

# Hidden Waters Parkway North

## Feasibility Study: Interstate 10 to State Route 74

### Final Report: Appendices

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Prepared For:



Prepared By:



January 2012



## Appendix A

- Technical Memorandum #1 - Existing and Future Corridor Features, June 2011



Hidden Waters Parkway North  
Corridor Feasibility Study:  
Interstate 10 to State Route 74

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Final -Tech Memo 1  
Existing and Future Corridor Features

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## Appendix

### Appendix A: Arizona Game & Fish Department Recommendations



## Abbreviations

Arizona Department of Water Resources	ADWR
Arizona Game and Fish Department	AGFD
Arizona Public Service	APS
Arizona State Land Department	ASLD
Bureau of Land Management	BLM
Bureau of Reclamation	BOR
Capital Improvement Program	CIP
Central Arizona Project	CAP
Development Master Plannd	DMP
Environmental Overview	EO
Flood Control District of Maricopa County	FCDMC
Geographic Information System	GIS
Maricopa Association of Governments	MAG
Maricopa County Department of Transportation	MCDOT
Municipal Planning Area	MPA
Master Planned Community	MPC
National Environmental Protection Agency	NEPA
National Registor of Historic Places	NRHP
Palo Verde Nuclear Generation Facility	PVNGF
Planned Area Development	PAD
Salt River Project	SRP
State Route	SR
Toyota Arizona Proving Grounds	TAPG
Technical Advisory Committee	TAC
Transportation Improvement Program	TIP
US Fish and Wildlife Service	USFWS
Western Area Power Authority	WAPA



# 1.0 Introduction

## 1.1 Background

The Interstate-10/Hassayampa Valley Roadway Framework Study (Hassayampa Framework Study) is a transportation planning document completed by the Maricopa Association of Governments (MAG) in 2007 that identified a comprehensive roadway network to meet future traffic demands in northwest Maricopa County. The roadway network recommended by the Hassayampa Framework Study is comprised of freeways, parkways and major arterial roads. The Hidden Waters Parkway was identified as a major link in the transportation framework.

The Hidden Waters Parkway North (Hidden Waters Parkway) Corridor Feasibility Study Area is located west of the Phoenix metropolitan area in Maricopa County, Arizona (Figure 1-1). The area west of the White Tank Mountains within the Hassayampa River Valley has been identified as an area where intense growth is anticipated to occur in the next 30 to 50 years. The Hidden Waters Parkway North Corridor Feasibility Study was commissioned by Maricopa County Department of Transportation (MCDOT) in response to this anticipated growth and the future need for a high-capacity parkway within this corridor.

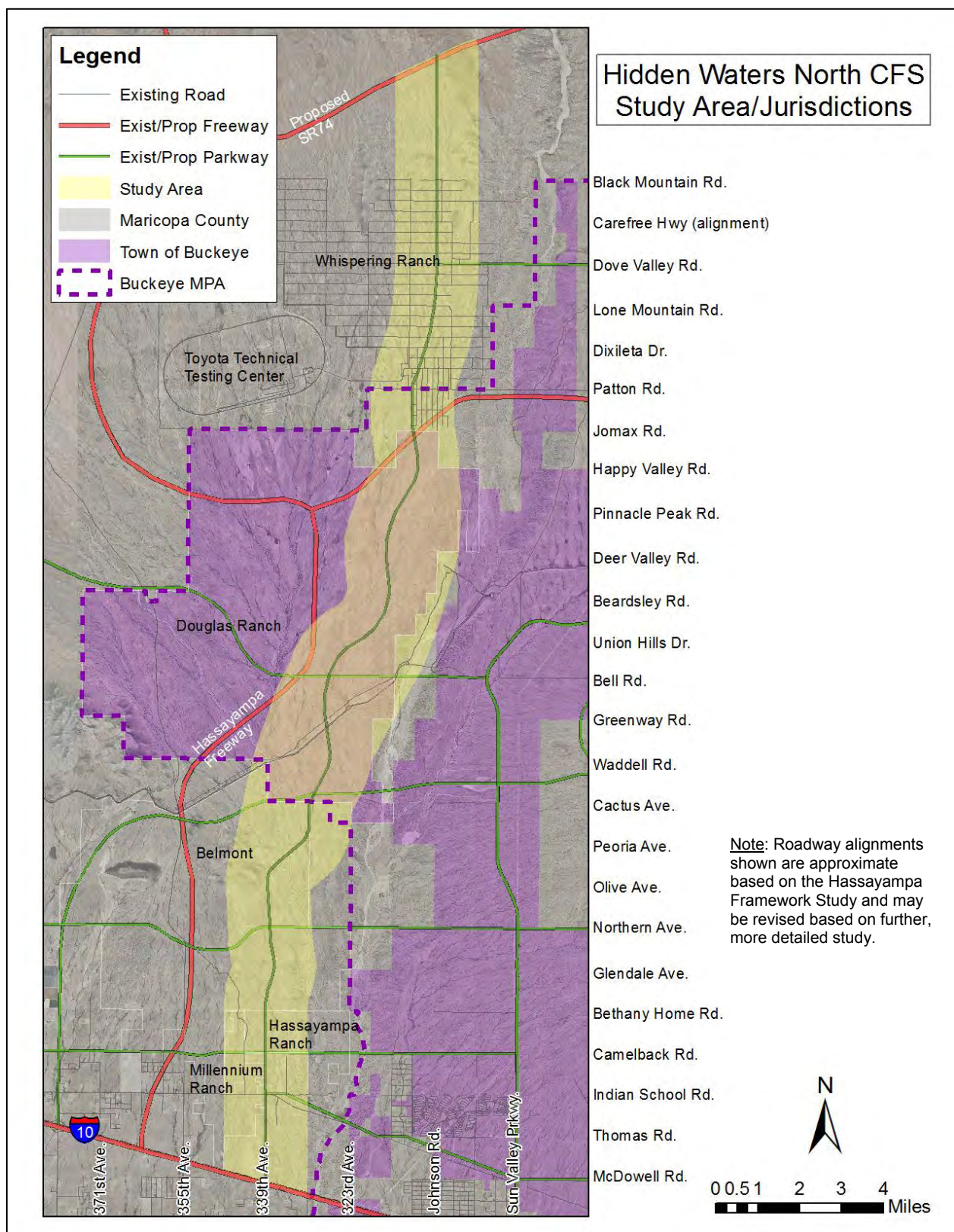
The study area includes the northern section of the Hidden Waters Parkway, as shown on the Hassayampa Framework Study, from Interstate 10 (I-10) north to the future alignment of State Route 74 (SR74). The study area is approximately 28 miles long and two miles wide, centered about the Hassayampa Framework Study proposed alignment for the Hidden Waters Parkway. Except in the area from Northern Avenue to Bell Road where the study area expands to two miles west of the Hassayampa Framework Study alignment and from the south end of Douglas Ranch to Patton Road the study area expands to two miles east of the Framework Study alignment. This results in the study corridor being a total of three miles wide in these two areas (refer to Figure 1-1 for graphic depiction of study area).

The proposed Hidden Valley Parkway corridor passes adjacent to, or through, several entitled Master Plan Communities (MPC) including: Hassayampa Ranch, Millennium Ranch, Belmont, and Douglas Ranch. At buildout, it is estimated that these communities will contain over 187,000 dwelling units. The need for a parkway within the Hidden Waters Corridor is based upon projected development and is linked directly to the development of the previously mentioned MPC's. It is important to identify a recommended alignment for the Hidden Waters Parkway during the planning stages of the proposed MPC's to ensure that adequate right-of-way will be preserved for the future parkway corridor.

The purpose of the Hidden Waters Parkway study is to document conditions along the parkway corridor, identify potential fatal flaws and develop an alignment alternative that meets the future traffic needs identified in the Hassayampa Framework Study. The recommended alternative will establish a roadway footprint that may be used as a guide for local agencies and development within the corridor.







**Figure 1-1 Hidden Waters Parkway study area**





## 2.0 Jurisdictions, Ownership, and Land Uses

### 2.1 Jurisdictional Control

Approximately two thirds of the Hidden Waters Parkway study area falls within the jurisdictional boundaries of Maricopa County (refer to Figure 1-1). The remaining third, which corresponds to the proposed Douglas Ranch development, is located within the Town of Buckeye. Each jurisdiction controls development through their adopted general/comprehensive plan and zoning ordinance. Portions of the study area are located within the Town of Buckeye Municipal Planning Area (MPA), but remain under Maricopa County jurisdiction until they are annexed into the Town. Currently, Maricopa County has jurisdictional control over all of the improved roadways within the study area.

### 2.2 Land Ownership

The study area is comprised mainly of privately owned land within the Town of Buckeye and unincorporated areas of Maricopa County. Less than a quarter of the study area contains land that is managed by the Bureau of Land Management (BLM), the Bureau of Reclamation (BOR), and the Arizona State Land Department (ASLD). Figure 2-1 illustrates the existing land ownership within the Hidden Waters Parkway study area.

Land Ownership	Acres	Percentage
Private	31,176	78%
Arizona State Trust Land	4,590	12%
Bureau of Land Management	3,515	9%
Bureau of Reclamation	489	1%
Total	39,770	100%

#### Private Lands

Private Lands include the CMPs of Belmont, Millennium Ranch, Hassayampa Ranch, and Douglas Ranch. Other private lands consist mainly of low density residential or agricultural lands.

#### Arizona State Land Department (ASLD)

Arizona State Trust Lands, managed by the ASLD, are scattered throughout the entire study area. The responsibility of the ASLD is to maximize revenue for the Trust beneficiaries through the sale and use of the lands.

#### Bureau of Land Management (BLM)

BLM manages land along the Hassayampa River adjacent to the proposed Belmont and Douglas Ranch developments. They also manage the land north of the existing Whispering Ranch community. A main objective of the BLM is to ensure the best balance of use and resource for America's "public" lands, which is implemented through an extensive and collaborative land use planning approach.

#### Bureau of Reclamation (BOR)

The Bureau of Reclamation owns a swath of land near the center of the study area that is coincident with the Central Arizona Project (CAP) Canal. A main objective of the BOR is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



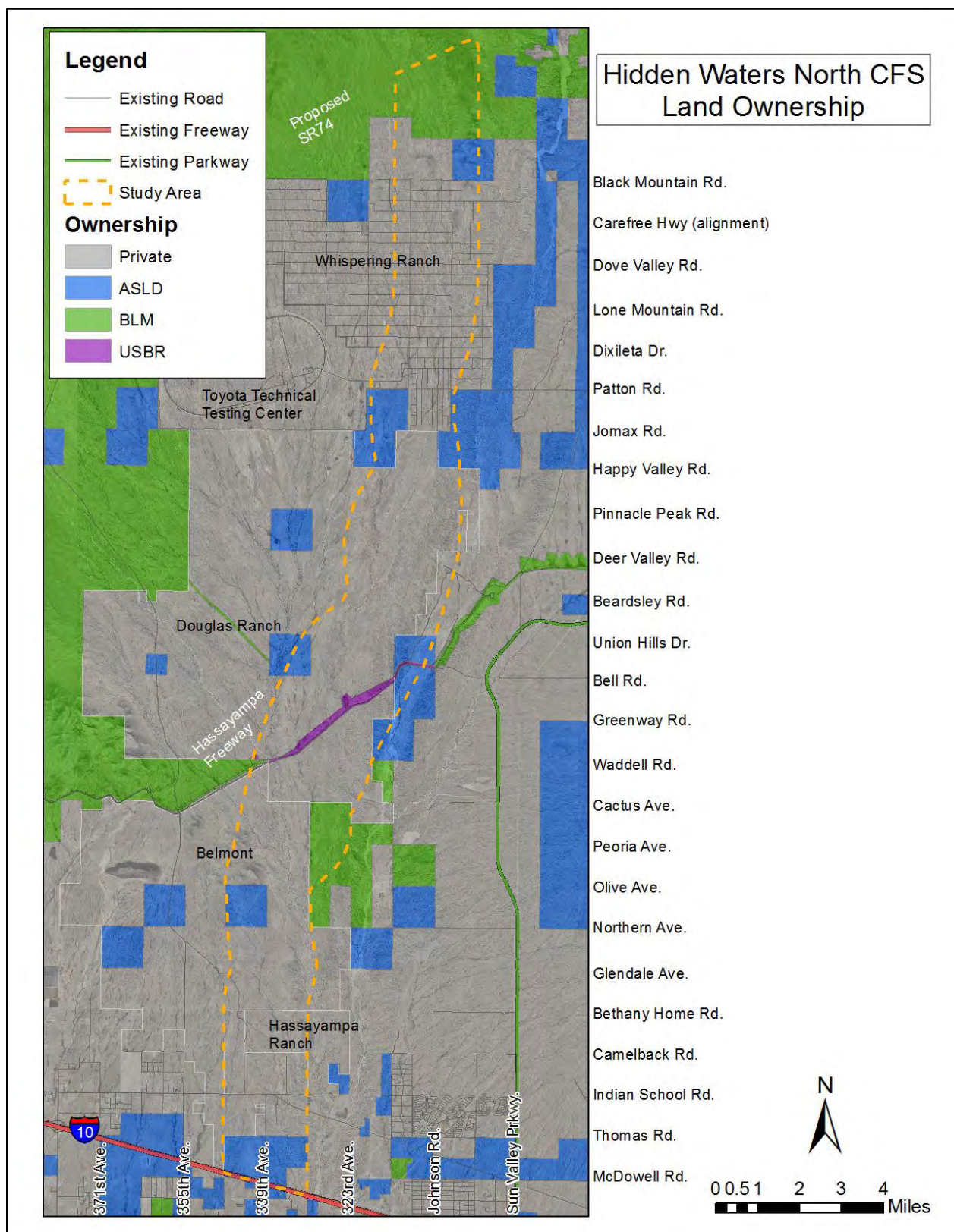


Figure 2-1 Land Ownership



## 2.3 Existing Land Use

Existing land uses presented in Figure 2-2 are based upon County Assessor's data and verified via aerial photography.

### Vacant

The vast majority of the study area remains as vacant/undeveloped Sonoran Desert land. Portions of this undeveloped land are used for cattle grazing. These grazing allotments occur within the study area from just south of the Central Arizona Project (CAP) canal through the northern end of the study area.

### Residential

Residential land uses within the Hidden Waters Parkway study area are best described as widely spaced rural development. A small cluster of residential parcels ranging in size from one to forty acres are located near the intersection of 339<sup>th</sup> Avenue and Indian School Road. These residential parcels generally contain existing homes and other improvements.

The second cluster of residential parcels is located near the northern end of the study area within the Whispering Ranch community. This community is characterized by large (mostly five-acre) residential parcels. Houses of varying size, including mobile and manufactured homes, are present on of these parcels. Some of the residential structures within this area have fallen into disrepair and are no longer habitable.

### Commercial

The Toyota Arizona Proving Grounds (TAPG) is located within the Hidden Waters Parkway study area adjacent to the Whispering Ranch community. The TAPG is the principal North American test facility for Toyota. This 18-square mile state-of-the-art proving ground is used to conduct rigorous vehicle performance and durability tests under the harsh conditions found in the Arizona desert climate. Toyota representatives have indicated that confidentiality is critical to their testing operations and requested that their privacy requirements be considered when developing potential parkway alternatives. Toyota considers the proving ground to be an essential facility required to meet Toyota's current and long term North American vehicle development activities.

Flood Control District of Maricopa County (FCDMC) records indicate that Sun State Materials has an active 240 acre sand and gravel operation along the west edge of the Hassayampa River north of the CAP canal. There is an additional 40 acre parcel approximately one quarter mile north of Indian School Road which appears to be the site of a neighborhood garage or shop.

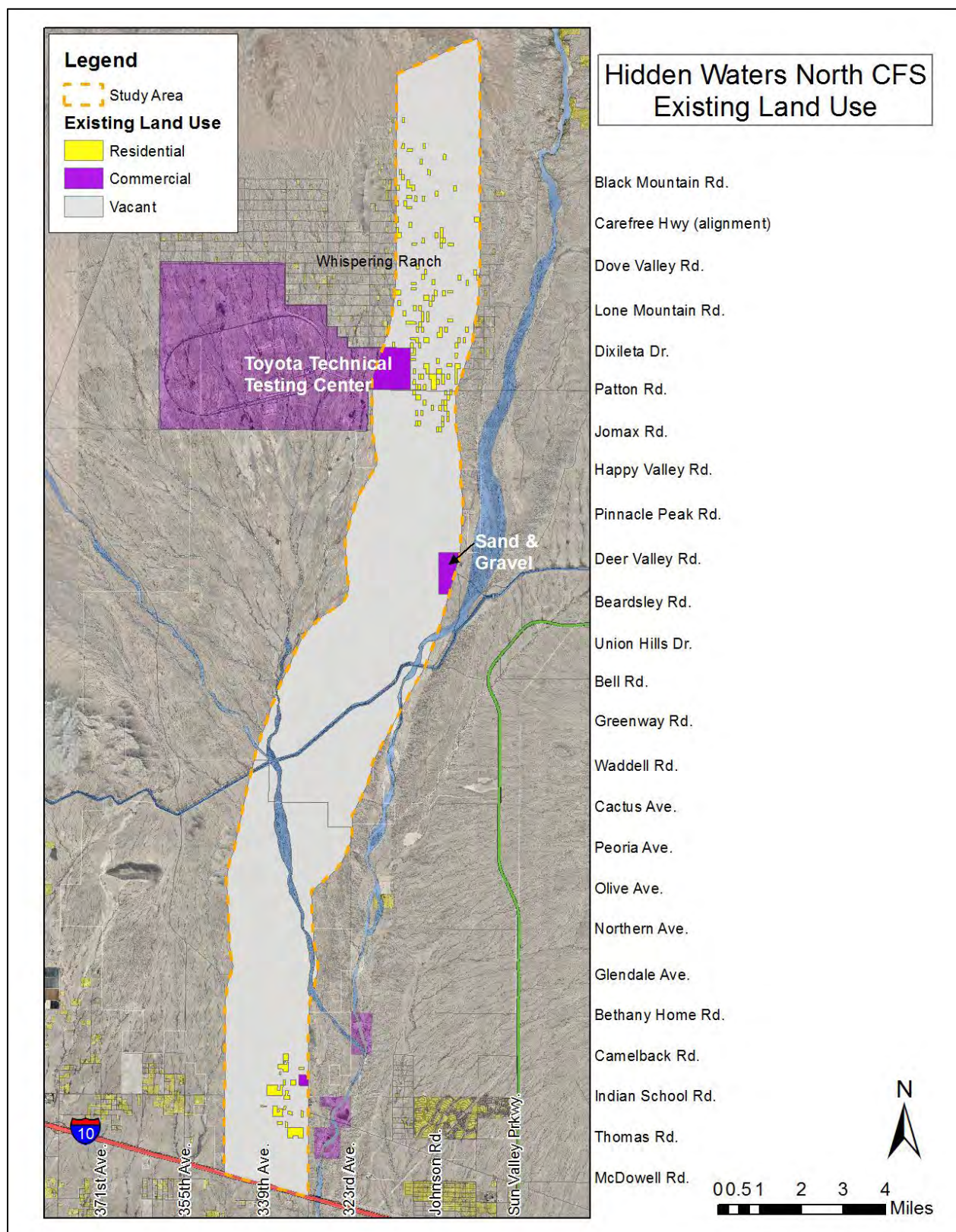
Table 2-2 summarizes the land uses within the study corridor by area. The "other" category includes land designated for transportation or regional drainage purposes.

**Table 2-1 Existing Land Use**

Land Use	Acres	Percentage
Vacant	37,230	94%
Residential	947	2%
Commercial	561	1%
Other	1,032	3%
Total	39,770	100%







**Figure 2-2 Existing Land Use**



## 2.4 Existing Zoning

The existing zoning patterns within the Hidden Waters Parkway study area are illustrated in Figure 2-3. Zoning data for the Town of Buckeye and unincorporated areas of Maricopa County were obtained from Town of Buckeye Planning & Zoning Department and Maricopa County Planning & Development Department (via the Maricopa County GIS portal), respectively.

### Town of Buckeye Zoning

The Town of Buckeye annexed the proposed Douglas Ranch development in 2002. The land was zoned as a “Planned Community” within the Town of Buckeye. The “Planned Community” zoning district was designed to accommodate/incorporate a combination of land uses, wherein specific uses, public services, densities, and design criteria were identified and adopted. The latest version of the Town’s development code (effective January 2010) eliminates the “Planned Community” zoning district for future zoning cases. However, this zoning designation has been carried forward for previously approved land areas that were assigned that zoning classification. The new Town development code offers the community master plan designation as an overlay district.

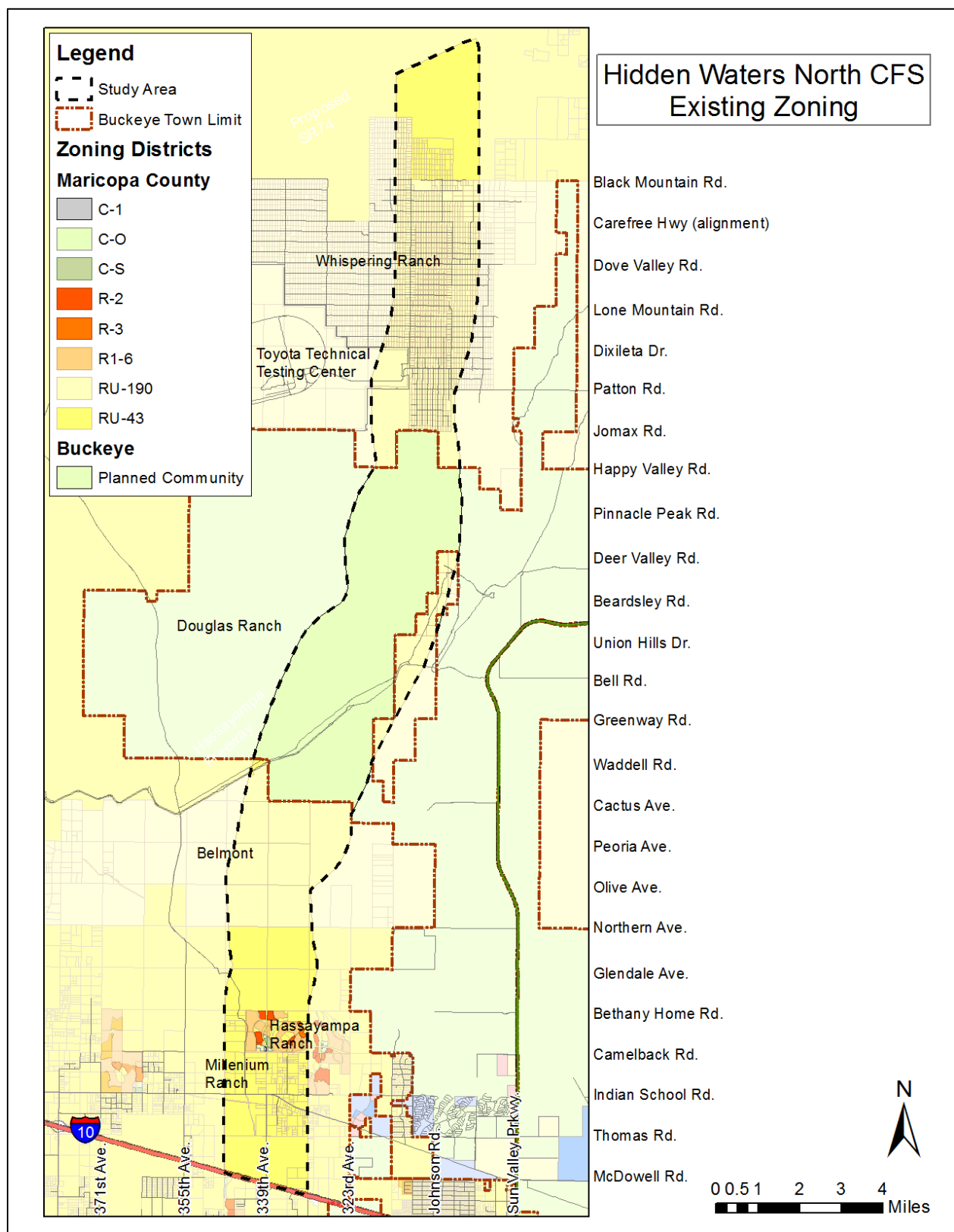
### Maricopa County Zoning

The vast majority of the existing zoning within unincorporated Maricopa County is zoned RU-43 and RU-190 (Rural Residential). The RU-43 and RU-190 zoning districts permit one dwelling unit per 43,000 and 190,000 square feet, respectively. The land area associated with Hassayampa Ranch is zoned in accordance with its approved Development Master Plan (DMP). The Hassayampa Ranch DMP adopted a Planned Area Development (PAD) overlay to permit and encourage a cohesive mixture and variety of residential and commercial zoning districts. The Hassayampa Ranch zoning districts are as follows:

- R1-6 (Single Family Residential- 6,000 square feet per dwelling unit);
- R-2 (Two-Family Residential- 4,000 square feet per dwelling unit);
- R-3 (Multiple-Family Residential- 3,000 square feet per dwelling unit);
- C-S (Planned Shopping Center);
- C-0 (Commercial Office); and
- C-1 (Neighborhood Commercial)

Although the Belmont and Millennium Ranch MPCs are currently zoned RU-43/RU-190, these developments will ultimately adopt zoning districts in accordance with their approved DMPs. There are currently no zoning requests being processed in the Hidden Waters Parkway study area.





**Figure 2-3 Existing Zoning**

## 2.5 Future Land Use

The future land use patterns within the Hidden Waters Parkway study area are illustrated in Figure 2-4. Future Land Use data for the Town of Buckeye and unincorporated areas of Maricopa County were obtained from the Town of Buckeye General Plan (2007 update), Maricopa County Comprehensive Plan 2020 (rev. August 2002), and the Maricopa County Tonopah/Arlington Sub Area Plan 2020 (September 2000).

### Town of Buckeye Future Land Use

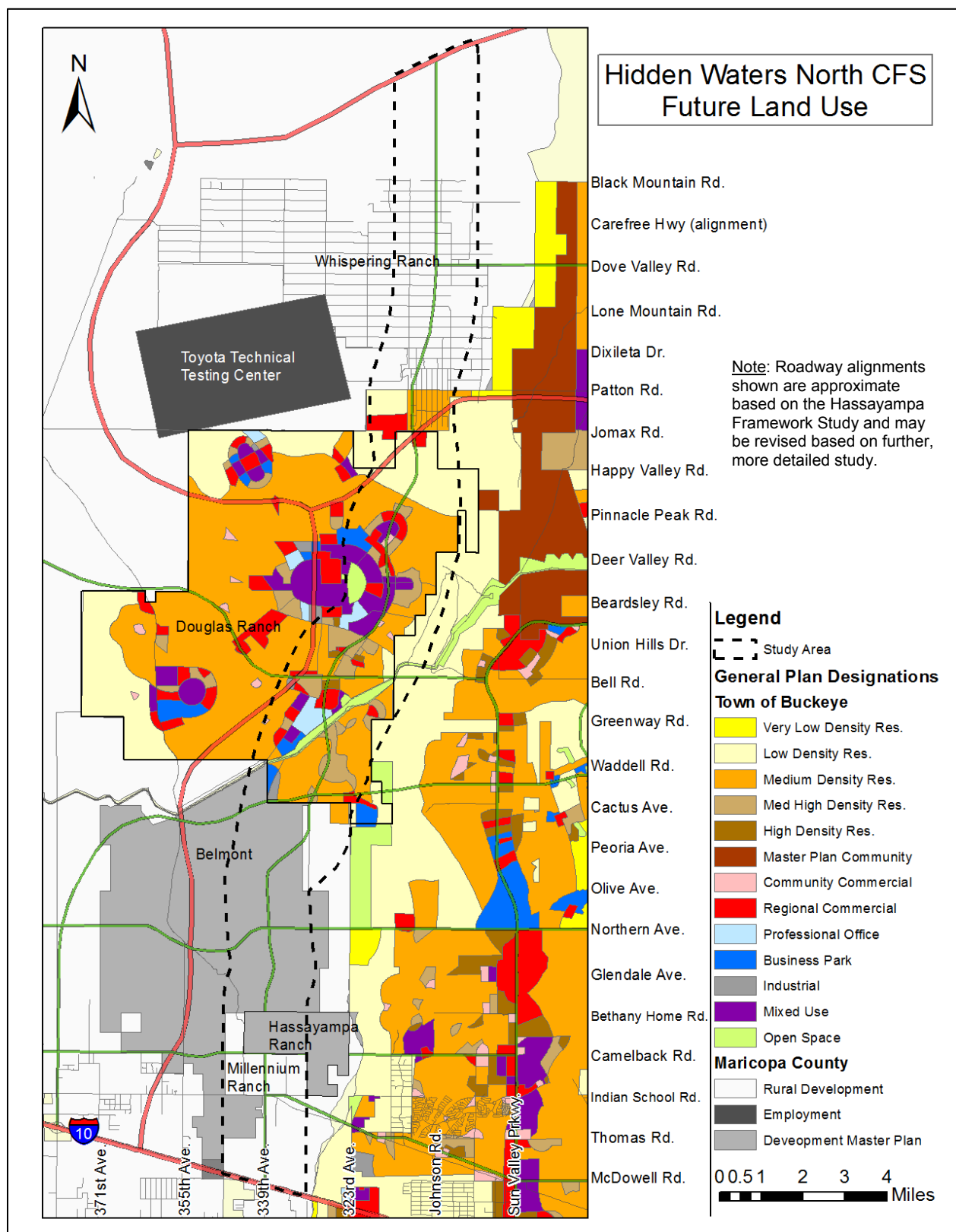
The Town of Buckeye General Plan identifies future land uses in conjunction with the approved Douglas Ranch Community Master Plan (CMP). The future land uses associated with the Douglas Ranch CMP are anticipated to provide a variety of single and multi-family residential densities (3 to 15 DU/ac), Community and Regional Commercial, Business Park/Employment, Mixed-Use containing a mix of office, retail, high and urban density residential, and open space and recreational uses. The Douglas Ranch CMP is further discussed in Section 2.6. Unincorporated land areas located adjacent to the east of Douglas Ranch, but within the Town's Master Planned Area (MPA) are anticipated as Very Low Residential (up to 1 DU/ac). Land areas adjacent to the north of Douglas Ranch are planned for Regional Commercial and Medium Density Residential (3 to 6 DU/ac), respectively.

### Maricopa County Future Land Use

The Maricopa County Land Use plan illustrates that a majority of the existing vacant, undeveloped land is anticipated to follow the approved DMPs for Hassayampa Ranch, Belmont, and Millennium Ranch. Similar to Douglas Ranch, these approved DMPs are anticipated to provide a wide range of housing densities, mixed-use commercial/employment/business land uses, open space and recreational uses, and multi-modal transportations systems. These master planned communities are further discussed in Section 2.6.

The northern portion of the study area is anticipated to continue as Rural Development at a very low density, generally one dwelling unit per five acres, and is consistent with the existing Whispering Ranch development. Additional areas of Rural Development are located along the east side of the study area adjacent to Belmont, and in the southern portion of the corridor area. While these areas are identified as a Rural Development, it is possible that these areas could become part of a development plan as the county and surrounding master plan communities develop. The future land use at the intersection of 339th Avenue and Interstate 10 is delineated as Community Retail Commercial (CRC), which allows for the development of general neighborhood/community based commercial uses.





**Figure 2-4 Future Land Use**





## 2.6 Master Planned Communities

The Hidden Waters Parkway study area passes adjacent to, or through several approved MPCs, (Hassayampa Ranch, Millennium Ranch, Belmont, and Douglas Ranch) and the existing community of Whispering Ranch. Figure 2-5 identifies the existing and approved MPCs within the study area. At complete build out, it is anticipated that these communities will combine for over 187,000 dwelling units. The following subsections further summarize the existing and approved Master Planned Communities and illustrate the relationship between these developments and the proposed Hidden Water Parkway Study Area.

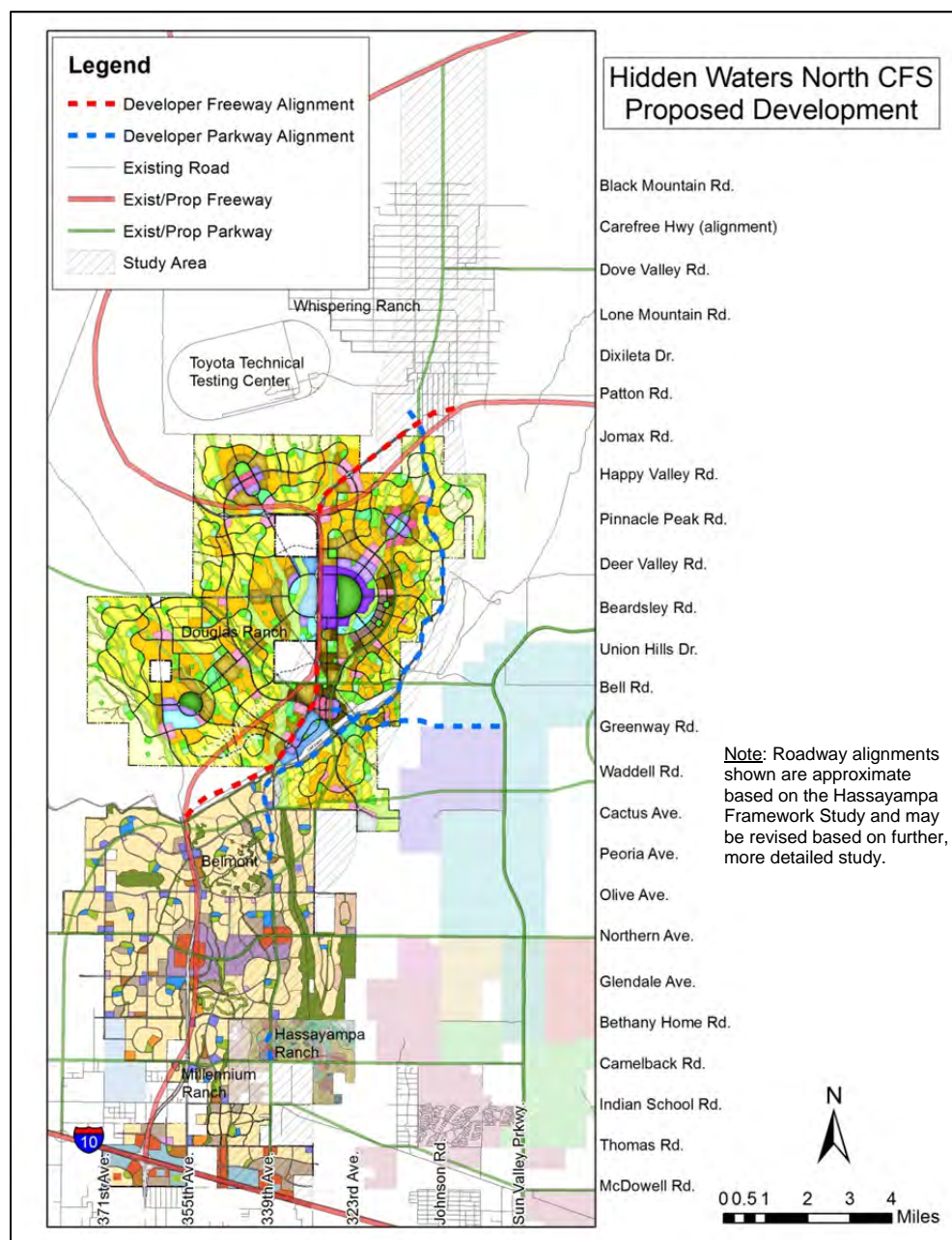


Figure 2-5 Planned Development

## Belmont

Developer: LKY Development

Date of Approval: Original- May 1991: Case No. DMP1990-1;  
Amendments- December 2006; June 2008: DMP 2007009

Total Acreage: 24,800 acres

Total No. of Dwelling Units: 78,370

The Belmont MPC is the second largest Development Master Plan within the study area, and is comprised of 24,800 acres with approximately 78,370 planned residential dwelling units. Belmont was originally planned and approved as a 20,000 acre development by the Maricopa County Board of Supervisors in 1991. In 2006, an Amendment to the DMP was approved to create a distinct Town Center and employment core while adding approximately 4,800 acres of Arizona State Trust Land to the master plan. In 2008, the Belmont DMP was again amended to respond to the Hassayampa Framework Study proposed alignment for the Hassayampa Freeway. Figure 2-6 illustrates the final approved Conceptual Master Plan for Belmont.

The majority of land within this proposed development (~16,900 acres) has been designated for various types of residential development. These residential areas are interconnected by approximately 3,450 acres of open space which is comprised of neighborhood parks, play grounds, community centers and trails as well as natural and recreational open space. Belmont includes approximately 2,000 acres of commercial property, and over 1,000 acres of Mixed-Use areas, which include retail, service, high density residential and light industrial (office) development. Belmont is anticipated to be home to roughly 209,000 people at build-out.

The approved Conceptual Master Plan for Belmont includes a parkway corridor with 200 feet of dedicated right-of-way along the 339<sup>th</sup> Avenue alignment. This corridor is consistent with the Hassayampa Framework Study proposed alignment for the Hidden Waters Parkway south of Olive Avenue.

A majority of the land use designations along the proposed parkway alignment consist of SLR (Small Lot Residential) and Medium Lot Residential (MLR). Significant RRC (Regional Retail Center) and MU (Mixed Use) land use designations are located at the Proposed Northern Avenue and Hidden Waters Parkway intersection.



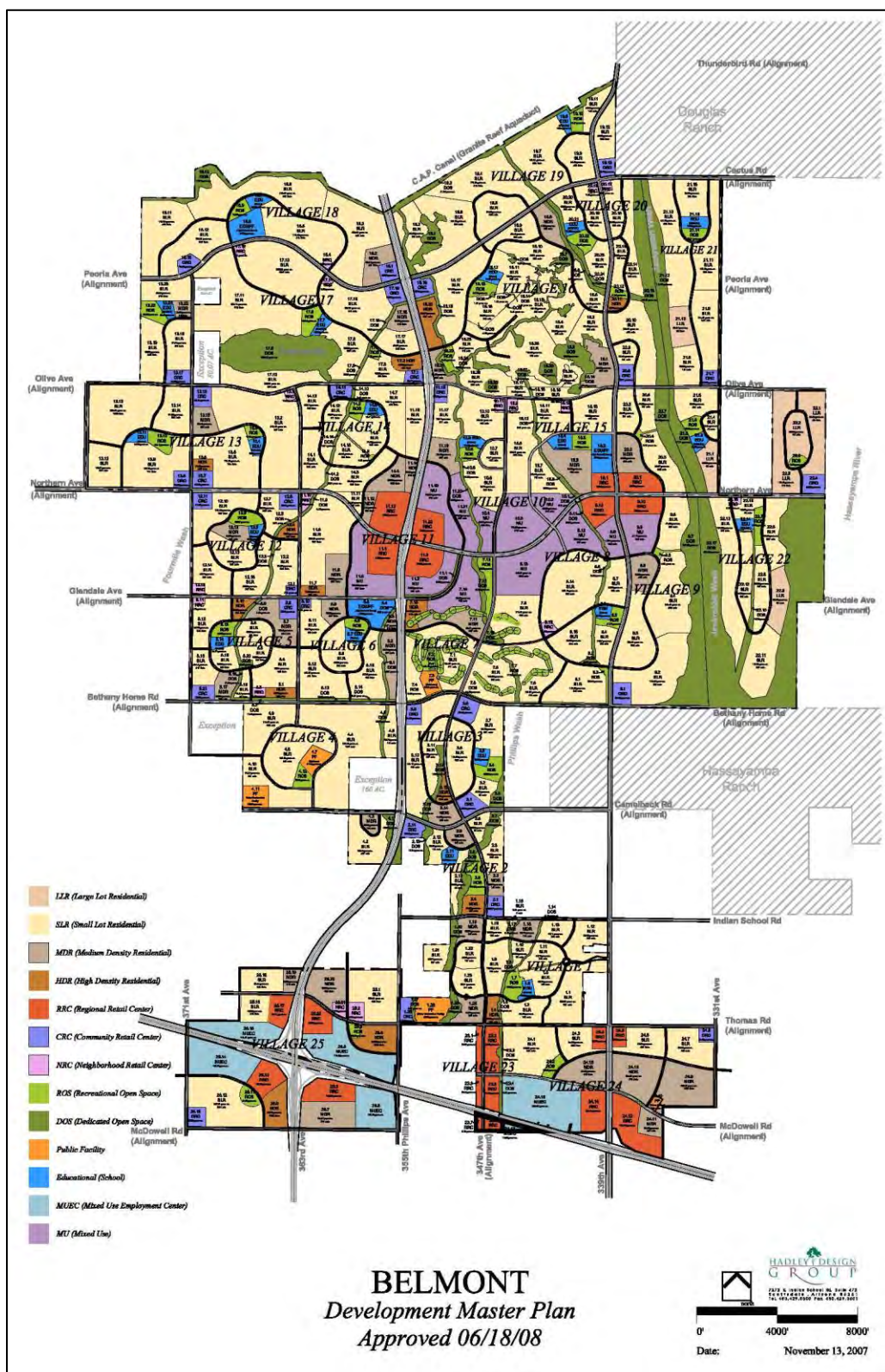


Figure 2-6 Belmont Land Use Plan





## Millennium Ranch

Developer: BET Investments, Inc.

Date of Approval: June 2010, Case No. DMP2008005

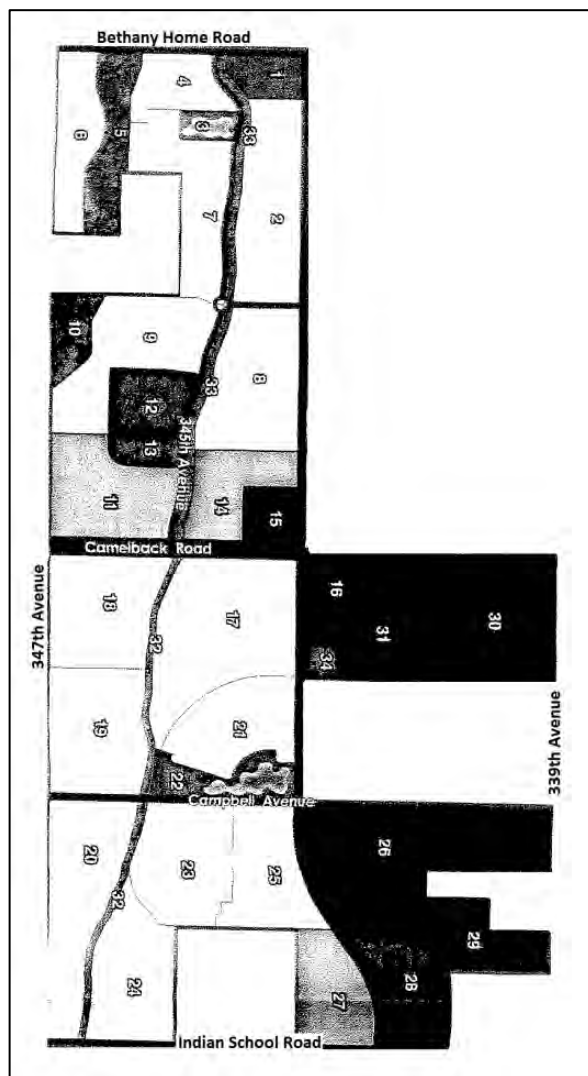
Total Acreage: 773 acres

Total No. of Dwelling Units: 3,186

The proposed Millennium Ranch development is located between the 339th Avenue Alignment on the east, the 347th Avenue Alignment on the west, the Bethany Home Road alignment on the north and the Indian School Road alignment on the south. Millennium Ranch is bordered on the north, west and south by the proposed Belmont DMP and to the east by Hassayampa Ranch DMP. The approved land use plan for Millennium Ranch is depicted in Figure 2-7.

At buildout, Millennium Ranch is anticipated to be home to 8,500 residents within single and multi-family residential parcels. The community plan includes 100 acres of neighborhood/community retail, 90 acres of mixed-use employment, 18 acres of public community facilities, 45 acres of recreational open space, and 25 acres of dedicated/non-developable open space. Land use designations along the 339th alignment consist of Community and Neighborhood Retail and Mixed-Use Employment use.

The approved plan illustrates access into the development via the 339th Avenue Alignment between Indian School Road Alignment and Camelback Road Alignment, although the DMP does not delineate a right-of-way width for the 339th Avenue Alignment.



**Figure 2-7 Millennium Ranch Land Use Plan**





## Hassayampa Ranch

Developer: Harvard Investments

Date of Approval: January 2007; Case Nos. DMP2005007, Z2008005

Total Acreage: 2,078 acres

Total No. of Dwelling Units: 5,707

The proposed Hassayampa Ranch development is located north of the Indian School Road alignment, south of the Bethany Home Road alignment, west of the 323rd alignment, and east of the 343rd Avenue Alignment (refer to Figure 2-8). At buildout, Hassayampa Ranch is anticipated to be home to between 12,000 and 15,000 residents within single and multi-family residential parcels. The community will also include “Active Adult” age-restricted residential living, 40 acres of Mixed-Use, 27 acres of Community Retail, 364 acres of Recreational Open Space, 412 acres of Dedicated/Non-Developable Open Space, two community recreation centers, and two elementary schools.

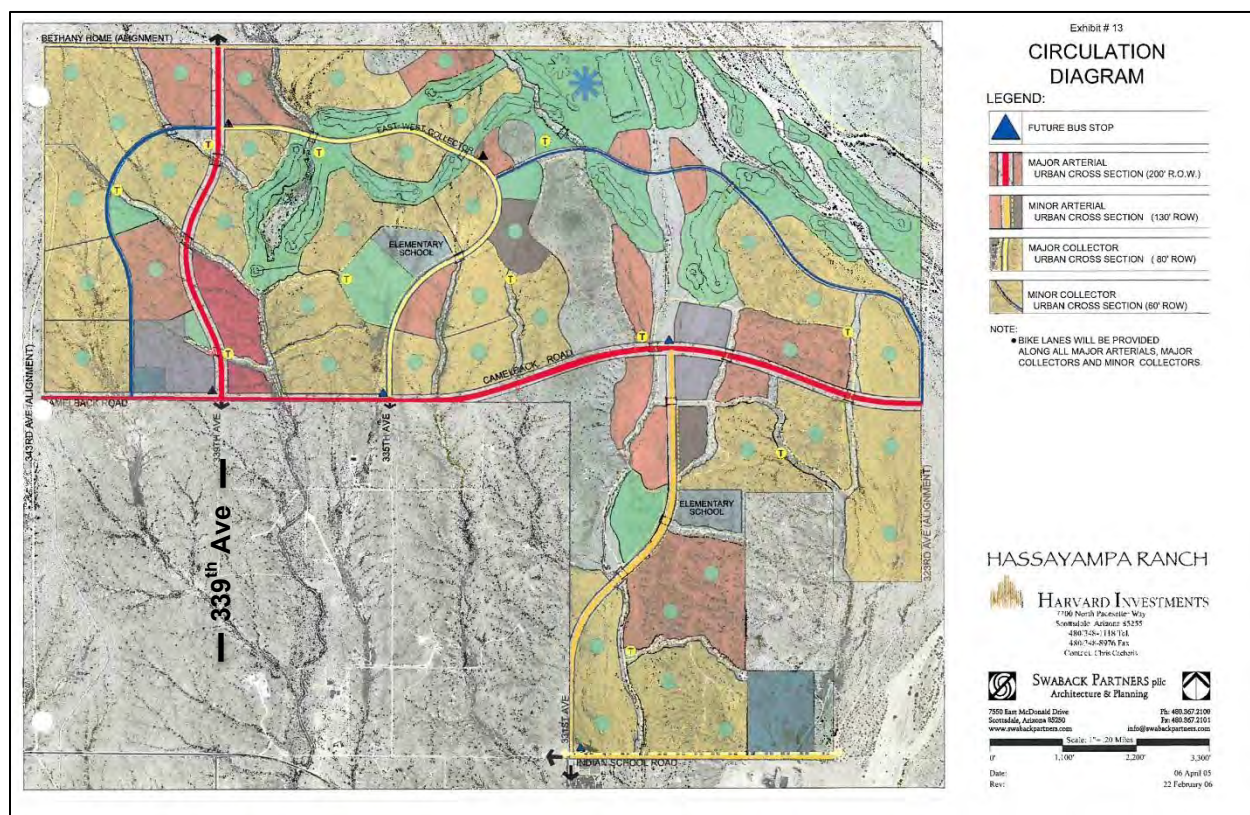


Figure 2-8 Hassayampa Ranch Circulation Diagram

The approved Circulation Plan delineates 200 feet of right-of-way for 339<sup>th</sup> Avenue alignment from Camelback Road to Bethany Home Road for the Hidden Waters Parkway (Illustrated in red in Figure 2-8). The Hassayampa Ranch Circulation Plan depicts a curvilinear alignment for the Hidden Waters Parkway through the development. In general, this parkway alignment is consistent with the Hassayampa Framework Study.



## Douglas Ranch

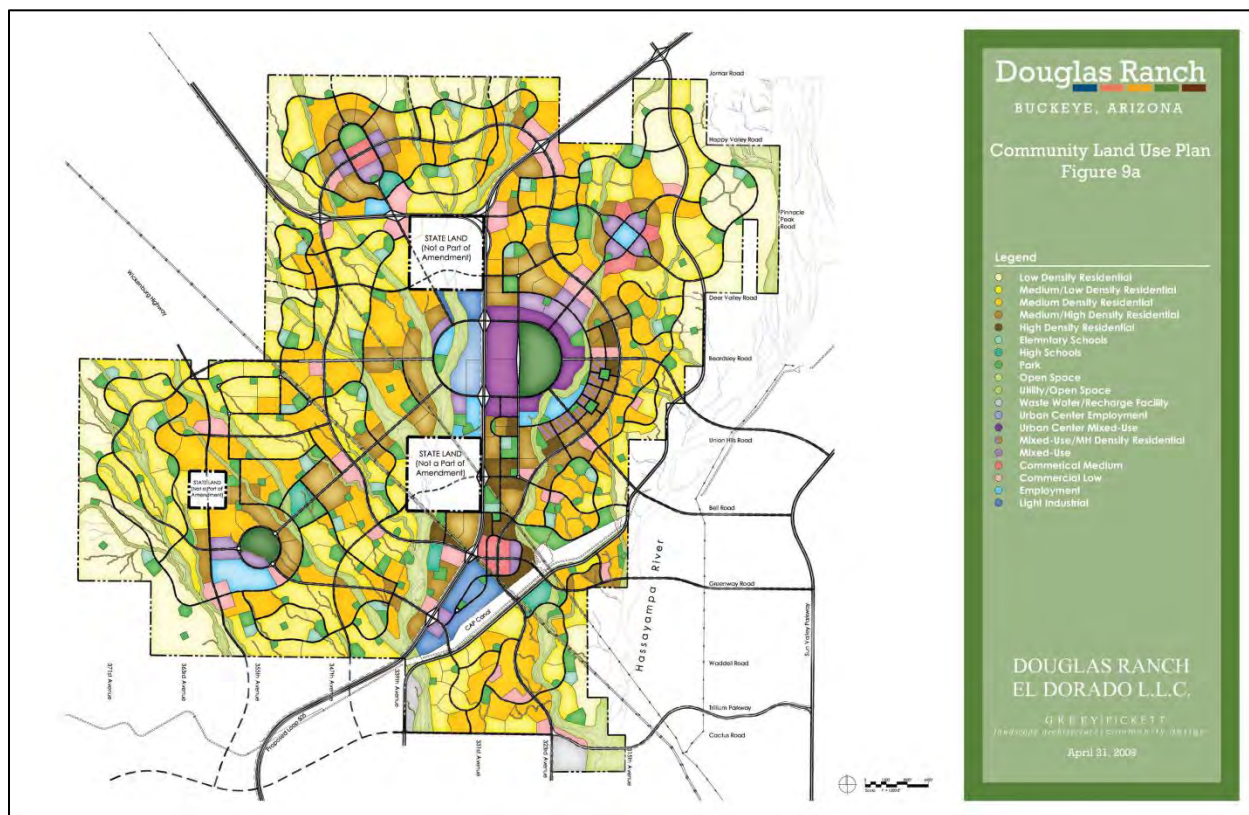
Developer: El Dorado Holdings

Date of Approval: Original 2002; Amendment February 2010: CMPA(M)07-02

Total Acreage: 33,810 acres

Total No. of Dwelling Units: 104,752

Douglas Ranch is the largest Community Master Plan within the study area, and is comprised of over 33,800 acres with approximately 100,000 planned residential dwelling units. At projected build out, Douglas Ranch will include 250,000 to 300,000 residents and 150,000 jobs. The original CMP was approved by the Town of Buckeye Council in 2002 and reflected a vision of lower density suburban single-family residential spread out with strip malls at the corners of arterials. In 2010, an amendment to the CMP was approved to respond to market demands and to incorporate the parkway and freeway concepts of the Hassayampa Framework Study. The CMP was revised to reflect a more sustainable development that offers a diversity of residential housing products and a dense urban central core with four village satellites. The new CMP is intended to better facilitate mass transit in the future. Figure 2-9 illustrates the approved Community Master Plan for Douglas Ranch.



**Figure 2-9 Douglas Ranch Land Use Plan**

The Circulation Plan of the Douglas Ranch CMP preserves 200 feet of right-of-way for the Hidden Waters Parkway along the south side of the CAP canal and along the east side of the proposed development. The CMP alignment for the Hidden Waters Parkway is generally east of the parkway alignment proposed in the Hassayampa Framework



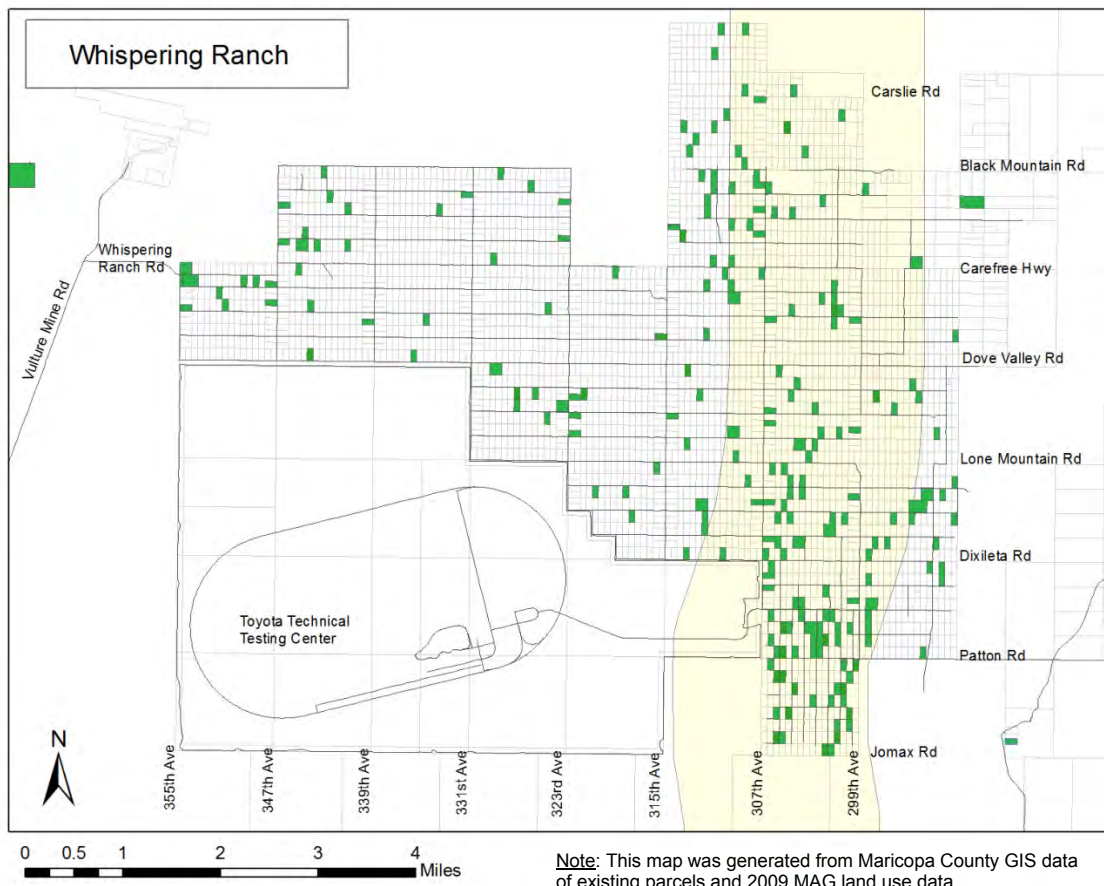


Study. A majority of the land use designations adjacent to the CMP parkway alignment consist of Low Density Residential and Medium/Low Density Residential.

### Whispering Ranch

The Whispering Ranch development is an existing community that was platted in 1965 and is located approximately between Carslie Road and Jomax Road in the northern portion of the study area. Refer to Figure 2-10 for a map of the Whispering Ranch Community.

The Primary access to the Whispering Ranch area is via Patton Road (also the access to the Toyota Technical Testing Center). Secondary access is available from Vulture Mine Road via Whispering Ranch Road. Whispering Ranch is a sparsely populated community that reflects a rural, isolated lifestyle versus that of an urban development. The community is comprised mainly of large residential parcels (five acres) throughout undeveloped subdivisions (i.e. no public water, sewer, or roadway improvements). Houses of varying size and types, including mobile and manufactured homes, are present on some of these parcels (highlighted in green on figure 2-10). As stated previously, some residential structures within this area have fallen into disrepair and are no longer habitable. There is no adopted circulation plan for Whispering Ranch.



**Figure 2-10 Whispering Ranch**



## **3.0 Physical Features**

### **3.1 Existing Topography**

The study area is located within the Basin and Range physiographic province of Central Arizona, which is characterized by numerous mountain ranges rising abruptly from broad valleys or basins. Figure 3-1 depicts the existing topography within the Hidden Waters Parkway study area per the 10-foot contour mapping provided by Maricopa County.

Elevation ranges from approximately 1,065 to 2,300 feet above mean sea level within the study area. Land within the northern portion of the study area includes rolling hills to steep mountains, but the majority of the study area lies on the valley floor just west of the Hassayampa River. Land within the central and southern portion of the study area is generally flat, with small to large drainages flowing primarily south and east where they join the Hassayampa River. The topography surrounding the corridor generally slopes from northeast to southwest.

The average slopes within the northern, central, and southern portions of the study area are 1.0%, 0.7%, and 0.5%, respectively.

### **3.2 Recreation Trails and Park Areas**

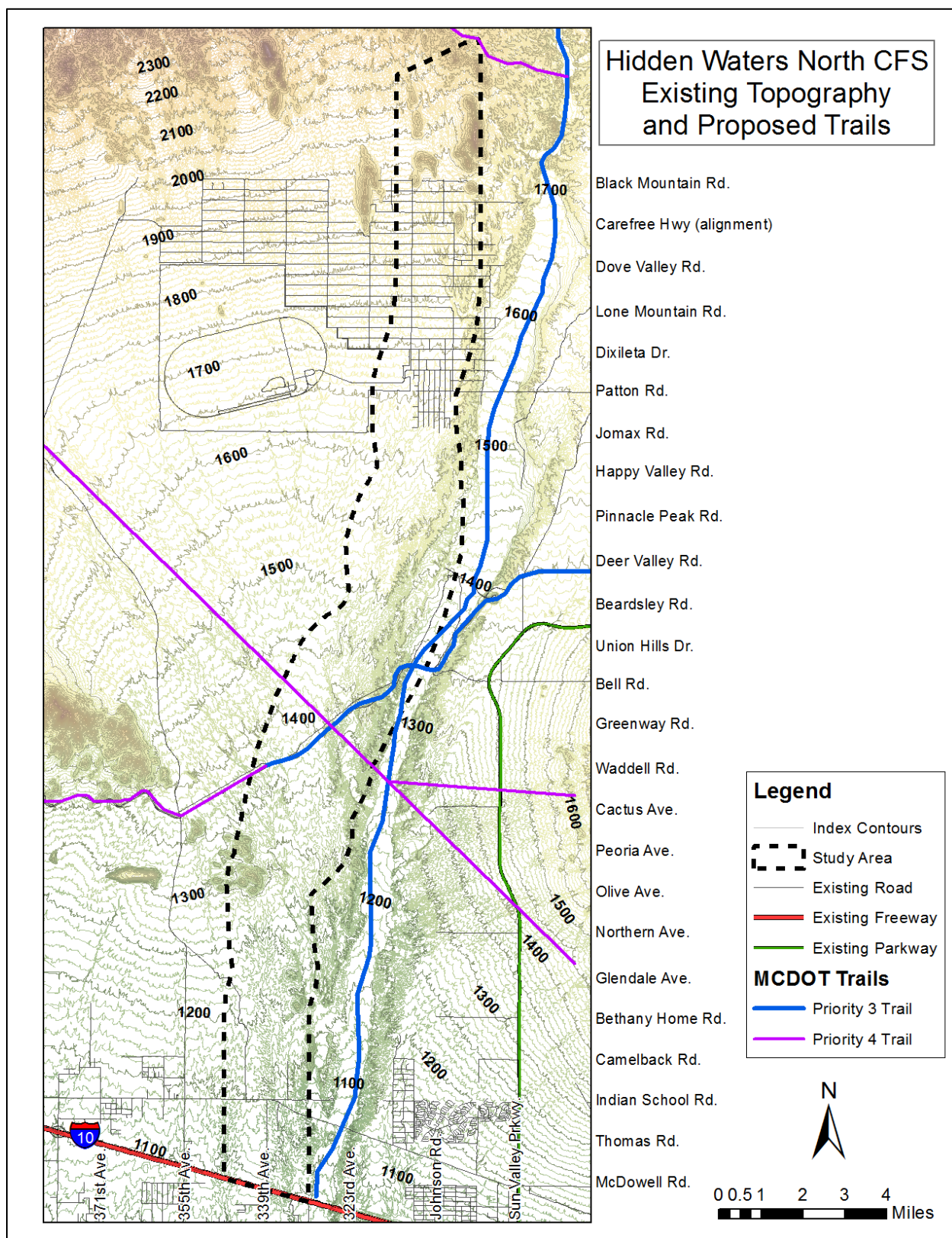
In 2004, Maricopa County published a Regional Trail System Plan to identify network of trails intended to link the county's regional parks and provide/protect natural open space corridors from development. Two paths identified in the Maricopa trail system cross the Hidden Waters Parkway study area (refer to figure 3-1).

The first of these trails follows the CAP canal (segment 103) between the western boundary of the Town of Buckeye to the La Paz County line. The second trail (segment 107) parallels the Liberty-Parker transmission corridor between the La Paz County line and the flood retarding structures just north of I-10. Neither of these trails are considered key components of the regional trails system at this time. However, their importance to the overall trails system will increase as development occurs along the Hidden Waters Parkway study area.

There are no regional county parks within the Hidden Waters Parkway study area. The closest of these facilities is the White Tanks Park which is located approximately seven miles to the east of the study area.







**Figure 3-1 Existing Topography and Proposed Trails**

### 3.3 Drainage

Hidden Waters Technical Memorandum No. 3 presents an overview of the drainage characteristics of the study area. Among the topics discussed in this memorandum are:

- Existing Hydrology Reports
- Past Drainage Problems
- Existing Drainage Facilities
- Existing Concentration Points
- Potential Drainage-Related Issue Segments

The intent of this section is to summarize key aspects of Technical Memorandum No. 3 in order to give an overview of its findings.

#### 3.3.1 Existing Floodplains

The Flood Control District of Maricopa County (FCDMC) has previously completed several reports in the area, two of which cover the entire Hidden Waters Parkway study area. In these reports, 100-year floodplain delineations have been determined for the large and medium watercourses in the region. Figure 3-2 shows the delineated floodplains in the area.

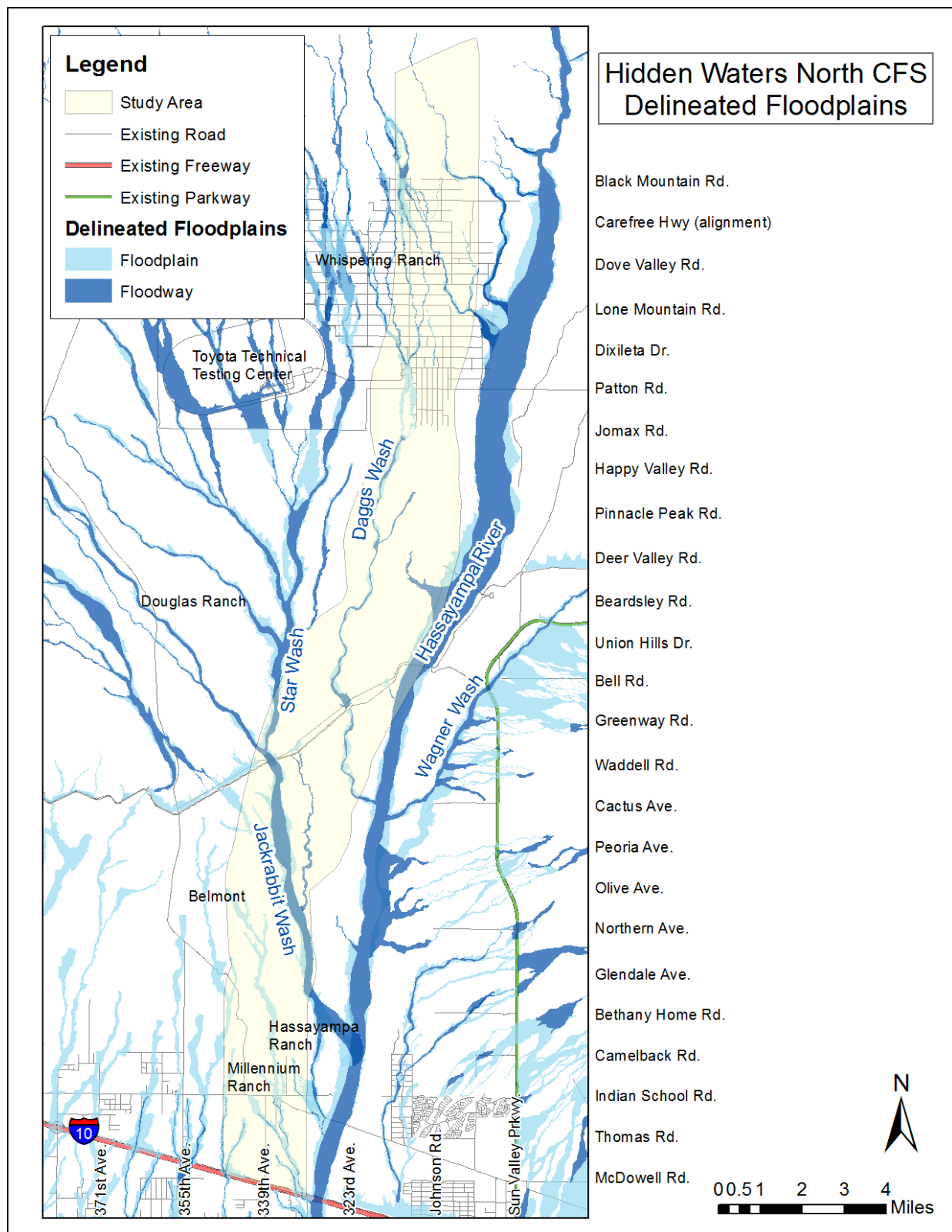
There are numerous tributary washes that flow from the north to southeast into the Hassayampa River. Three of the larger contributing washes within the study area include Star Wash, Jackrabbit Wash, and Daggs Wash.

#### 3.3.2 Existing Drainage Facilities

There are a few existing culverts along 339<sup>th</sup> Avenue and Indian School Road near the southern end of the study area. The majority of the Hidden Waters Parkway study area is undeveloped with no existing drainage improvements. Other roadway drainage crossings are at-grade “dip-crossings” that allow offsite runoff to pass over the top of the road surface.

The Central Arizona Project (CAP) canal is a major drainage feature within the study area as it runs perpendicular to the existing washes and obstructing the historic flow patterns. Hidden Waters Technical Memorandum No. 3 describes seven drainage facilities that cross the CAP canal within the study area. Two of the major drainage structures across the CAP canal include a 1450’ siphon beneath Jackrabbit Wash and a 43’ flume passing Daggs Wash over the canal. The other CAP cross-drainage structures include pipes, culverts and overchutes ranging in size between 30 to 66 inches.



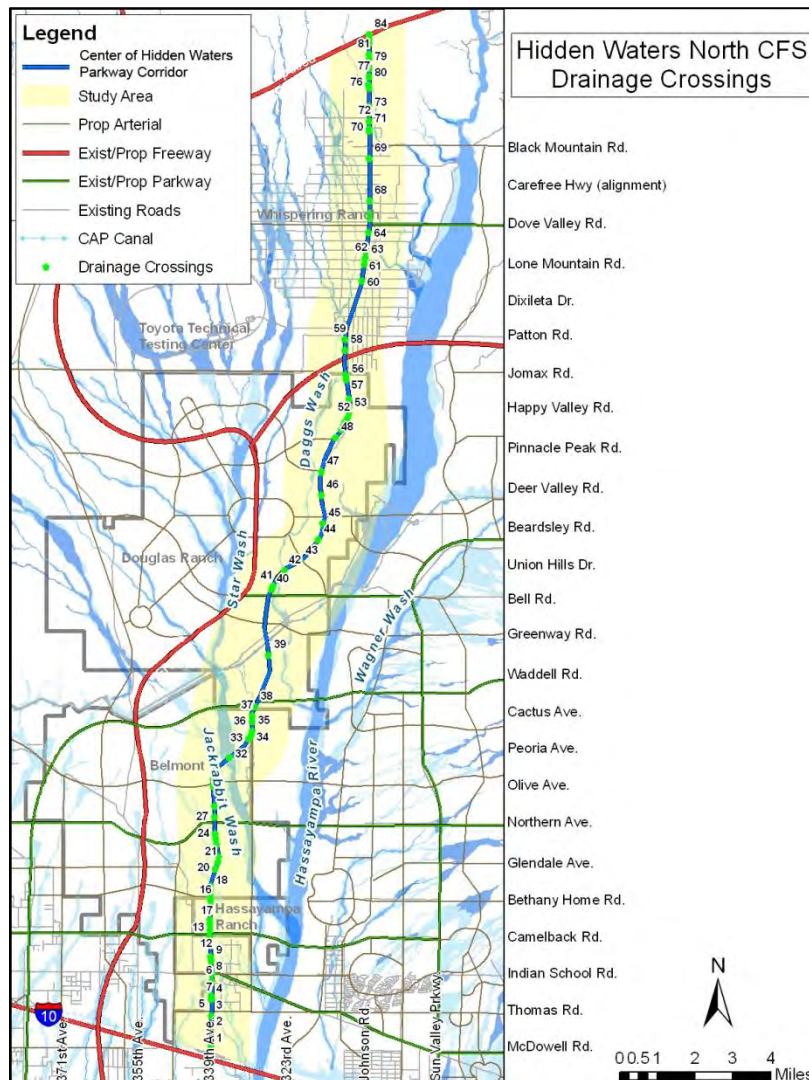


**Figure 3-2 Delineated Floodplains**



### 3.3.3 Hydrology Results

A total of 84 drainage crossing locations were identified across the center of the Hidden Waters Parkway study area. The largest of these crossings corresponds to Jackrabbit Wash which would require a bridge structure to traverse the 33,600 cfs flow during the 100-year storm event. Descriptions of the remaining cross-drainage structures within the study area may be found in the Hidden Waters Technical Memorandum No. 3. Figure 3-3 shows the locations of the identified drainage crossings.



**Figure 3-3 Proposed Drainage Crossings**

All of the potential drainage constraints within the study area can be mitigated through additional engineering and construction efforts. Hidden Waters Technical Memorandum No. 3 concluded that no fatal flaws, based upon drainage issues, occur within the study area.



### 3.4 Existing/Proposed Utilities

Arizona Blue Stake was contacted to identify the utility stakeholders within the Hidden Waters Parkway study area. Table 3-1 contains a list of the utility owners and utility types identified by Blue Stake within the study area.

**Table 3-1 Utility Stakeholders in the Hidden Waters Parkway Study Area**

Utility Company	Type of Utility
AT&T	Fiber Optic, Telephone
Arizona Department of Transportation	Culverts, Electric, Fiber, Gas, Irrigation, Lighting, Propane, Sewer, Storm Drain, Telephone, Traffic Signals, Water
Arizona Public Service (APS)	Aerial and Buried Electric
Central Arizona Water Conservation District	Fiber Optic, Electric, Water
Qwest Local Networks	Fiber Optic, Telephone
Sprint Communications Company	Fiber Optic
Western Area Power Authority	Electric
Zona Communications	Fiber Optic, Telephone

The utility stakeholders identified by Blue Stake were contacted to determine what facilities are within in the Hidden Waters Parkway study area and to request mapping. The following section provides descriptions of the existing utilities within the study corridor by utility stakeholder. Figure 3-4 illustrates the locations of the existing and proposed utilities within the study area.

#### 3.4.1 Existing Utilities within the Hidden Waters Corridor

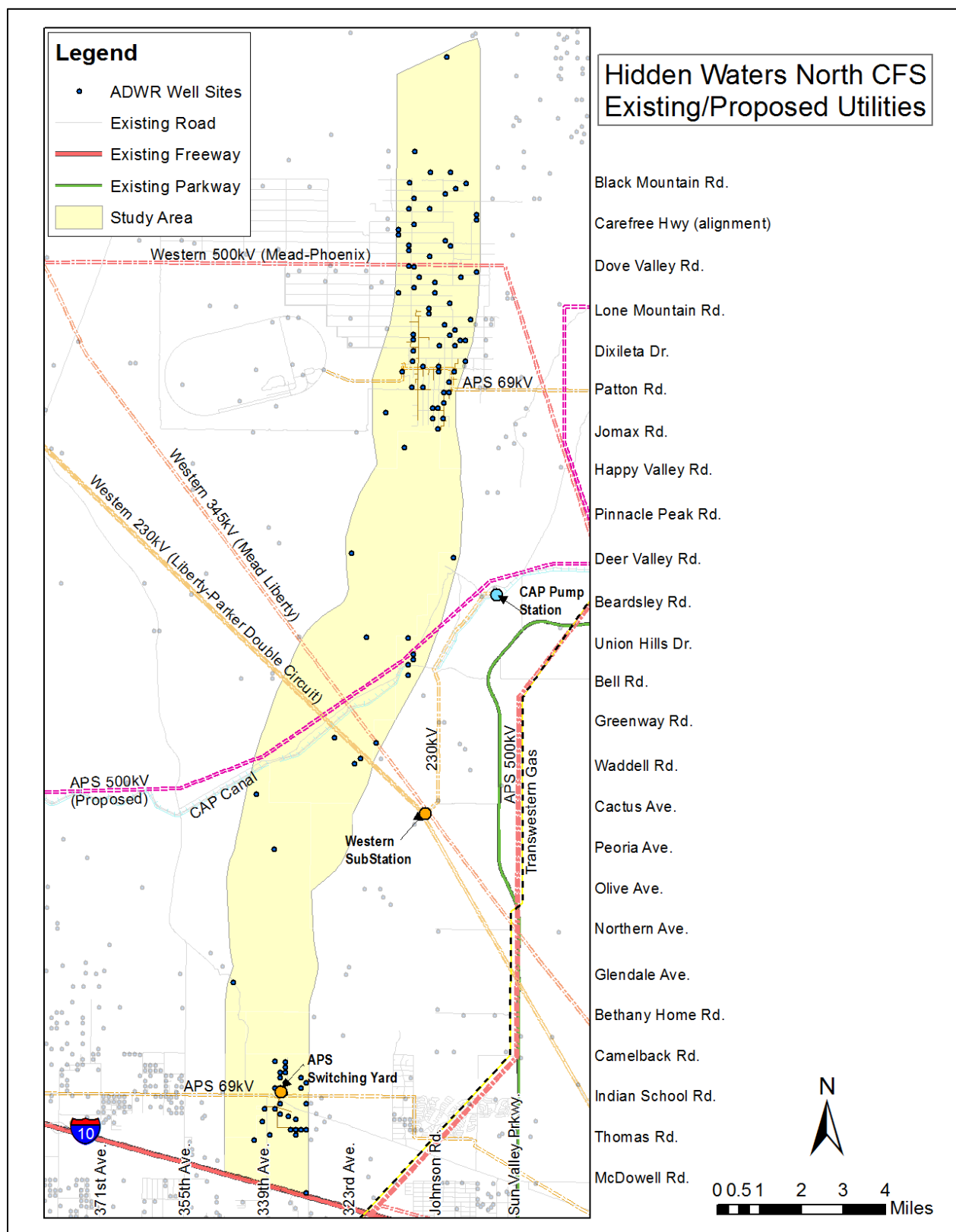
AT&T – AT&T has two transcontinental fiber optic cable systems that cross the study area. The Phoenix-Blythe Nexgen line extends east-west across the study area along the south side of Indian School Road. The second AT&T fiber optic line, the Phoenix-Blythe FTA line, crosses the Hassayampa Framework alignment approximately 1500 feet south of Indian School Road.

Arizona Department of Transportation – The only ADOT Roadway within the Hidden Waters Parkway study limits is Interstate 10 (I-10), which serves as southernmost limit of the study area. ADOT owns/maintains eight culverts across I-10 within the limits of the study area.

Arizona Public Service – APS owns a 69kV transmission line that crosses the Hidden Waters Parkway study area along the north side of Indian School Road. This 69kV transmission line ties into a switching station near 337<sup>th</sup> Avenue then continues to the east. Twelve kV distribution lines branch off of the APS switching station to provide power to residential parcels near 339<sup>th</sup> Avenue.

APS owns a second 69kV transmission line near the northern limit of the study area along the Patton Road and Peak View Road alignments. This transmission line provides power to the Toyota Technical Testing Center as well as a localized region of the Whispering Ranch community (via a branching network of 12kV distribution lines).





**Figure 3-4 Existing/Proposed Utilities**



Central Arizona Water Conservation District – The Central Arizona Project (CAP) canal is a 336-mile long system of aqueducts, tunnels and pipelines that convey water from the Colorado River to Maricopa, Pinal and Pima Counties. It passes through the Hidden Waters Parkway study area on a diagonal between the Waddell Road and Bell Road alignments. The canal is approximately 75 feet wide and is located on land owned by the United States Bureau of Reclamation.

There are buried electrical and fiber optic cables along the CAP canal used to power and control the canals gates and pumps.

Qwest Local Networks – Data requested.

Sprint Communications – Sprint owns/maintains a buried fiber optic cable that crosses the Hidden Waters Parkway study area along the north side of Indian School Road.

Western Area Power Authority – Western has three separate overhead transmission corridors that pass through the study area.

The Liberty Parker transmission corridor has two 230kV transmission lines within a 140 right-of-way. This transmission corridor crosses the Hassayampa Framework Study alignment and CAP canal at the same location (approximately along the Greenway Road alignment).

Mead-Liberty single-circuit 345kV transmission line is located within a 150 foot wide transmission corridor. This overhead transmission line crosses the study area and CAP canal less than a mile away from the Liberty Parker Transmission corridor.

The Mead-Phoenix transmission line crosses the study area along the Dove Valley Road alignment within a 200 foot transmission corridor.

An additional 230kV transmission line connects the Western Substation to the existing CAP Hassayampa Pumping Station.

Zona Communications – Zona Communications facilities consist of aerial fiber optic cable placed on existing APS power poles within the Whispering Ranch community.

### **3.4.2 Existing Wells**

The Arizona Department of Water Resources (ADWR) well registry identifies 139 existing well sites within the study area. These well sites are predominantly concentrated in the Whispering Ranch Community and near the intersection of 339<sup>th</sup> Avenue and Indian School Road. The reported water level depths of the existing wells vary between 80 feet and 650 feet, with the shallowest levels occurring near natural washes.

### **3.4.3 Other Facilities**

The Palo Verde Nuclear Generation Facility (PVNGF) is the largest nuclear energy facility within the United States. It is located approximately seven miles southwest of the Hidden Waters Parkway study area. The federal government has established a 10-mile Emergency Planning Zone (EPZ) where the potential risk of radiation exposure from significant radiological release at Palo Verde. Approximately seven square miles of the Hidden Waters Parkway study area (south of the Bethany Home Road Alignment) are located within the EPZ of the PVNGF.





### **3.4.4 Proposed Utilities within the Hidden Waters Corridor**

Arizona Public Service – APS has plans to construct a new 500kV transmission line from the Palo Verde Nuclear Generation Plant to the proposed Sun Valley Substation, which is located near the existing CAP Hassayampa Pumping Station. The proposed transmission line crosses the Hidden Waters Parkway study area along the north side of the CAP canal.

APS intends to continue the expansion of this 500kV transmission line to the north and east between the proposed Sun Valley Substation and the existing Morgan Substation in the City of Peoria. Although outside of the Hidden Waters Parkway study area, this additional expansion has been identified on Figure 3-4.

## **3.5 Environmental Considerations**

Based on the evaluation of the existing conditions within the study area, additional research, analysis, coordination, and/or permitting will be required before construction of the proposed parkway. The following is a brief on Environmental issues within the study area. For detail and information on the complete list of environmental issues please reference Tech memo #2, Environmental Overview.

### Cultural Resources

Research indicates approximately 15 percent of the study area has been previously surveyed for cultural resources; however, 12 of the 22 surveys were conducted before 2000 and may not meet current ASM, State Historic Preservation Office, and other professional standards for site recording and reporting; as such, it is likely that they may require new survey. The research also resulted in the identification of five cultural resources sites within the study area, including two historic roads, two historic prospects, and one prehistoric lithic scatter. A historic road has been recommended eligible for inclusion in the NRHP under Criterion A, and the lithic scatter, has been recommended NRHP eligible under Criterion D. The other three sites were previously recommended not eligible for listing in the NRHP.

### Natural Resources

The majority of the study area is located within relatively undisturbed Sonoran Desertscrub vegetation. This vegetation supports numerous species of plants and wildlife that are likely to be impacted by project activities. The study area does not contain suitable habitat for any threatened or endangered species included on the USFWS list, and no proposed or designated critical habitat as listed under the Endangered Species Act occurs. The northern third of the study area contains suitable habitat for the Sonoran desert tortoise and the California leaf-nosed bat, which are sensitive species. Coordination with the USFWS, AGFD and BLM regarding listed and species of concern should occur as the project is further developed. Pre-construction surveys for Sonoran desert tortoise may be necessary within the northern portion of the study area. Numerous species of wildlife use the Hassayampa River corridor for forage as well for movement. In addition, wildlife is drawn to the Hassayampa River due to the presence of food and water following precipitation. As the Hassayampa River, the White Tank-Vulture/Hieroglyphic Mountains wildlife linkage corridor, and CAP canal are major wildlife movement areas; avoidance of these areas is recommended. New road construction in the study area is likely to result in habitat loss, increased habitat



fragmentation, decreased connectivity for wildlife, and increased wildlife/vehicle collisions. Fragmentation and isolation of wildlife habitats and populations leads to:

- Decreased colonization and/or exchange between local wildlife populations
- Reduced population sizes
- Reduced genetic diversity
- Reduced species diversity and abundance
- Local extirpations

Roadways have the potential for direct mortality (i.e., roadkill) and habitat loss and to impede the movement of wildlife across the landscape, resulting in habitat fragmentation and the isolation of wildlife populations. Coordination with the AGFD to address potential impacts and explore the possibility of wildlife crossing structures or fencing options to maintain wildlife connectivity is recommended.

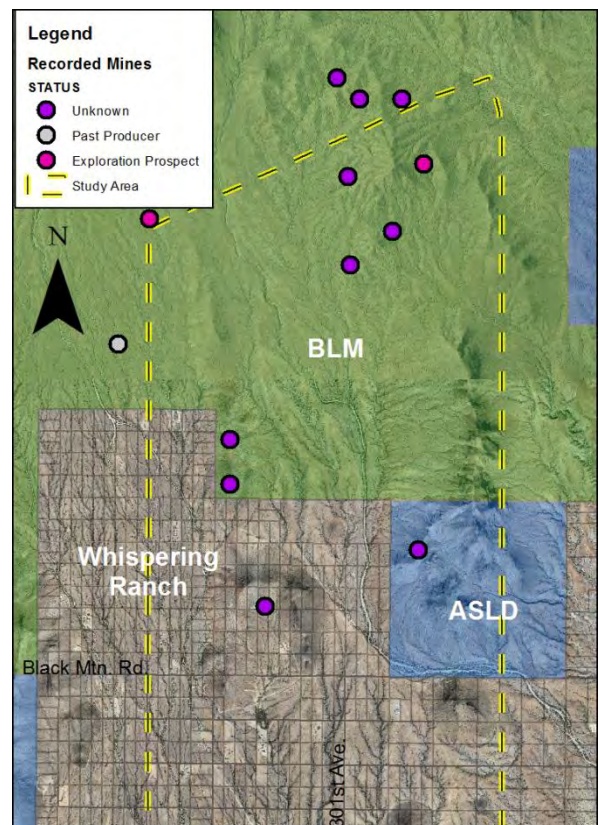
### Land Use and Socioeconomics

Environmental justice populations (elderly and disabled) occur in greater number within the northern half of the study area than in Maricopa County and the town of Buckeye. Some general types of impacts such as acquisition of new right-of-way, increased noise levels, and community continuity are likely with the development of a new transportation corridor. It will be necessary for any NEPA evaluations to address any potential disproportionate adverse effects on these populations as required by Title VI of the Civil Rights Act of 1964 and Executive Order 12898.

### Existing/Abandoned Mines

There are several mines located primarily within BLM lands near the northern end of the study area. Some of the mines are known to have been sealed but the status of most will require further analysis in the field to determine their condition. The mines where the current condition is unknown are identified by purple markers on the adjacent graphic. Additional field analysis of the abandoned mines is outside of the scope of this study.

AGFD noted that abandoned mine sites within the vicinity of the study area have the potential to be inhabited by bats. They recommend that mines potentially impacted by future parkway alignments be inventoried, prior to roadway design/construction, to determine if bat colonies are present. (See Appendix A for additional AGFD recommendations.)



### 3.6 Existing Roadways

There are currently five paved roadways within the Hidden Waters Parkway study area. The current functional classifications, pavement conditions, and existing traffic volumes on these roadways are summarized in Table 3-2.

**Table 3-2 Existing Roadway Conditions**

Road	Segment	Length (Miles)	Existing Facility	Width (Feet)	Surface Type	Pavement Condition	Year Built	ADT (2010)
339th Ave.	5962' North of I-10 to Indian School Road	1.0	2-lane minor arterial	30	Asphaltic Rubber	Very Good	1982	941
Indian School Road	347th Avenue to 331st Avenue	2	2-lane minor arterial	28	Not Reported	Not Reported	Not Reported	213
Patton Road	299th Avenue to 5280' East of 299th Avenue	1	2-lane major collector	28	Penetration Chip	Good	1989	500
299th Avenue	Patton Road to Peak View Road	0.5	2-lane local road	28	Asphaltic Concrete	Excellent	1991	466
Peak View Road	299th Avenue to 5280' West of 299th Avenue	1	2-lane local road	28	Asphaltic Concrete	Excellent	1991	411

\*Data gathered from MCDOT's 2010 roadway summary reports.

### 3.7 Existing Access Control

Access control may be described as the process of managing access points, and thus the number of conflict areas, along a roadway to increase the efficiency and safety of traffic flow.

Access control does not currently exist along the existing roadways within the Hidden Waters Parkway study area, with the exception of the right-of-way along Interstate 10 wherein the access is 100% controlled. This lack of access control has likely contributed to the large number of unpaved dirt driveways observed throughout the study area. There are three partially stop controlled intersections within the study area. These intersections are described in the following sections.

#### Indian School Road and 339<sup>th</sup> Avenue

Indian School Road is an east-west two-lane undivided roadway near its intersection with 339<sup>th</sup> Avenue, with lane widths of approximately 12 feet, and unpaved shoulders. At the intersection, Indian School Road has one lane in each direction of travel with no exclusive turn lanes. There is no traffic control on Indian School Road at the intersection with 339<sup>th</sup> Avenue.

339<sup>th</sup> Avenue has approximately 12 foot lane widths and unpaved shoulders. The lanes of 339<sup>th</sup> Avenue are approximately 12 feet





wide and there are no dedicated turn lanes at the Indian School Road intersection. There is stop control on 339<sup>th</sup> Avenue on the northbound approach to the intersection. The intersection is a “T” intersection, as 339<sup>th</sup> Avenue does not continue to the north.

#### Patton Road and 299<sup>th</sup> Avenue

Patton Road is an east-west two-lane undivided roadway with lanes approximately 12 feet wide. The Patton Road alignment is unpaved west of 299<sup>th</sup> Avenue. Patton Road



has one lane in each direction with no dedicated turn lanes at the intersection. There is no traffic control on Patton Road at the intersection with 299<sup>th</sup> Avenue.

Southbound 299<sup>th</sup> Avenue is a two-lane, undivided roadway that terminates at Patton Road. Both lanes are approximately 12 feet wide with un-paved shoulders. At the intersection of Patton Road, 299<sup>th</sup> Avenue is stop controlled. There are no dedicated turn lanes at the intersection.

#### Peak View Road and 299<sup>th</sup> Avenue

Northbound 299<sup>th</sup> Avenue is a two-lane undivided roadway with unpaved shoulders south of Peak View Road and an unpaved roadway north of Peak View Road. There is no traffic control on 299<sup>th</sup> Avenue or dedicated turn lanes at the intersection with Peak View Road.

Peak View Road is also a two-lane, undivided roadway with unpaved shoulders west of the intersection with 299<sup>th</sup> Avenue and an unpaved roadway east of the intersection. Both eastbound and westbound Peak View Road are stop controlled at the intersection with 299<sup>th</sup> Avenue with no dedicated turn lanes.



### 3.8 Existing Right-of-way

The existing right-of-way varies between 0ft and 75ft throughout the study corridor. Right-of-way data was gathered by reviewing the Maricopa County Assessor's maps, GIS data, and final plats/surveys available on MCDOT's online county plat map index. Table 3-3 summarizes the existing right-of-way widths along the corridor and in nearby areas.

**Table 3-3 Existing Right-of-Way along Proposed Corridor**

Road	Segment			Right-of-Way		
				West/South of Centerline/ Sectionline	East/North of Centerline/ Sectionline	Total Width
339th Avenue	Thomas Road	to	2640' north of Thomas Road	40'	40'	80'
	2640' north of Thomas Road	to	3545' north of Thomas Road	0'	40'	40'
	3545' north of Thomas Road	to	3865' north of Thomas Road	40'	40'	80'
	3865' north of Thomas Road	to	Indian School Road	0'	40'	40'
	Indian School Road	to	2640' north of Indian School Road	65'	0'	65'
	2640' north of Indian School Road	to	3960' north of Indian School Road	65'	32'	97'
	3960' north of Indian School Road	to	Camelback Road	65'	65'	130'
	Camelback Road	to	Bethany Home Road	0'	0'	0'
	Bethany Home Road	to	Northern Avenue	75'	75'	150'
	Northern Avenue	to	Olive Avenue	0'	75'	75'
	Olive Avenue	to	Peoria Avenue	75'	75'	150'
Indian School Road/ Tonopah-Salome Hwy.	339th Ave	to	5280' west of 339th Avenue	20'	20'	40'
	339th Ave	to	5280' east of 339th Avenue	55'	55'	110'

Other areas of dedicated right-of-way within the study corridor are located in the Whispering Ranch development. These areas are summarized in table 3-4.



**Table 3-4 Other Right-of-Way**

Road	Segment			Right-of-Way		
				West/ South of Centerline/ Sectionline	East/ North of Centerline/ Sectionline	Total Width
Peak View Road	299th Avenue	to	660' west of 299th Avenue	45'	45'	90'
	660' west of 299th Avenue	to	990' west of 299th Avenue	20'	45'	65'
	990' west of 299th Avenue	to	2310' west of 299th Avenue	45'	45'	90'
	2310' west of 299th Avenue	to	2640' west of 299th Avenue	20'	20'	40'
	2640' west of 299th Avenue	to	307th Avenue	45	45	90'
299th Avenue	Patton Road	to	Peak View Road	45'	45'	90'





## 4.0 Future Roadway Network

### 4.1 Forecast Traffic Conditions

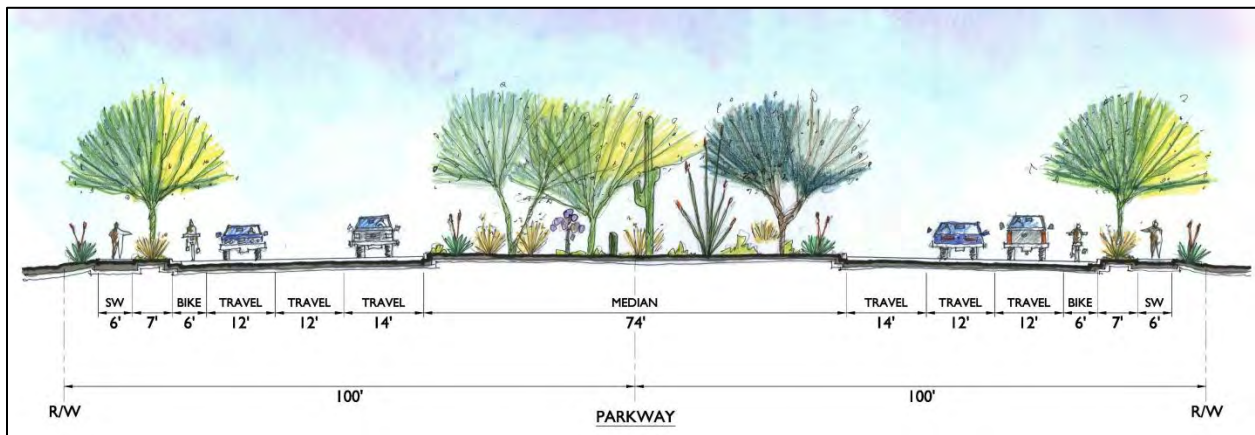
The MAG Hassayampa Framework Study is the basis for all of the forecast traffic volumes for this study. Table 4-1 summarizes the MAG forecasted average daily traffic volumes for the Hidden Waters Parkway study area in the year 2030 and at build-out.

**Table 4-1 Summary of MAG Forecasted Traffic Volume**

Hidden Waters Parkway North Segment		Average Daily Traffic	
From	To	2030	Build-out
I-10	Thomas Rd.	15,000	65,000
Thomas Rd.	Indian School Rd.	13,000	68,000
Indian School Rd.	Camelback Rd.	10,000	67,000
Camelback Rd.	Bethany Home Rd.	12,000	59,000
Bethany Home Rd.	Glendale Ave.	13,000	63,000
Glendale Ave.	Northern Ave.	10,000	34,000
Northern Ave.	Olive Ave.	10,000	34,000
Olive Ave.	Peoria Ave.	11,000	30,000
Peoria Ave.	Cactus Ave.	12,000	51,000
Cactus Ave.	Waddel Ave.	7,000	34,000
Waddel Ave.	Greenway Rd.	7,000	34,000
Greenway Rd.	Bell Rd.	11,000	47,000
Bell Rd.	Union Hills Dr.	4,000	49,000
Union Hills Dr.	Beardsley Rd.	4,000	41,000
Beardsley Rd.	Deer Valley Rd.	3,000	47,000
Deer Valley Rd.	Pinnacle Peak Rd.	3,000	47,000
Pinnacle Peak Rd.	Happy Valley Rd.	2,000	45,000
Happy Valley Rd.	Jomax Rd.	1,000	67,000
Jomax Rd.	Patton Rd.	1,000	45,000
Patton Rd.	Dixileta Dr.	1,000	45,000
Dixileta Dr.	Lone Mountain Rd.	< 1,000	43,000
Lone Mountain Rd.	Dove Valley Rd.	< 1,000	43,000
Dove Valley Rd.	Carefree Highway (alignment)	< 1,000	31,000
Carefree Highway (alignment)	Black Mountain Rd.	< 1,000	32,000

### 4.2 Future Functional Classification

The future functional classification for the Hidden Waters Parkway, an Arizona Parkway, was established during the Hassayampa Framework Study and is depicted in Figure 4-1. Arizona Parkways are described in the Hassayampa Framework Study as intermediate capacity roadways with six to eight lanes, partial access control (primarily right-in/right-out) and no direct-left turns permitted at each intersection. This roadway requires a 200 feet of right-of-way with a 74-foot wide median in urban settings.

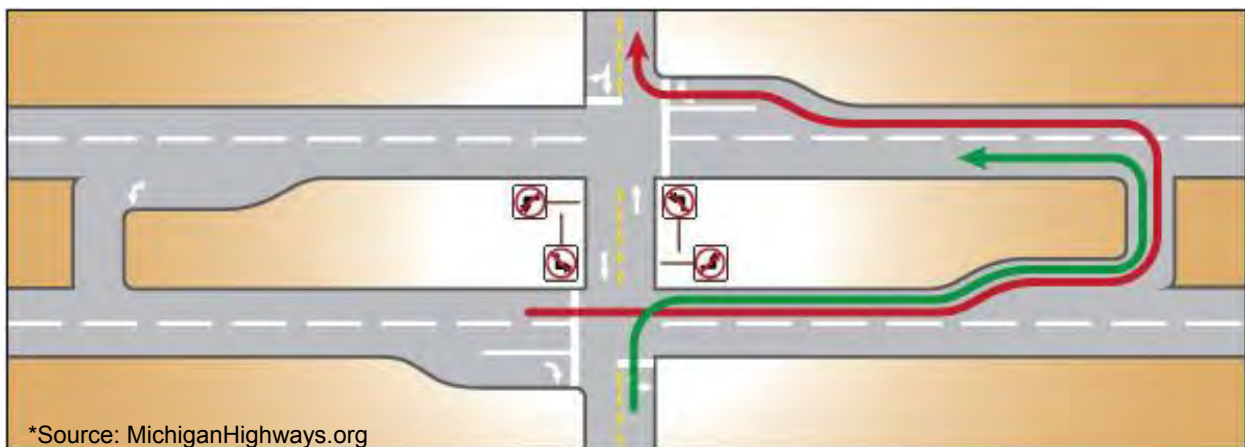


**Figure 4-1 Typical Urban Section for an Arizona Parkway**

The Arizona Parkway concept improves the operational efficiency/capacity of the roadway network by shifting left-turn movements from crossing streets to the medians downstream of the intersections. This adjustment allows for two-phase traffic signal operation at intersections which leads to increased signal green time for through movements and enhanced traffic flow. Figure 4-2 presents a schematic of the indirect left turning movements that are required to preserve two-phase traffic signal operation.

In Figure 4-2, the red line illustrates the path that vehicles traveling on an Arizona Parkway would take to turn left onto an intersecting crossroad. Drivers desiring to turn left at a given crossroad would pass through the intersection to make a U-turn in a median crossover, double back to the intersection, and then make a right-turn onto the desired cross-street.

Similarly, the green line represents the path crossroad traffic would take to turn left onto the Arizona Parkway. Drivers wishing to turn left onto the Arizona Parkway would first turn right onto that parkway, move to the left lane and turn left into the median crossover. When traffic clears sufficiently, the left turn onto the opposite direction of the Arizona Parkway is completed.



**Figure 4-2 Schematic Turning Movements for Arizona Parkway**

Figure 4-3 presents an example of an existing parkway-to-arterial intersection (source [www.bqaz.org](http://www.bqaz.org)).



**Figure 4-3 Aerial Photograph of AZ Parkway Concept**

### **4.3 Programmed Roadway Improvements**

The most recently available Capital Improvement Programs (CIP) and/or Transportation Improvement Programs (TIP) for MCDOT, ADOT, MAG, and the Town of Buckeye were reviewed to determine the potential for future transportation or public improvement projects within the study corridor. Based on this review, no significant publicly funded projects are planned within the next four or more years in the study corridor.





## 5.0 Relevant Plans Reports Guidelines Studies & Standards

Several relevant transportation studies and design guideline documents will be referenced throughout the course of the corridor feasibility study. Some of the studies include the following:

- Interstate 10-Hassayampa Valley Transportation Framework Study, MAG, September 2007
- 2007 Town of Buckeye General Plan, Town of Buckeye, adopted January 2008.
- Town of Buckeye Preliminary Transportation Master Plan, Town of Buckeye, in draft form.
- Town of Buckeye Development Code, Effective January 2010
- Hassayampa Framework Study for the Wickenburg Area, MAG, in draft form.
- Interstate 8 and 10: Hidden Valley Transportation Framework Study, MAG, October 2009
- McDowell Parkway Corridor Feasibility Study: 339<sup>th</sup> Avenue to Dean Road, MCDOT, June 2010
- Hidden Waters Parkway South Corridor Feasibility Study (I-10 to Watermelon Road), MCDOT, June 2010.
- Northern Parkway/Tonopah Parkway Corridor Feasibility Study, MCDOT, ongoing
- Design Guideline Recommendations for the Arizona Parkway, MCDOT, August 2008
- Arizona Parkway Intersection/Interchange Operational Analysis and Design Concepts Study, MCDOT, August 2009.
- Freeway to Parkway Interchange Template, ADOT, October 2010.
- MCDOT Roadway Design Manual, Revised April 2004, MCDOT, April 2004.
- Wildlife Friendly Guidelines- Community and Project Planning, Arizona Game and Fish Department, February 2009
- Guidelines for Bridge Construction or Maintenance to Accommodate Fish & Wildlife Movement and Passage, Arizona Game and Fish Department – Habitat Branch, November 2008
- Guidelines for Culvert Construction or Maintenance to Accommodate Fish & Wildlife Movement and Passage, Arizona Game and Fish Department – Habitat Branch, November 2008



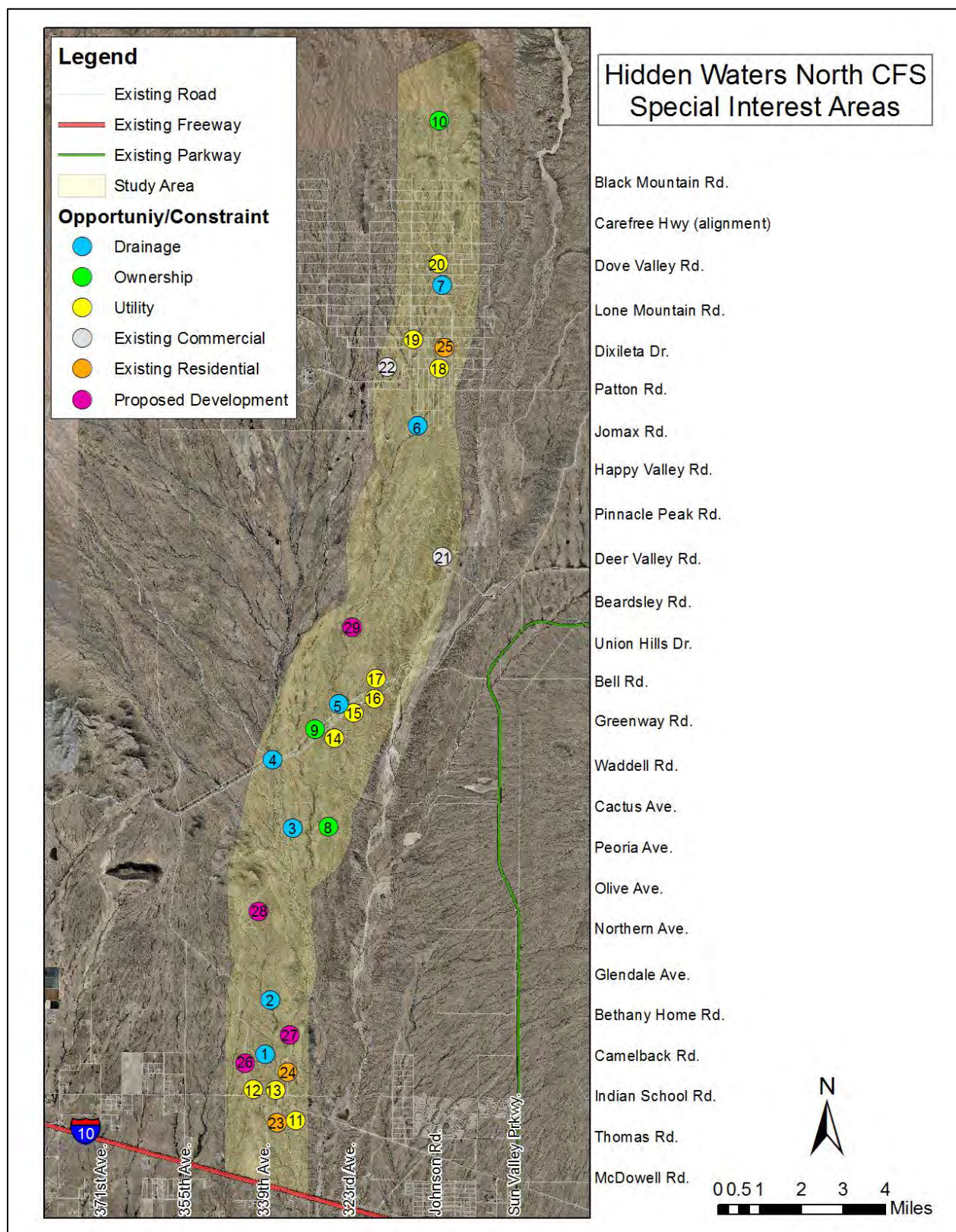
## 6.0 Conclusion/Special Interest Areas

The purpose of this technical memorandum is to document existing and future conditions within the study area and to identify potential fatal flaws that will aid in the development of alignment alternatives. Table 6-1 lists the special interest area identified in this technical memorandum that will need to be considered when creating conceptual alignments for the Hidden Waters Parkway. These areas are highlighted graphically in Figure 6-1 on the following page.

**Table 6-1 Summary and Key of Identified Special Interest Areas**

#	Opportunity/ Constraint	Description
1	Drainage	Opportunity to avoid numerous wash crossings by locating alignments on adjacent ridgelines
2		Centerline of study area aligned with long stretch of existing wash
3		Bridge likely required to cross Jackrabbit Wash
4		CAP siphon beneath Jackrabbit Wash
5		Daggs Wash Flume over the CAP canal
6		Study area passes through complex braided floodplain area
7		Opportunity to avoid numerous wash crossings by locating alignments on adjacent ridgelines
8	Ownership	Bureau of Land Management
9		Bureau of Reclamation
10		Bureau of Land Management
11	Utility	Numerous existing well sites
12		Overhead 69kV and 12kV Transmission Lines (APS), Buried fiber optic lines (AT&T, Sprint)
13		APS Switching Station
14		Overhead 230kV Transmission Lines, Double Circuit (Western)
15		Overhead 345kV Transmission Lines (Western)
16		CAP canal
17		Proposed Overhead 500kV Transmission Lines (APS)
18		Overhead 69kV and 12kV Transmission Lines (APS)
19		Overhead fiber optic lines (Zona Communications)
20		Overhead 500kV Transmission Lines (Western)
21		Numerous existing well sites
22	Existing Commercial	Existing Sand & Gravel Operations
23		Toyota Arizona Proving Grounds
24	Existing Residential	Existing Large Lot Residential Parcels
25		Existing Large Lot Residential Parcels
26		Existing Community of Whispering Ranch
27	Proposed Residential	Proposed Millennium Ranch Development
28		Proposed Hassayampa Ranch Development
29		Proposed Belmont Master Planned Community
30		Proposed Douglas Ranch Community Master Plan





**Figure 6-1 Identified Special Interest Areas**



## Appendix A

- Arizona Game & Fish Department Letter dated June 14, 2011





THE STATE OF ARIZONA  
**GAME AND FISH DEPARTMENT**

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**DEPUTY DIRECTORS**

GARY R. HOVATTER

BOB BROSCHEID



June 14, 2011

Matt Truitt  
EPS Group, Inc.  
2045 S. Vineyard Ave.  
Suite 101  
Mesa, Arizona 85201

Re: Hidden Waters Parkway North Corridor Feasibility Study: Draft-Tech Memo 1 Existing and Future Corridor Features

Dear Mr. Truitt:

The Arizona Game and Fish Department (Department) has reviewed the May 2011 Hidden Waters Parkway North Corridor Feasibility Study: Interstate 10 to Route 74. We have reviewed the Draft-Tech Memo 1 Existing and Future Corridor Features and have a few recommendations and comments for revision in order to fully portray natural resources found within the area.

3.3.3 Hydrology Results

Hidden Waters Parkway will cross a total of 84 desert washes, providing the opportunity to help maintain wildlife connectivity within the area if wildlife crossing structures are properly designed. As explained in our May 10, 2011 correspondence, desert washes the parkway will cross are frequently used by wildlife for habitat and as travel corridors (Henke et al. 2001). The Department recommends constructing a variety of culvert and bridge crossings to accommodate the free movement of large and small species, in addition to preserving the natural hydrological functions of the washes. Crossing structures (for example, culvert, box culvert, bridge, or other as appropriate) should be designed specifically to accommodate wildlife movement and utilize funnel fencing that is essential in guiding animals through. Without these wildlife-friendly structures, species richness and wildlife populations will decline and potentially disappear from the area. Therefore, the Department recommends the following:

- Collaborate with the Department to identify the most biologically suitable locations and designs for wildlife crossing structures (both wildlife overpass and underpass designs should be considered).
- Construct several large bridges within modeled linkage areas and other key wash locations along the parkway corridor that are suitable for passage by large mammals including mule deer. The Department will provide specific recommendations in the future.
- Construct a vehicle bridge over the CAP that is of sufficient size to allow large mammals, including mule deer, continued passage beneath the bridge along the CAP Right of Way (ROW) lands. The CAP corridor ROW has been identified as a wildlife movement corridor and includes

lands set aside for the purpose of wildlife mitigation when CAP was constructed. Preservation of wildlife movement along this corridor remains an important goal for the Department.

For more information on building wildlife crossing structures, fencing, and their specifications, please review the previously sent guidelines or visit <http://www.azgfd.gov/hgis/guidelines.aspx>. However, please contact the Department when incorporating specific guideline criteria into planning documents to ensure the most up-to-date information is used. Often, new information or technology is available before it becomes available on the Department website or other publicly-accessible locations due to a time lag (for example, the Department's 2011 revised Fencing Guidelines are complete but not yet available on the website).

### 3.5 Environmental Considerations

The Department requests that information within the Natural Resources section be updated to include the Sonoran desert tortoise (*Gopherus agassizii*), California leaf-nosed bat (*Macrotus californicus*), and cave myotis (*Myotis velifer*) as potentially occurring within or near the northern portion of the project location. Their official state and federal status should also be included within the Natural Resources section. The Sonoran desert tortoise and the California leaf-nosed bat are listed as Wildlife of Special Concern in Arizona by the Department, but the Sonoran desert tortoise is also listed as a candidate species for listing as threatened under the Endangered Species Act. The cave myotis is also listed as a Species of Concern by the U.S. Fish and Wildlife Service. The Bureau of Land Management (BLM) also has requirements for the mitigation of lost Sonoran desert tortoise habitat on BLM land. For more information, please contact Codey Carter at [codey\\_carter@blm.gov](mailto:codey_carter@blm.gov). The Department recommends that tortoise surveys be conducted during the design phase of the project to determine if tortoises and/or burrows are present within the area of potential affect. For more information on tortoise handling and survey guidelines, please review the attached guidelines or visit <http://www.azgfd.gov/hgis/guidelines.aspx>. We recommend including the tortoise handling and survey guidelines with the appropriate technical report as an appendix for future reference.

The Department recommends further evaluation and inclusion of any information on potential mine sites and/or caves that may be in close proximity (within a few miles) of the study area. We believe there is potential for these sites to be occupied by bats. Just east of the study area, on the east side of the Hassayampa River corridor, and on the south end of the White Tanks Mountains, the Department's Research Branch has been monitoring bat use of the Golden Eye Mine #2 on Buckeye National Guard property between 2003 and 2008. A copula was installed September 2005 by the Department's Development Branch, to protect this important winter bat roost for California leaf-nosed bats. The most recent emergence counts conducted by the Department in 2008 resulted in a total of 691 bats emerging from the roost.

The California leaf-nosed bat is found primarily in Sonoran and Mohave Desert habitat, remains active year-round, and does not migrate. During the summer this species moves to cooler roost sites. They congregate in warm roost sites during the winter but are limited to foraging within approximately 2 miles of the Golden Eye Mine #2 near the White Tank Mountains. This bat species uses visual acuity to glean insects from vegetation and the wash corridors in the area are important foraging areas. Just a bit north of the Golden Eagle Mine our researchers found that males use the Valencia Mine Prospect (also



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on National Guard property) as a lek site, a site for competitive mating displays by males (pers. comm. Shawn Lowry, Department Research Branch).

The Department Recommends:

- Further discuss information within the Technical Memos on mine sites and potential bat use.
- Inventory mine sites in the area that might be impacted by the future parkway to determine whether bats are using them and avoid those that may be occupied by bats.
- Evaluate and select alignment alternatives that avoid direct and indirect impacts to mine sites and associated bat foraging areas.
- Create development buffers around known bat roosts and/or mine sites and minimize the disturbance of natural vegetation and topography in the buffer area. Consult with the Department to determine proper buffer locations and distances.
- Minimize artificial lighting along parkway sections within the roost site buffer areas. Roadway lights restrict movement and fragment habitat along washes, rivers, and linkages resulting in increased habitat fragmentation and isolation (Beier 1995; Stone et al. 2010).
- If mine closures are necessary after thorough evaluation; conduct inspections for bat and other wildlife use prior to any closures and consult with the Department to determine proper closure methods that minimize impacts to wildlife.

Finally, the Department plans to provide you with additional information: 1) identifying ideal locations for wildlife crossing structures and 2) providing further information on mine sites within the proposed parkway alignment. That will be provided once wildlife data collected from the Hassayampa River area has been analyzed.

Thank you for the opportunity to provide comments on the Draft-Tech Memo 1 Existing and Future Corridor Features. If you have any questions, please contact me at 928-341-4069 or [tbommarito@azgfd.gov](mailto:tbommarito@azgfd.gov).

Sincerely,



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