual basis as part of the City's Capital Improvement Program.

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Future Activities and Considerations for Future Corridor Development

The following are key issues identified during this study's public involvement process that should be taken into consideration by individual jurisdictions as the recommendations of this study are carried forward into design and implementation:

- **Project Funding.** There is currently no funding programmed for construction. It can be anticipated that area developers will participate as part of project requirements.
- **Access Management Strategies**. MCDOT, the cities of Surprise and Peoria have specific expectations regarding roadway access. Specific strategies should be implemented to ensure a seamless roadway with efficient traffic flow, safety and good access to local land uses.
- **Environmental Impacts and Noise Mitigation**. Specific impacts on the local environment will require further evaluation in future project development.
- **New Right-of-Way Requirements**. Final roadway configuration will determine how much land will need to be acquired.
- **Landscaping plans**. Final project design will specify the type of landscaping to be used.
- **Drainage Structures**. Because the future roadway corridor crosses a number of washes and lies partly in a flood zone, it will be critical to ensure the roadway is designed to provide "all weather" crossings during major storm flows. Bridges along the new roadway will be designed during final roadway design.
- **Bicycle, Pedestrian and Transit Access**. Future projects will be designed to accommodate alternative modes of travel and provide access to trails and neighborhoods in the area.
- **Corridor Traffic Management.** ITS (Intelligent Transportation System) will control operation of traffic between jurisdictions and differing intersection configurations.
- **Jurisdictional Coordination.** As with the overall traffic control, implementation of different corridor improvements and access management concepts will need to be coordinated to ensure a safe, seamless and efficient transportation facility.

12/12/2007

MARICOPA COUNTY MCDOT TRANSPORTATION

Right Road Right Time Right Cost

INDIRECT LEFT TURNS

Indirect Left Turns replace the left turn at an intersection by a u-turn crossover beyond the intersection and then a right turn onto the cross-street. The indirect left turn must occur on a divided roadway. A significant median, at least 60 feet wide, is necessary to accommodate the u-turn movement. This width is adequate for buses and trucks.

The Indirect Left Turn concept is best used on an entire corridor or area to avoid motorist confusion. A benefit to using this type of Median U-turn Intersection Treatment is a higher volume of traffic is able to be moved through the intersection. Research indicates an increase of 20-50%, depending on location. Also, the Indirect Left Turn is a common accident mitigation measure at intersections suffering from a high number of left-turn accidents, since it removes the left-turn movement from the intersection.

The Federal Highway Administration recently published a Technical Briefing paper entitled "Synthesis of the Median U-turn Intersection Treatments", Safety and Operational Benefits. (Publication No FHWA-HR7-07-03)

Among the conclusions in this national report are:

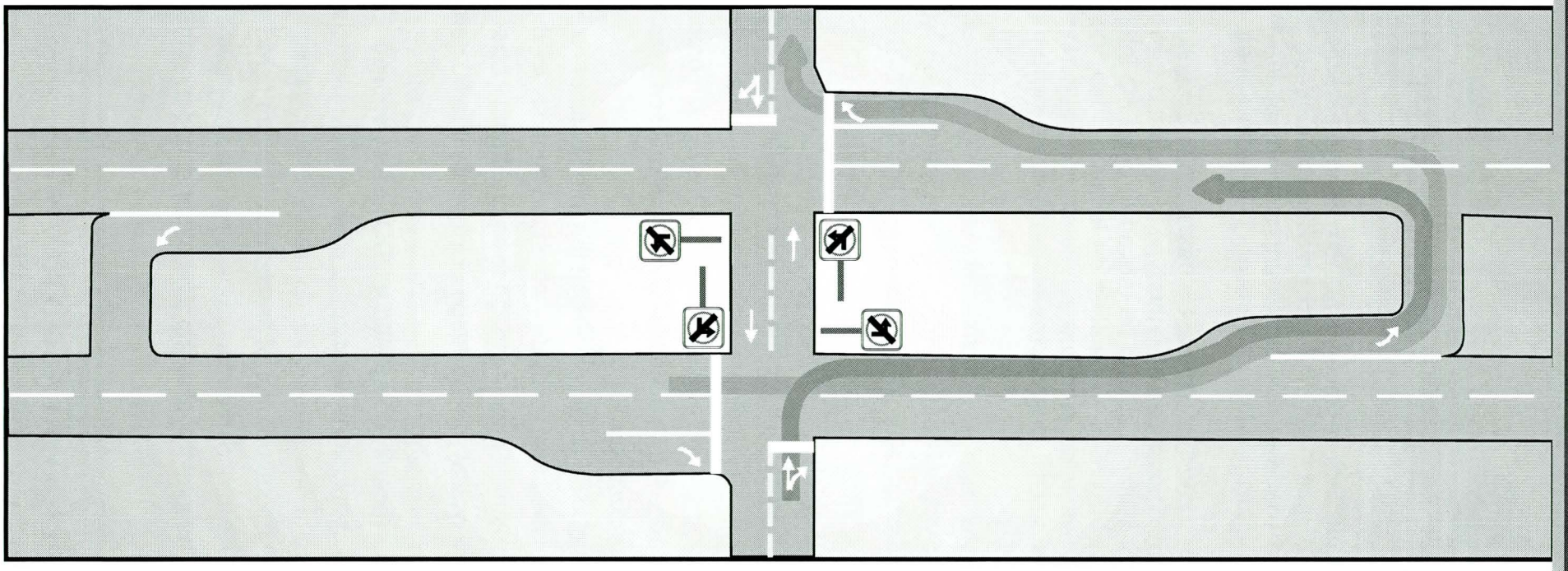
- The safety performance of Median U-turn Intersection Treatment is better than conventional intersections because they have fewer vehicle-vehicle conflict points. Typical total crash reductions range from 20 percent to 50 percent.
- Head-on and angle crashes that have high probabilities of injury are significantly reduced for the Median U-turn Intersection Treatment compared to conventional intersections.
- Reducing signal phases at the intersection (via elimination of left-turn arrows/lanes) provides increased capacity for the Median U-turn Intersection Treatment in comparison to conventional intersections. The capacity increases are typically in the range of 20 percent to 50 percent.

In another recently completed MCDOT study entitled "Enhanced Parkway Study" the following conclusions were noted when a conventional roadway system was compared to one with median indirect lefts using computer simulation:

- The total number of traffic "delay" hours is reduced by one-third, or 33.3 %.
- The total of motorist stops is reduced by more than 20 %
- The total travel or trip time experienced by a motorist is reduced by 10%

Maricopa County
Department of Transportation

Indirect Left Turn



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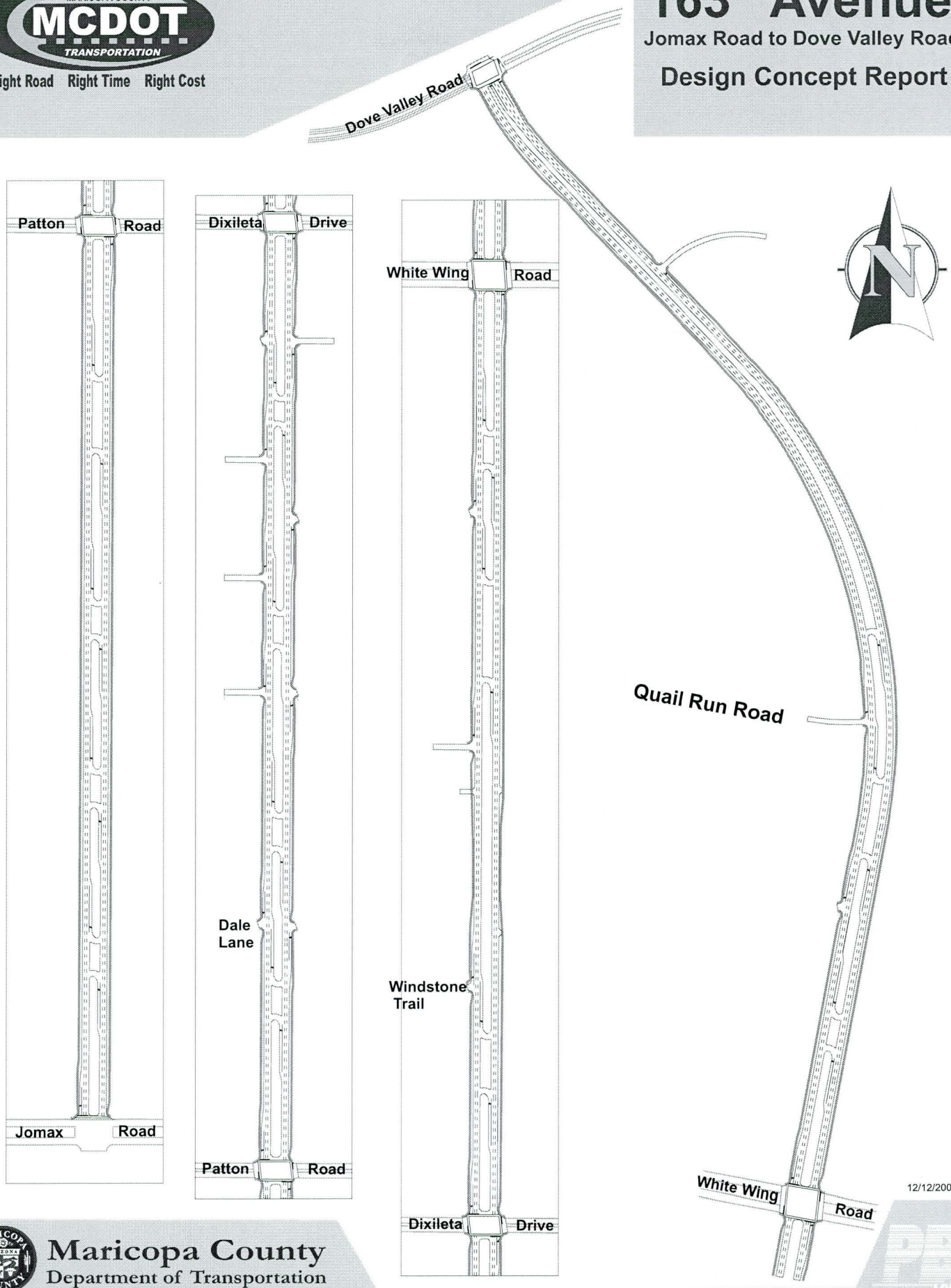
Right Road Right Time Right Cost

163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report



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Right Road Right Time Right Cost

163rd Avenue

Jomax Road to Dove Valley Road

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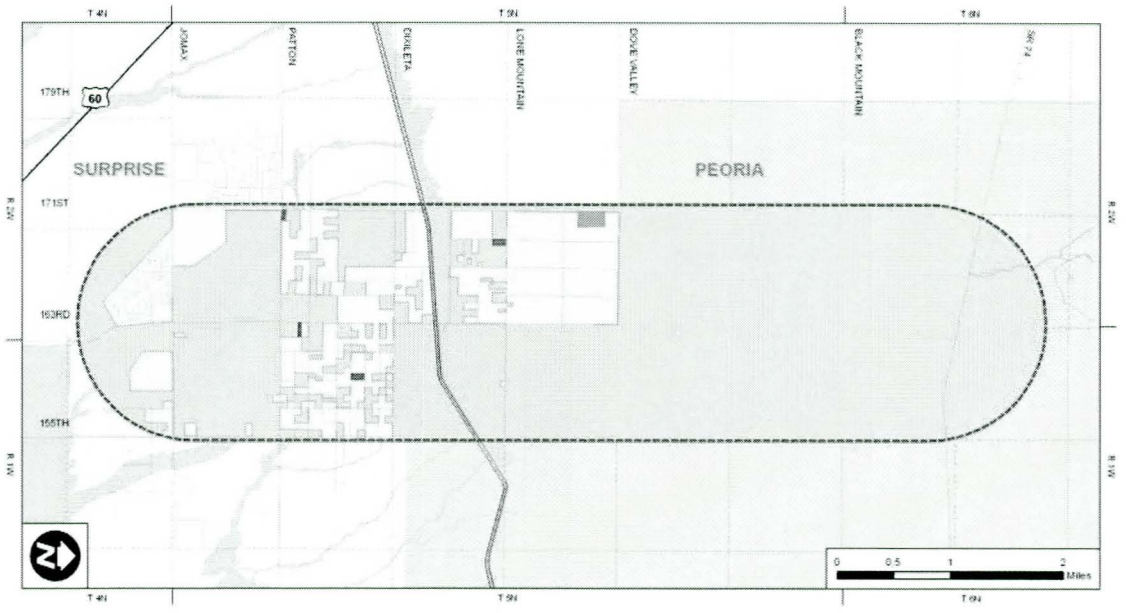
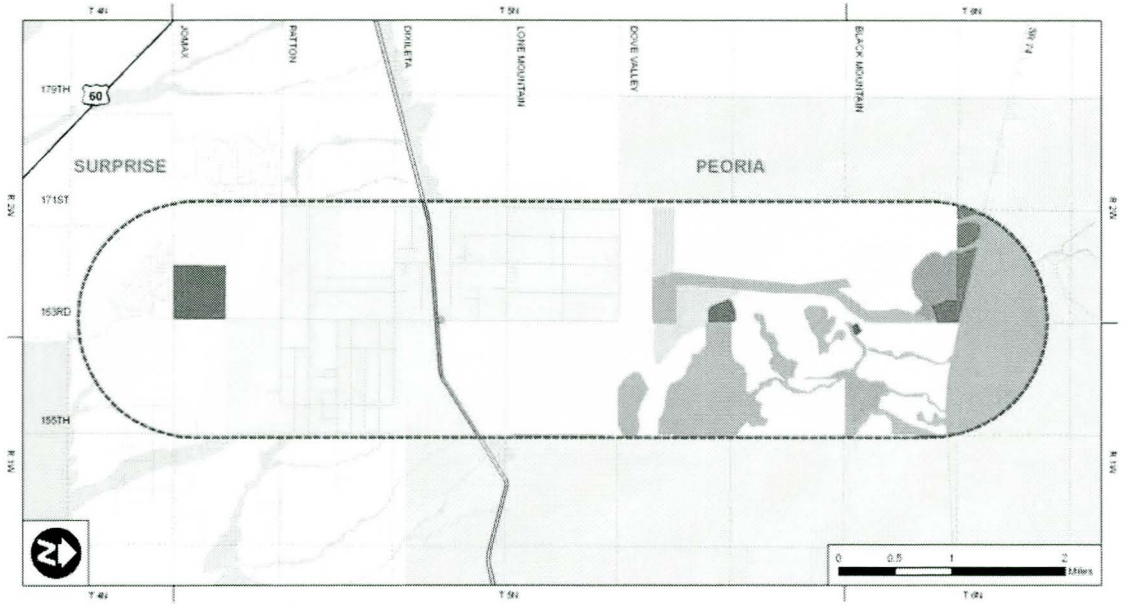


Existing Land Use

Sources: MAG and PB

Legend

- Residential
- Commercial
- Agriculture
- Public/Quasi-Public
- Vacant
- Water
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains



Future Land Use

Sources: City of Peoria and City of Surprise

Legend

Peoria Land Use

- Residential/Estate
- Residential/Low
- Residential/Medium
- Residential/Medium High
- Mixed Use
- Business Park/Industrial
- Community Commercial
- Park/Open Space
- Public/Quasi-Public

Surprise Land Use

- Rural Residential
- Low Density Residential
- Suburban Residential
- Commercial
- Open Space
- Central Arizona Project (CAP) Canal
- Railroad
- Roadways
- Corridor Study Area
- Peoria Planning Area
- Surprise Planning Area
- Flood Plains

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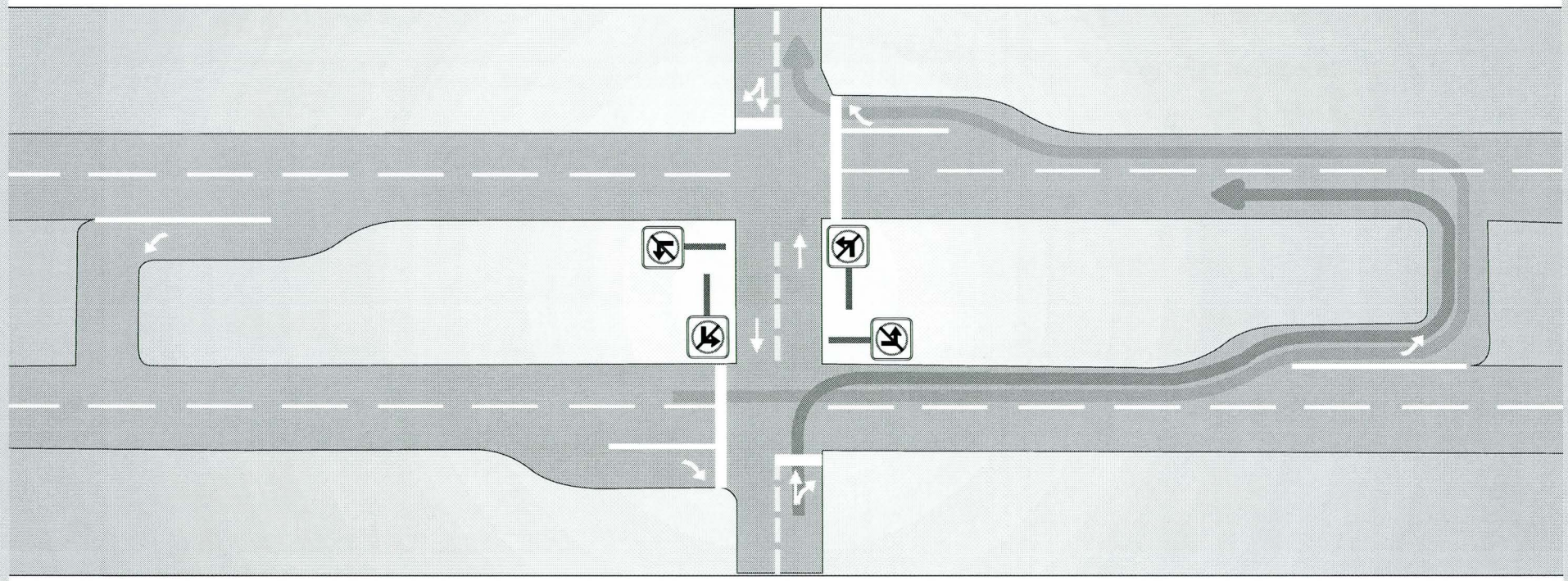
Department of Transportation

Indirect Left Turn



12/12/2007

MARICOPA COUNTY
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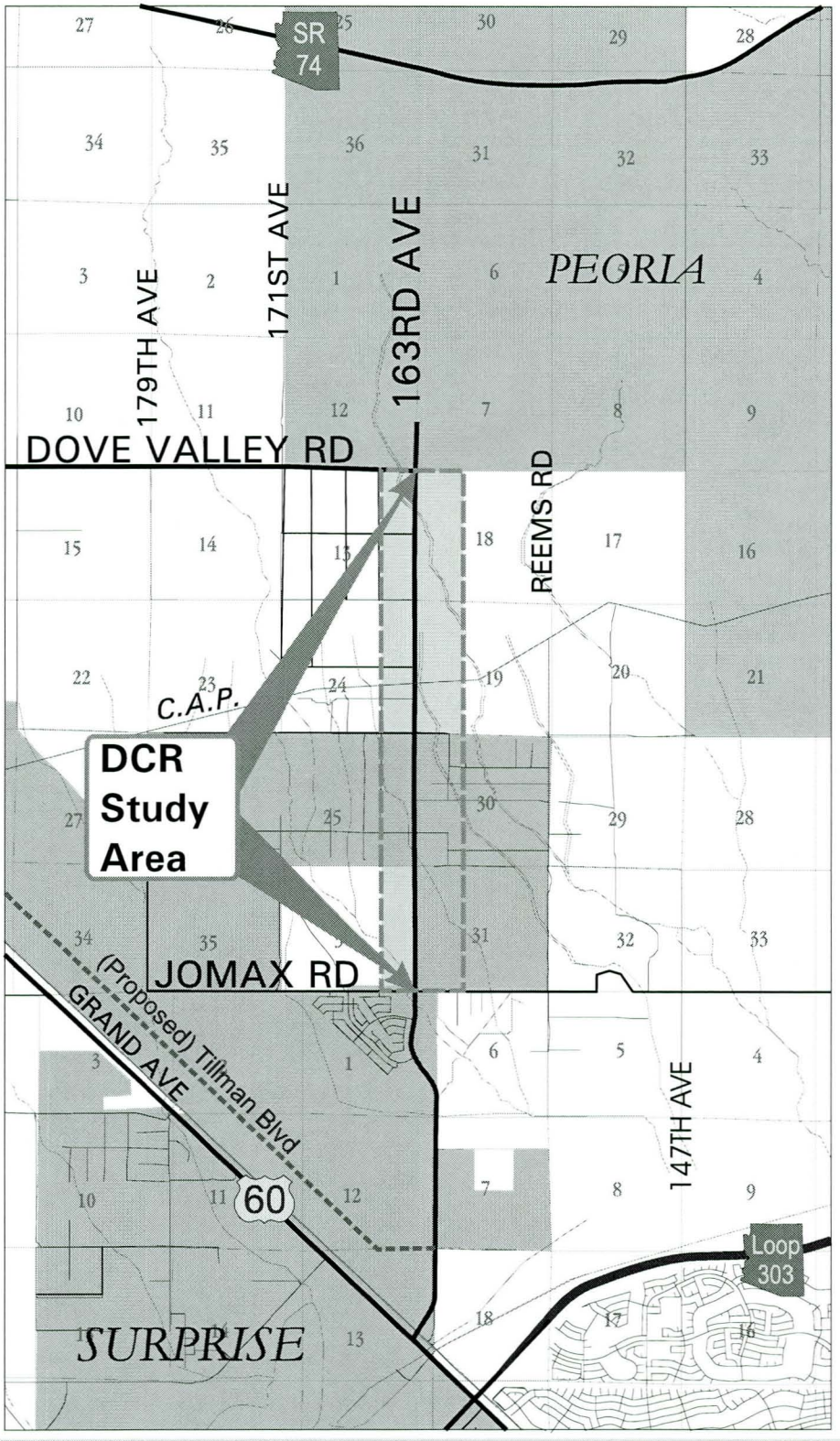
163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report



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Maricopa County
Department of Transportation

Study Need

- Respond to regional growth / local development
- Implementation of regional transportation plans

Study Goals

- Create a "vision" or footprint for 163rd Avenue and develop a plan for achieving the vision
- Establish principles, policies and guidelines for corridor improvements
- Develop agreed-upon roadway plans and recommendations

12/12/2007

163rd Avenue

Jomax Road to Dove Valley Road

Design Concept Report

Study Objectives

- Define the role of 163rd Avenue as a critical north/south roadway
- Identify current corridor deficiencies
- Define long-term corridor needs and requirements
- Develop / evaluate alternatives
- Establish design criteria for future roadway
- Develop access management guidelines (intersection spacing/median break locations)
- Establish roadway operation and performance criteria
- Complete 30% design plans for 163rd Avenue between Jomax Road and Dove Valley Road
- Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system

Study Challenges

- Incorporate regional and local travel
- Achieve mobility/access balance
- Address current and future development
- Incorporate jurisdictional interests
- Address engineering challenges
- Consider roadway environment

12/12/2007