ADOT

Arizona Department of Transportation
Multimodal Planning Division

Task Assignment MPD0015-22:

Statewide Rest Area Study

Final Report

May 2023

Acknowledgement

This study would not have been possible without the support and invaluable insights from the Project Management Team (Myrna Bondoc, Giovanni Nabavi, Robert Wheeler, and Adam McGuire), as well as from members of the Technical Advisory Committee.

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Additionally, the project team would like to express appreciation to Rest Area Managers from the Texas Department of Transportation, California Department of Transportation, Nevada Department of Transportation, Utah Department of Transportation, and New Mexico Department of Transportation for their coordination and responses to surveys.

Executive Summary

The Arizona Department of Transportation (ADOT) operates and manages a statewide system of 19 rest area facilities (33 sites). These facilities provide various services and amenities to the traveling public and commercial drivers along Arizona's state highway system. This *Statewide Rest Area Study* evaluated the long-term needs, functionality, and opportunities for modernizing Arizona's rest area facilities to address the increasing travel demand from growth in tourism, population, and commerce.

Arizona prepared this long-range plan to document the rest area facility needs and identify recommended improvements to rest areas through year 2042. The goals for this plan included:

1. **Assess current rest area facilities and identify deficiencies**
2. **Evaluate future needs for preservation, expansion, modernization, and new facilities**
3. **Develop evaluation criteria and a plan for improvements**

Arizona's rest area facilities and the transportation industry have experienced many changes since the *2011 Statewide Rest Area Study* was developed. Notable changes since the previous plan include changes in traffic patterns and volumes adjacent to rest areas, population increases, changing technology, and new commercial driver requirements. Although most rest areas have been renovated or improved since the previous plan, opportunities for modernization and the need for expansion were explored.

Based on a review of the 2011 Study, existing conditions at rest areas, federal regulations, and industry trends, this study evaluates key issues and opportunities identified by ADOT and stakeholders.

As part of this study's objective to determine the capability of Arizona's rest area facilities to serve existing and future transportation needs, an analysis was conducted to determine their existing needs and deficiencies. The analysis involved evaluating the number, location, and usage of rest areas. The needs assessment also considered four key areas of focus to ensure that Arizona's rest areas support the state's transportation needs over the next 20 years, including the following:

- Rest area spacing
- Alternative stopping opportunities (ASOs)
- Service considerations (modernization and repurposing)
- Truck parking considerations

Section 2 describes the existing conditions and rest area inventory. Although some of ADOT's managed rest areas are spaced beyond the Federal Highway Administration's (FHWA) recommended 60 miles or 1-hour drivetime, none of the rest areas are without an available ASO within the recommended spacing and provide ample opportunities for the traveling public to stop and rest. Therefore, no new full-service rest area locations were identified, and no existing rest areas are recommended for closure.

Since the previous study, ADOT has completed major rehabilitation of 16 of the 19 rest areas. To ensure rest areas continue to meet the traveling public needs, this study evaluated when aboveground and belowground facilities at the rest areas may require a detailed assessment to identify rehabilitation needs. That analysis found that none of the rest areas' aboveground facilities would require an assessment within the short-term planning horizon (0 to 5 years). Furthermore, no belowground facilities are expected to require assessments within short-, mid-, or long-term planning horizons.

Truck parking demand also was reviewed to ensure that Arizona continues to foster economic growth by providing infrastructure for existing and future freight needs. The American Association of State Highway and Transportation Officials (AASHTO) parking forecast model, in conjunction with data from the previously completed *2019 Arizona Truck Parking Study* and *2017 Arizona State Freight Plan,* was relied upon to analyze truck parking needs at ADOT rest areas.

Between 2011 and 2022, a majority of rest areas have experienced an increase in annual average daily traffic (AADT) along the adjacent mainlines. In addition, 14 of the 19 rest areas experienced an increase in the truck traffic percentage (percent of AADT designated as trucks) adjacent to rest areas (as discussed in Section 4.4.1). Results from the AASHTO forecast model, along with undesignated parking locations noted in the *2019 Arizona Truck Parking Study*, show that most rest areas will have truck parking deficiencies by 2042. **Table ES-1** summarizes the overall results from the forecasted deficiencies for each ADOT managed rest area in 2042.

Table ES-1. Rest Area Forecasted Deficiencies in 2042

Map No.[a]	Rest Area	Route	Traffic Direction Served	Restroom Excess/ Deficiencies in 2042		Parking Excess/ Deficiencies in 2042		Water Excess/ Deficiencies (Gallons/Hour) in 2042
				Men	Women	Cars[b]	Trucks[c]	
1	Mohawk	I-8	EB	+4	+3	-3	-15	+891
1	Mohawk	I-8	WB	+3	+2	-14	-10	
2	Sentinel	I-8	EB	+2	0	-16	-15	+773
2	Sentinel	I-8	WB	+4	+3	+7	+1	
3	Ehrenberg	I-10	EB	0	-3	-32	-54	+481
3	Ehrenberg	I-10	WB	+2	+1	-10	-26	
4	Bouse Wash	I-10	EB	2	-1	-10	-41	+126
4	Bouse Wash	I-10	WB	+3	+1	-13	-33	
5	Burnt Well	I-10	EB	-3	-6	-82	-81	+473
5	Burnt Well	I-10	WB	-1	-4	-28	-32	

Map No.[a]	Rest Area	Route	Traffic Direction Served	Restroom Excess/ Deficiencies in 2042		Parking Excess/ Deficiencies in 2042		Water Excess/ Deficiencies (Gallons/Hour) in 2042
				Men	Women	Cars[b]	Trucks[c]	
6	Sacaton	I-10	EB	+1	-1	+11	-21	--[d]
6	Sacaton	I-10	WB	+2	-1	-3	-17	
7	Texas Canyon	I-10	EB	+1	-2	-20	-86	+583
7	Texas Canyon	I-10	WB	+1	-2	-15	-100	
8	San Simon	I-10	EB	+2	+2	-9	-54	+912
8	San Simon	I-10	WB	+3	+2	+6	-59	
11	Haviland	I-40	EB	+5	+2	+8	-50	+1,105
11	Haviland	I-40	WB	+5	+2	+4	-43	
17	Parks[e]	I-40	EB	--[f]	--[f]	--[f]	--[f]	--[f]
17	Parks[e]	I-40	WB	--[f]	--[f]	--[f]	--[f]	
18	Meteor Crater	I-40	EB	+3	+1	-17	-58	+708
18	Meteor Crater	I-40	WB	+3	+0	-14	-64	
12	Painted Cliffs	I-40	Both	+3	+1	-7	-28	+1,026
16	McGuireville	I-17	NB	+3	+1	+15	-11	+486
16	McGuireville	I-17	SB	+2	+0	+12	-22	
9	Sunset Point[g]	I-17	Both	+3	+1	+2	-9	+442
19	Christensen[e]	I-17	NB	--[f]	--[f]	--[f]	--[f]	--[f]
19	Christensen[e]	I-17	SB	--[f]	--[f]	--[f]	--[f]	
10	Canoa Ranch	I-19	NB	+6	+5	+2	+8	--[d]
10	Canoa Ranch	I-19	SB	+6	+5	+16	+9	
13	Hassayampa	US 60	Both	--[f]	--[f]	--[f]	--[f]	+1,105
14	Salt River Canyon	US 60	Both	--[f]	--[f]	--[f]	--[f]	--[f]
15	Mazatzal[h]	SR 87	Both	--[f]	--[f]	--[f]	--[f]	--[f]

[a] *Map No. = Rest area number corresponding to Figure 2-1*
[b] *FHWA vehicles C1-C3 and C5-C7 (includes motorcycles, passenger cars, two axle vehicles, and single-unit vehicles)*
[c] *FHWA vehicles C4 and C8-C13 (includes buses, four or more axle vehicles, and single and multi-trailer vehicles)*
[d] *Pump capacity not available because rest area uses city water*
[e] *Permanently closed, but open to truck parking during the pandemic*
[f] *No data available*
[g] *Rest area under construction, but temporarily open to truck parking*
[h] *Permanently closed*

Based on the analysis of truck parking needs documented in Chapter 10, this study identified short-, mid-, and long-term truck parking expansion recommendations through 2042. Because this study is expected to be updated every 10 years (next update is anticipated in 2032) and to ensure rest areas maintain flexibility as changes in the transportation landscape occur, forecasted deficiencies through 2032 were used to prioritize recommended parking expansions. Among those recommendations, two previously closed rest areas (Christensen and Parks) were recommended for repurposing as truck parking only facilities with limited amenities.

Peer states also were analyzed during this study to capture changes in the transportation industry and to identify best practices for potential implementation into ADOT's rest area program. Stakeholder engagement and input from the Project Management Team also played a crucial role in understanding the needs and potential limitations of modernizing ADOT rest areas. Section 14 describes the types of modernization improvements considered for this study and their resulting prioritization.

Table ES-2 summarizes the overall prioritized recommendations through 2032.

Table ES-2. Overall Short- and Mid-Term Prioritized Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
Short-Term (0-5 Years) Prioritized Recommendations								
1	Texas Canyon	I-10	EB & WB	• Expand truck parking within the existing ROW using minor ramp realignment. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$3,361,344	$3,704,064	$4,646,544	
2	New Safe Truck Parking Only Location	I-10	Both	• Construct a safe truck parking only location along I-10 between Texas Canyon and San Simon within an existing interchange or adjacent to the interstate as a pulloff (site to include gravel lot, high-mast lighting, and trash receptacles).	$4,091,808	$7,462,140	$16,643,952	
3	Bouse Wash	I-10	EB & WB	• EB: Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in NW corner of existing rest area. • WB: Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$4,161,300	$5,423,880	$10,817,070	
4	Parks	I-40	EB & WB	• Convert to permanent truck parking only facility. • Remove existing restroom buildings. • Rehabilitate ramadas and pavement, install vaulted/composting toilets, high-mast lighting, and signage.				$5,260,200
5	Christensen	I-17	EB & WB	• Convert to permanent truck parking only facility. • Remove existing restroom buildings. • Rehabilitate ramadas and pavement, install vaulted/composting toilets, site-lighting, and signage.				$6,336,000
6	Salt River Canyon	US 60	Both	• Install flash flood warning signs, static context-sensitive displays. • Perform structural rehabilitation; replace composting toilets; rehabilitate site paving.				$1,645,050
7	Hassayampa	US 60	Both	• Perform structural, mechanical, and electrical rehabilitation, and Americans with Disabilities Act improvements. • Pave site. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.				$4,248,750
8	San Simon	I-10	EB & WB	• Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s). • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$4,830,000	$6,442,800	$10,878,000	
9	Ehrenberg	I-10	EB & WB	• Upgrade high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • EB: Expand car and truck parking within the existing ROW by relocating ramp along freeway with new ramp gore(s). • WB: Expand truck parking within the existing ROW using minor ramp realignments and provide overflow gravel parking area in NE corner.	$4,413,360	$5,439,034	$9,245,001	
10	Haviland	I-40	EB & WB	• Upgrade high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • EB: Provide overflow gravel parking area in SE corner of existing rest area. • WB: Provide overflow gravel parking area in SW corner of existing rest area.	$2,796,750	$4,193,310	$8,183,360	
11	Sunset Point	I-17	Both	• Provide overflow gravel parking area north of existing ponds.	$1,267,200	$1,996,500	$4,143,150	

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
Mid-Term (6-10 Years) Prioritized Recommendations								
12	Burnt Well	I-10	EB & WB	• Install high-mast lighting and security cameras. • EB: Expand car and truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area. • WB: Provide overflow gravel parking area in NW corner of existing rest area.	$6,392,100	$8,738,400	$16,663,350	
13	Mohawk	I-8	EB & WB	• Upgrade interior lighting with LED lights and install security cameras. • Expand truck parking within the existing ROW using minor ramp realignment.	$1,174,800	$1,491,600	$2,362,800	
14	McGuireville	I-17	NB & SB	• Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • SB: Provide overflow gravel parking between the ponds and restroom building.	$3,212,550	$3,612,708	$5,220,237	
15	Meteor Crater	I-40	EB & WB	• Install security cameras. • EB: Provide overflow gravel parking area in the SW corner existing rest area. • WB: Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s).	$858,480	$1,491,302	$3,366,754	
16	New Safe Truck Parking Only Location	I-40	Both	• 2023 Truck Parking Study to evaluate and identify potential locations along I-40 between Meteor Crater and Painted Cliffs within an existing interchange or adjacent to the interstate as a pull-off (site to include gravel lot, high-mast lighting, and trash receptacles).	N/A	N/A	N/A	
17	Sentinel	I-8	EB	• Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • Provide overflow gravel parking area in SW corner of existing rest area.	$2,550,405	$2,988,645	$4,303,365	
18	Various Locations	N/A	N/A	• Implement wireless internet at rest areas with high utilization/demand or at locations near the state border (potential to use rest area sponsorships or P3s).				N/A
19	Various Locations	N/A	N/A	• Install solar panels at rest areas with high utilization/demand to offset energy use and long-term operations cost (Burnt Well, Sacaton, Painted Cliffs, Bouse Wash, Ehrenberg, and Sunset Point).				N/A

[a] Final surface material and treatment type will be selected during final design.

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Acronyms and Abbreviations

AADT	Annual average daily traffic
AADDT	Annual average daily truck traffic
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphaltic concrete
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADT	Average daily traffic
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
ASO	Alternative stopping opportunity
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
Caltrans	California Department of Transportation
CCTV	Closed-circuit television
DH	Design hourly factor
DMS	Dynamic messaging sign
DOT	Department of Transportation
EB	Eastbound
EJ	Environmental justice
EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
FCC	Federal Communication Commission
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
GIS	Geographic information system
HOS	Hours of service
ITD	Idaho Transportation Department
LTE	Long-Term Evolution
MNDOT	Minnesota Department of Transportation
MP	Milepost
MPD	Multimodal Planning Division
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standard
NATSO	National Association of Truck Stop Operators
NB	Northbound
NDOT	Nevada Department of Transportation

NMDOT	New Mexico Department of Transportation
NRCS	Natural Resources Conservation Service
NWP	Nationwide permit
PCCP	Portland Cement Concrete Pavement
PMT	Project Management Team
ROW	Right-of-way
SB	Southbound
SD	Standard deviation
SDDOT	South Dakota Department of Transportation
SHOPP	State Highway Operation and Protection Program
SY	Square yard
TAC	Technical Advisory Committee
TPAS	Truck Parking Availability System
TSMO	Transportation Systems Management and Operations
TXDOT	Texas Department of Transportation
UDOT	Utah Department of Transportation
UPRR	Union Pacific Railroad
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WB	Westbound

1. Introduction and Background

The 2011 Statewide Rest Area Study has provided a foundation for the Arizona Department of Transportation's (ADOT) strategic plan to expand, preserve, and modernize rest areas for the last 10 years. Although these facilities have served travelers well over the last few decades, recent changes in technology and the transportation industry require a thorough reassessment.

This update to the Statewide Rest Area Study is being conducted by ADOT's Multimodal Planning Division (MPD). This update will develop a comprehensive list of improvements to all 19 of Arizona's state-owned, operated, and maintained rest area facilities. This study will identify, evaluate, and propose strategies to meet the rapidly growing need for the state to provide rest area services to the traveling public through the study target year of 2041.

1.1. Relevant ADOT Studies

Recent efforts completed by ADOT were reviewed for information related to rest areas. The findings of those reviews are summarized as follows:

- ***What Moves You Arizona 2040*** is a long-range transportation plan that provides information to ADOT partners, such as metropolitan planning organizations and councils of government, about transportation needs and investment priorities to inform decisions on state highway funding. This plan identifies goals relevant to this study, such as increased investment in freight reliability and maintaining, preserving, and extending the service life of existing and future state transportation system infrastructure.
- ***2017 Arizona State Freight Plan*** identifies short- and long-term transportation investment priorities and goals that are intended to promote economic growth within Arizona. More than 65% of freight tonnage moved within Arizona uses the highway system. Specifically, the interstate highway system supports the greatest volume of freight (in terms of tonnage and value), particularly along the Interstate 40 (I-40) and Interstate 10 (I-10) corridors. The *2017 Arizona State Freight Plan* identified a statewide shortage of safe truck parking as an issue ADOT should address to improve freight movement, especially on the Interstate 17 (I-17) corridor between Phoenix and Flagstaff and on I-10 between Tucson and Blythe, California.
- ***2019 Arizona Truck Parking Study*** was developed in response to the *2017 Arizona State Freight Plan's* conclusion that inadequate truck parking affects the safety and efficiency of freight movement within the state. Inadequate truck parking causes truck drivers to park on highway shoulders, on-/off-ramps, vacant properties, or local surface streets. Increasing truck traffic volumes statewide have further exacerbated truck parking shortages in Arizona. Truck parking in these undesignated locations negatively affects highway safety, infrastructure condition, and quality of life. The *2019 Arizona Truck Parking Study* identified gaps between truck parking supply and demand, defined infrastructure and policy needs, and proposed potential capacity and technology solutions to improve truck parking in Arizona. The recommendations from the *2019 Arizona Truck Parking Study* included truck expansion projects at several ADOT rest areas.

Specifically, the study recommended that the number of existing truck parking spaces at the Haviland, Bouse Wash, and Sacaton rest areas be expanded and the Meteor Crater Rest Area formalize its overflow parking lots.

1.2. Study Process

This study updates and supersedes the *2011 Statewide Rest Area Study*. The same planning process is being followed: (1) inventory of existing conditions and data collection, (2) forecast future conditions and deficiencies, and (3) develop evaluation criteria and plan for improvements.

A Working Paper was written for each of these listed steps. Then, the Working Papers were combined to create this document.

1.3. Study Goals and Objectives

This study's goals and objectives will expand upon the transportation planning recommendations made by previous studies and plans, including the *Arizona State Freight Plan* (2017), *What Moves You Arizona 2040* (2018), and the *Arizona Truck Parking Study* (2019). **Table 1-1** presents the study's goals and objectives.

Table 1-1. Study Goals and Objectives

Goals/Objectives
Assess current rest area facilities and identify deficiencies. • Inventory existing rest areas. • Identify existing parking deficiencies. • Determine traffic demand peak and capture rates. • Develop benchmarking process to identify best practices.
Evaluate future needs for preservation, expansion, modernization, and new facilities. • Forecast traffic for 5-, 10-, 20-year planning horizons. • Evaluate future levels of service and parking. • Identify rehabilitation and preservation projects for existing facilities. • Identify the need for closing, adding, or expanding existing facilities. • Identify public and private funding opportunities.
Develop evaluation criteria and a plan for improvements. • Develop specific projects and implementation strategies addressing the following areas: motorist safety and security, traffic volumes, distance to alternative facilities, economic development, design features for each facility to operate in a safe and satisfactory conditions, required operating capacity for the planning horizons, and funding opportunities.

1.4. Stakeholder Communication

1.4.1. Project Management Team

The Project Management Team (PMT) for this study was developed to assist in obtaining all relevant information that would be useful in evaluating rest areas. The PMT consisted primarily of ADOT staff from multiple departments, which included:

- MPD
- Transportation Systems Management and Operations
- Facilities Management

The PMT's expertise and knowledge related to rest areas was crucial in identifying the rest areas' existing conditions, needs, and constraints. The PMT held monthly meetings to discuss the study's progress, provide input regarding needs, refine the evaluation criteria, and deliver updates regarding relevant studies and projects.

1.4.2. Technical Advisory Committee

The PMT invited ADOT staff in roles relevant to the study to participate in the Technical Advisory Committee (TAC). The TAC's role was to provide input on technical aspects of the study. Virtual meetings, email updates, and surveys were sent from the PMT to the TAC for their input.

Several TAC and stakeholder meetings were held throughout the study to gather valuable input from ADOT staff and state agencies. The TAC kickoff meeting was held on February 2, 2022.The meeting was held to invite ADOT staff to participate as TAC members, introduce the project and background, and give participants a tentative milestone schedule. The second TAC/stakeholder meeting was conducted on October 19, 2022, to gain input regarding existing conditions and forecasted deficiencies. The TAC and stakeholders were asked to participate in a survey during the development of the evaluation criteria to further help define priority improvements.

1.4.3. Tribal Consultation

As several rest areas are located on or adjacent to Tribal lands, this study also sought to obtain input throughout the process regarding available data and recommendations from Tribal communities. This study coordinated with ADOT's Tribal Liaison to ensure Tribal communities had multiple opportunities to provide input and recommendations. Letters were sent to the Tribes in June 2022. Of the four Tribes contacted, only two Tribes (San Carlos Apache and Gila River Indian Community) provided a response. Coordination meetings with the San Carlos Apache Tribe and the Gila River Indian Community were held on August 17, 2022 and November 2, 2022, respectively. These meetings were held to discuss needs and issues related to the Salt River Canyon and Sacaton rest areas. Input received as part of those meetings is summarized in Section 14.

1.4.4. Public Input

Public engagement was also an integral part of this study's process and public outreach activities resulted in effective input. A project website was created to provide the public with the opportunity to track the study's progress and review documents relevant to the study. This Final Report was posted to the study's website (https://azdot.gov/planning/transportation-studies/arizona-statewide-rest-area-study) to allow the public to review and comment prior to being published. As a result, 163 public comments were received and responded to. Response to public comments were posted online to the study's website.

1.5. Data Collection

This study collected data to (1) evaluate the existing conditions of Arizona's rest area facilities and their ability to meet traveler's existing and future needs, (2) identify deficiencies, and (3) implement emerging trends solutions that align with the goals and objectives of this study. Data needs were developed through careful consideration of this study's objectives and a review of the 2011 *Arizona Statewide Rest Area Study*.

The data needs identified for this study included the following:

- Rest area locations (route, mileposts, direction, and nearest exit)
- Existing and future traffic (includes differentiation between passenger vehicles and trucks)
- Existing rest area usage
- Distance to alternative facilities (operating 24 hours a day and 7 days a week)
- Rest area right-of-way (ROW) and adjacent land ownership
- Existing amenities at rest areas
- Annual operation and maintenance costs
- Existing utilities at rest areas (location, condition, and required permits)
- Americans with Disabilities Act (ADA)-compliant features at rest areas
- Completed improvements at rest areas (since the 2011 Study)
- Programmed improvements (as documented in ADOT's 2022-2026 5-Year Construction Program)

In addition, data from successful "peer" state rest area programs were collected for the purpose of updating the benchmarking process previously developed as part of the 2011 Study. This information also was used to determine contemporary best practices. Six peer states were selected based on their proximity and relation to Arizona, ongoing initiatives (I-10 Coalition), and input from the ADOT PMT. Although Florida is not a neighboring state to Arizona, the Florida Department of Transportation recently completed an update to its *Statewide Rest Area Long-Range Plan* (2020), which highlights emerging trends and recent changes in the transportation landscape. Therefore, Florida also was included as a peer state. The states selected for review included:

- Texas
- California
- Utah
- Nevada
- New Mexico
- Florida

California and New Mexico will be prioritized as they connect to Arizona through two major freight corridors in the state, I-10 and I-40.

1.5.1. Methodology

Data collection for this study was conducted between February and April 2022. Data were acquired through three major sources. The first method involved desktop research of available data acquired from publicly accessible and accredited online sources, including geographic information system (GIS) data. Desktop data collection largely consisted of updates to sources used for the prior *2011 Arizona Statewide Rest Area Study*, as well as new ADOT initiatives and guidelines published since the previous study. Secondly, data not readily available to the public was acquired directly from the appropriate agency.

The third method of data collection involved field visits to each rest area for the purpose of verifying and documenting existing onsite conditions. Field visits were conducted in March 2022 over a 3-week period. It should be noted that the Bouse Wash and Sentinel Rest Areas were under construction at the time of the field visits, and data could not be confirmed. In addition, the Mazatzal Rest Area is permanently closed, and data could not be collected. Finally, the Parks and Christensen Rest Areas are temporarily open to truck parking during the pandemic. Only data related to truck parking were collected at these two locations. The following data were obtained for each rest area where data were collected:

- **Truck counts** were obtained in the field between 5:00 p.m. and 5:00 a.m. to get accurate numbers for truck parking utilization for each rest area.
- **Site conditions** were examined, including building condition, utilities, roadway conditions, parking utilization, safety and security, signage, ADA-compliant facilities, and all available services. These data were collected using the GIS-based application software Survey123.
- **User behavior** observations were examined using a rest area evaluation checklist (**Appendix A**) that included parking availability, observed lengths of stay, preferred parking locations, visitor tendencies, and other observational data on how the facility is being used.
- **Leading peer state** information was obtained during the desktop research portion of the data collection effort. For peer states that do not have publicly accessible data needed for this study, a questionnaire was developed. When approved by the ADOT PMT, the peer state questionnaire was distributed to peer state rest area program and/or facility managers on April 6, 2022.

2. Existing Conditions

2.1. Rest Area Locations

Rest areas in Arizona are located along interstates, state roads, and other roads in all 7 ADOT Districts. In total, there are 35 rest areas located in Arizona, as presented on **Figure 2-1**. Of the 35 rest areas, 19 are owned and operated by ADOT, and 1 (Navajo Bridge Rest Area) is owned by ADOT and jointly maintained by ADOT and the National Park Service. The remaining 15 rest areas are owned and operated by other agencies. For the purposes of this study, only those rest areas solely managed by ADOT will be evaluated. The 19 rest areas (33 sites) being evaluated by this study are summarized in **Table 2-1**.

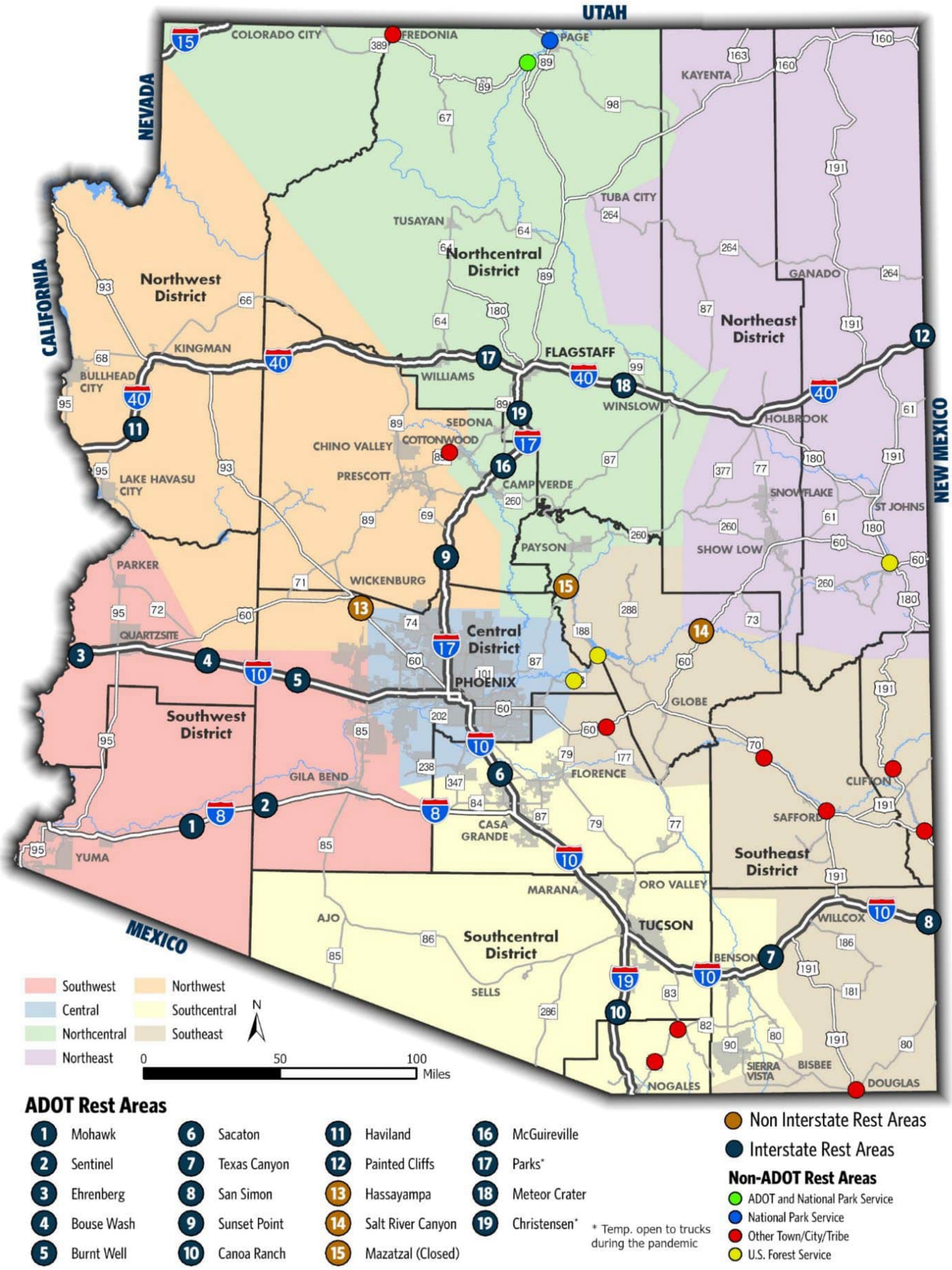

Figure 2-1. Statewide Rest Areas

Table 2-1. ADOT Rest Area Locations

MAP No.[a]	Rest Area	ADOT District	Route	Traffic Direction Served	Milepost[b]
1	Mohawk	Southwest	I-8	EB	55.8
1	Mohawk	Southwest	I-8	WB	56.5
2	Sentinel	Southwest	I-8	EB	83.6
2	Sentinel	Southwest	I-8	WB	84.9
3	Ehrenberg	Southwest	I-10	EB	4.4
3	Ehrenberg	Southwest	I-10	WB	5.3
4	Bouse Wash	Southwest	I-10	EB	52.2
4	Bouse Wash	Southwest	I-10	WB	52.9
5	Burnt Well	Southwest	I-10	EB	86.0
5	Burnt Well	Southwest	I-10	WB	86.8
6	Sacaton	Southcentral	I-10	EB	181.7
6	Sacaton	Southcentral	I-10	WB	183.5
7	Texas Canyon	Southcentral	I-10	EB	320.2
7	Texas Canyon	Southcentral	I-10	WB	320.8
8	San Simon	Southeast	I-10	EB	388.4
8	San Simon	Southeast	I-10	WB	389.0
9	Sunset Point	Northwest	I-17	Both	252.8
10	Canoa Ranch	Southcentral	I-19	NB	32.7
10	Canoa Ranch	Southcentral	I-19	SB	33.7
11	Haviland	Northwest	I-40	EB	22.6
11	Haviland	Northwest	I-40	WB	23.2
12	Painted Cliffs	Northeast	I-40	Both	359.0
13	Hassayampa	Southwest	US 60	Both	116.1
14	Salt River Canyon	Southwest	US 60	Both	292.9
15	Mazatzal[c]	Southwest	SR 87	Both	235.7
16	McGuireville	Northcentral	I-17	NB	296.5
16	McGuireville	Northcentral	I-17	SB	297.1
17	Parks[d]	Northcentral	I-40	EB	181.6
17	Parks[d]	Northcentral	I-40	WB	182.7

MAP No.[a]	Rest Area	ADOT District	Route	Traffic Direction Served	Milepost[b]
18	Meteor Crater	Northcentral	I-40	EB	235.2
18	Meteor Crater	Northcentral	I-40	WB	236.4
19	Christensen[d]	Northcentral	I-17	NB	323.8
19	Christensen[d]	Northcentral	I-17	SB	324.3

[a] Map No. = Rest area number corresponding to Figure 2-1
[b] Milepost = Location of mainline off-ramp intersection for rest area
[c] Permanently Closed
[d] Permanently closed, but temporarily open to truck parking during the pandemic
Notes:
EB = eastbound; NB = northbound; SB = southbound; WB = westbound
I-8 = Interstate 8; I-17 = Interstate 17; I-19 = Interstate 19; US 60 = U.S. Highway 60; SR 87 = State Route 87

2.2. Right-of-Way and Land Ownership

2.2.1. Right-of-Way

The existing ROW information about the rest areas was obtained from ADOT. ADOT was in the process of updating the existing ROW data during the period these data were received (**Figure 2-2**).

2.2.2. Land Ownership

The land ownership information for each of the rest areas was obtained from the Arizona State Land Department (ASLD). The ownership of the land at and adjacent to the rest area varies per location. The land ownership of the rest areas and adjacent land is shown in **Figure 2-3**.

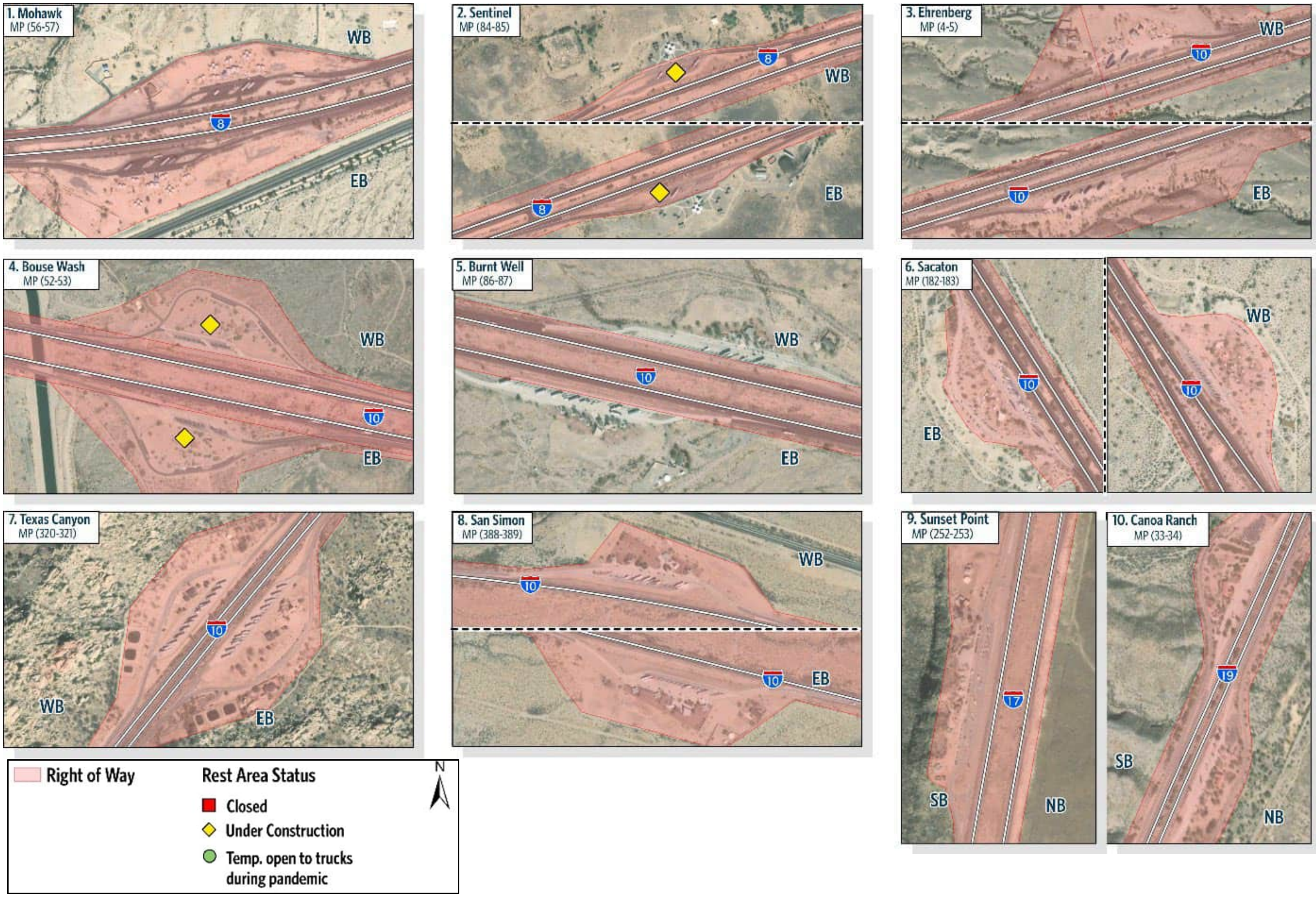

Figure 2-2. Existing Right-of-Way (Page 1 of 2)

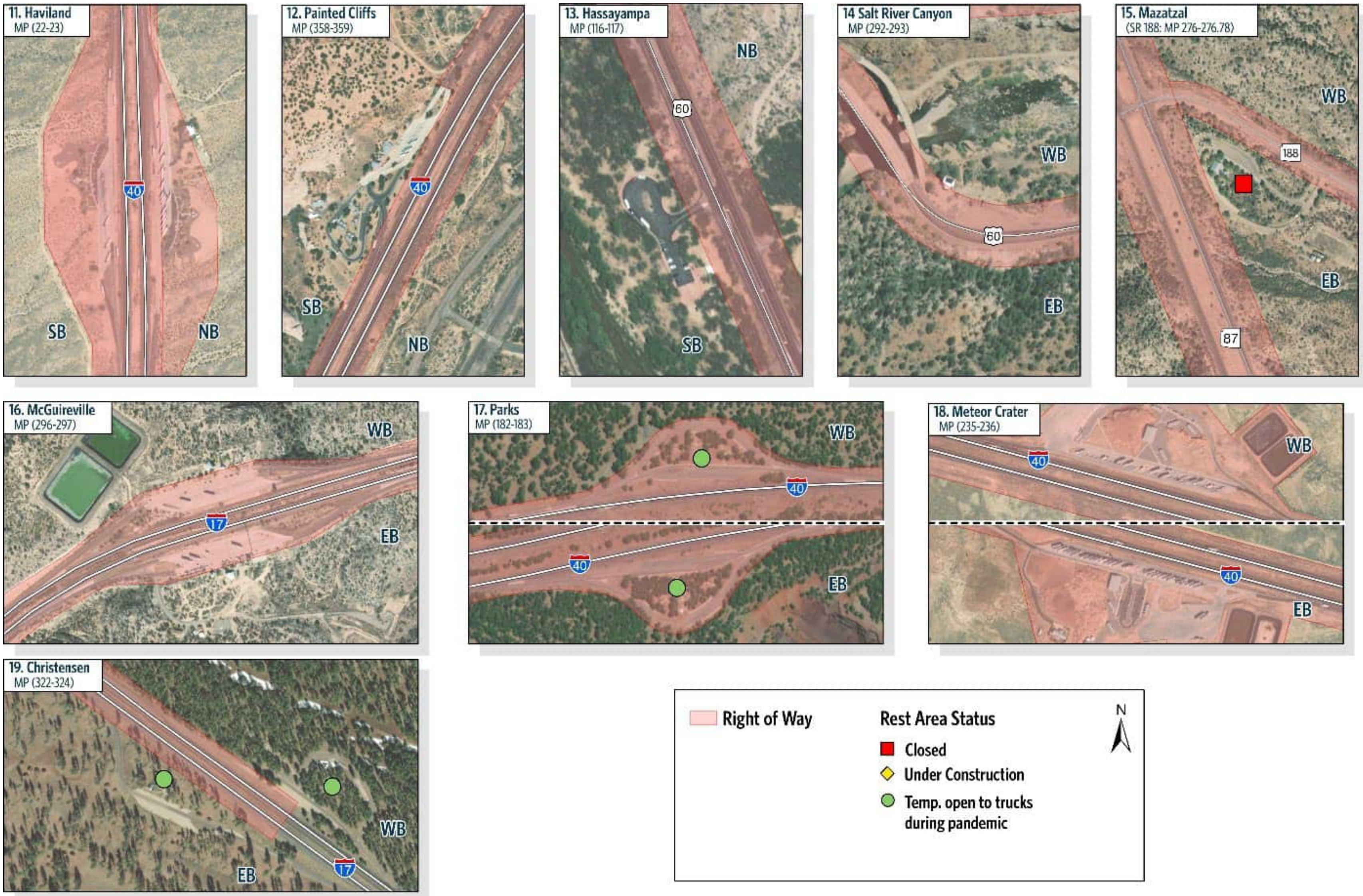

Figure 2-2. Existing Right-of-Way (Page 2 of 2)

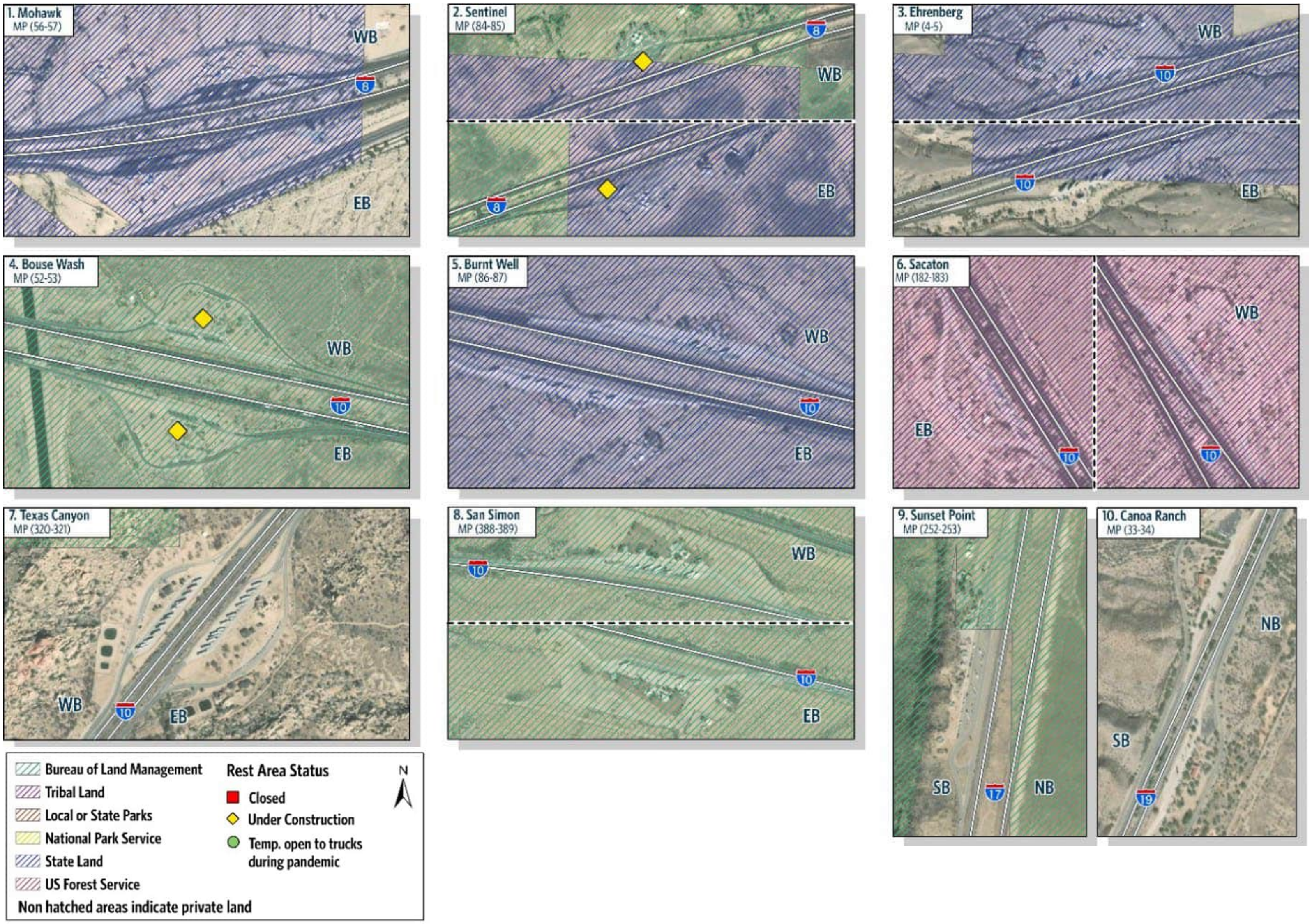

Figure 2-3. Existing Land Ownership (Page 1 of 2)

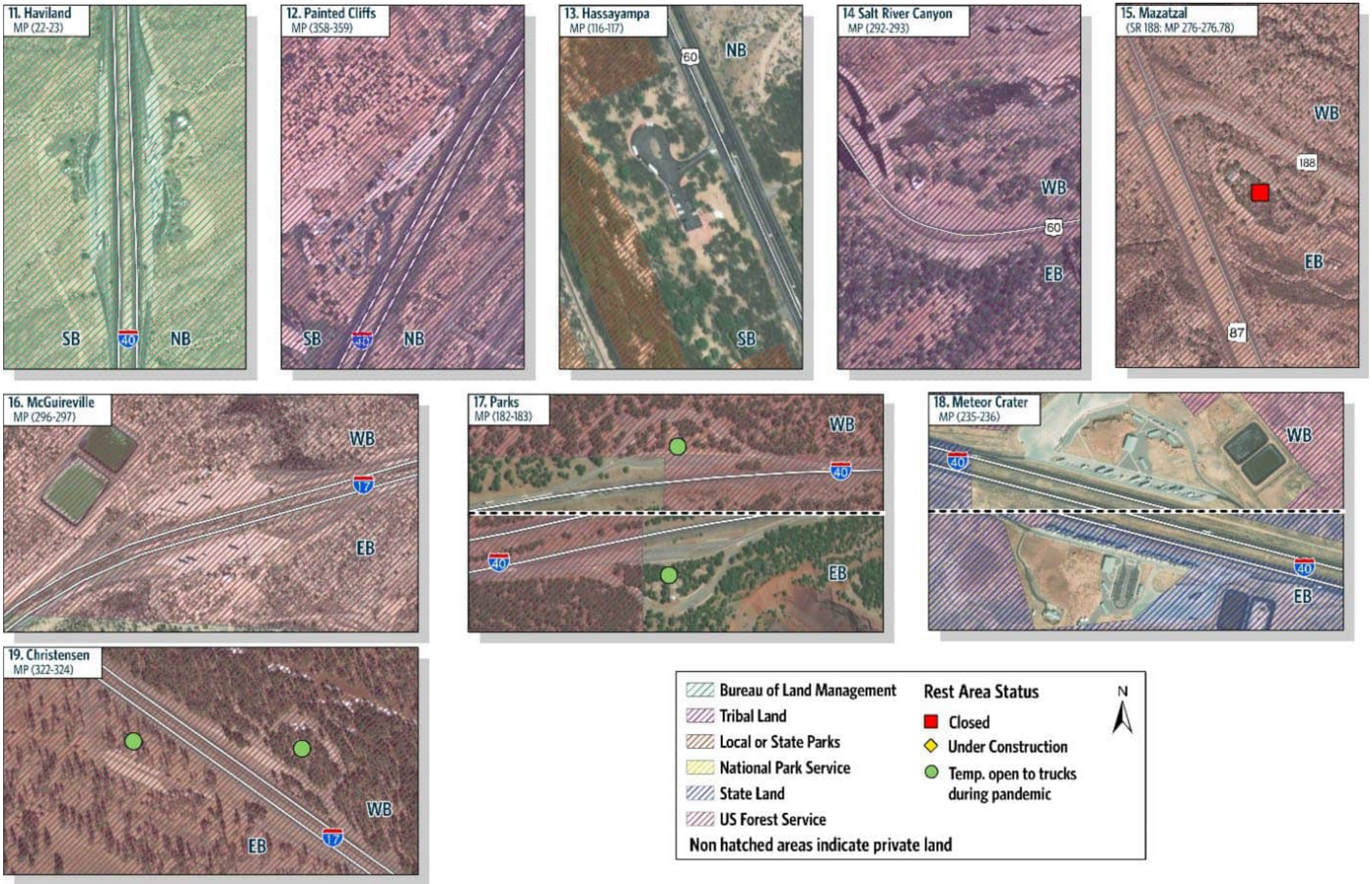

Figure 2-3. Existing Land Ownership (Page 2 of 2)

2.3. Environmental Overview

2.3.1. Environmental Background

Preliminary information about the natural environment in the vicinity of each rest area was obtained from the Bureau of Land Management (BLM), the U.S. Environmental Protection Agency (EPA), the Arizona Game and Fish Department (AGFD), the U.S. Fish and Wildlife Service (USFWS), the National Wetlands Inventory, and the Natural Resources Conservation Service (NRCS). **Figure 2-4** illustrates the biological and water resources and other environmental features adjacent to the rest areas.

As presented on **Figure 2-4**, 13 rest areas are located adjacent to a habitat block and 11 are in a wildlife linkage zone. As defined by AGFD, a habitat block consists of important wildlife habitat that can reasonably be expected to remain wild for at least 50 years, and a wildlife linkage zone is an area critical to wildlife movement. Coordination with AGFD is recommended during the rest area study and design processes.

At least 14 rest areas are located adjacent to washes, streams, or creeks, including the Hassayampa and Salt River Canyon areas. Coordination with the U.S. Army Corps of Engineers is recommended to determine the appropriate level of investigation and permitting required under the Clean Water Act. In addition, the Canoa Ranch rest area is located within the Upper Santa Cruz and Avra Basin sole source aquifer; coordination with the EPA would be necessary prior to construction at this rest area. No prime or unique farmland is present at or immediately adjacent to any of the 19 rest areas (NRCS 2022)[1].

No suitable habitat for sensitive species is present at the rest areas because of the high level of disturbance at each location and the continuously maintained landscape areas. However, the rest areas tend to be in the vicinity of undeveloped land that may provide potential habitat for sensitive species. The USFWS Information for Planning and Consultation system was used to identify federal threatened and endangered species within 2 miles of each rest area (**Table 2-2**). Ground surveys and further coordination with USFWS, AGFD, and BLM would be required to determine suitability of habitat, whether sensitive species are likely to occur in the project area, and potential impacts from construction on both habitat and species.

[1] U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2022. Online Soil Survey. Accessed March 7, 2022. https://websoilsurvey.sc.egov.usda.gov/app/HomePage.htm.

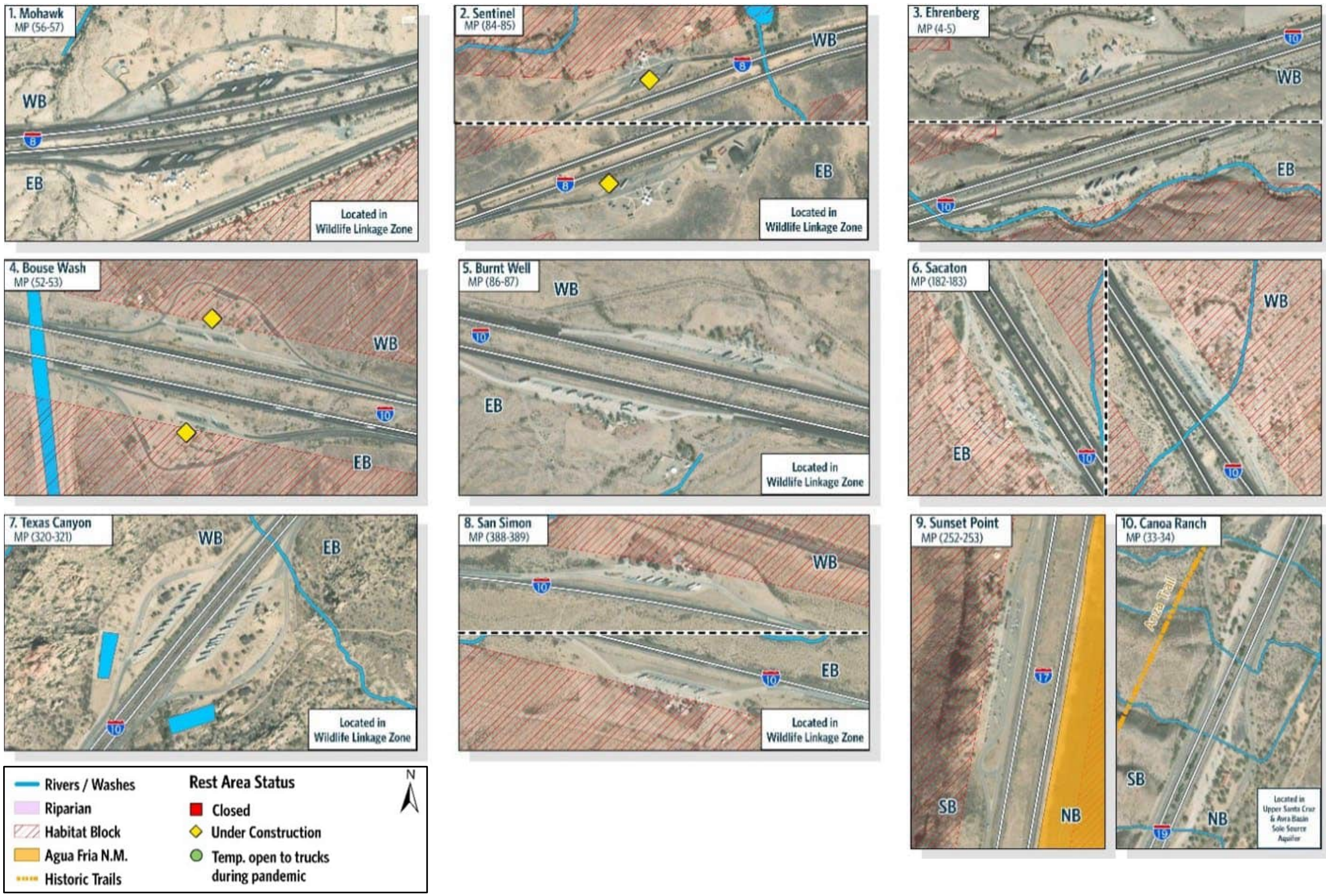

Figure 2-4. Preliminary Environmental Features (Page 1 of 2)

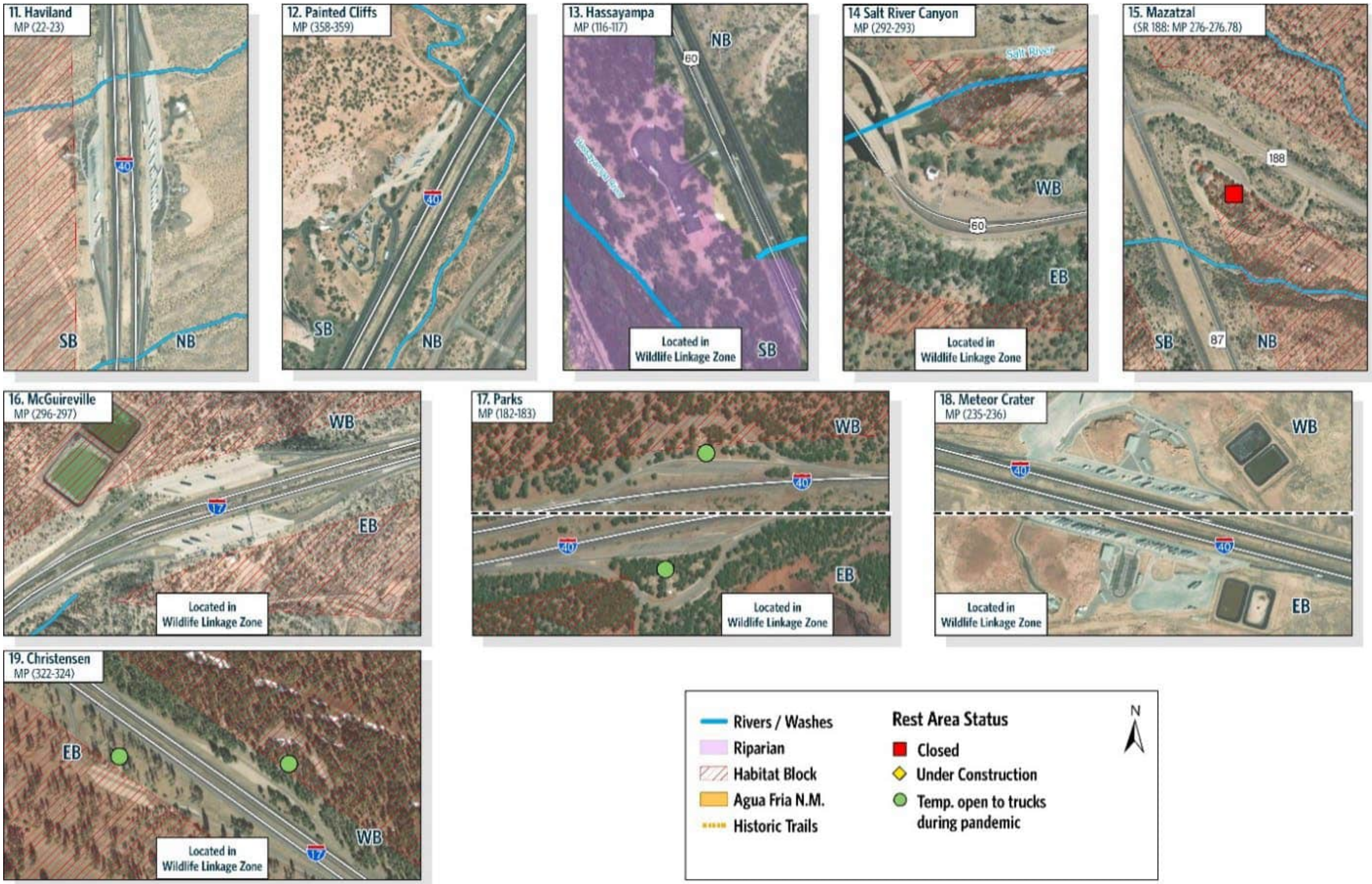

Figure 2-4. Preliminary Environmental Features (Page 2 of 2)

Table 2-2. Potential Threatened and Endangered Species Near Rest Areas

Common Name	Scientific Name	Federal Status	Rest Areas Near Potential Habitat
Mammals			
Jaguar	*Panthera onca*	Endangered	Canoa Ranch, San Simon, Texas Canyon
Mexican Wolf	*Canis lupus baileyi*	Endangered	Salt River Canyon
Ocelot	*Leopardus (=Felis) pardalis*	Endangered	Canoa Ranch, Texas Canyon
Sonoran Pronghorn	*Antilocapra americana sonoriensis*	Endangered	Bouse Wash, Burnt Well, Canoa Ranch, Ehrenberg, Mohawk, Sacaton, Sentinel
Birds			
California Condor	*Gymnogyps californianus*	Endangered	Meteor Crater, Parks
California Least Tern	*Sterna antillarum browni*	Endangered	Burnt Well, Canoa Ranch, Hassayampa, Haviland, Sentinel
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	Canoa Ranch, Christensen, Mazatzal, McGuireville, Meteor Crater, Painted Cliffs, Parks, Salt River Canyon, Sunset Point
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	Canoa Ranch, Ehrenberg, Hassayampa, Mazatzal, McGuireville, Painted Cliffs
Yellow-billed Cuckoo	*Coccyzus americanus*	Threatened	Bouse Wash, Burnt Well, Canoa Ranch, Christensen, Ehrenberg, Hassayampa, Haviland, Mazatzal, McGuireville, Meteor Crater, Mohawk, Painted Cliffs, Parks, Sacaton, Salt River Canyon, San Simon, Sentinel, Sunset Point, Texas Canyon
Yuma Ridgway's Rail	*Rallus obsoletus yumanensis*	Endangered	Ehrenberg, Mohawk, Sentinel

Common Name	Scientific Name	Federal Status	Rest Areas Near Potential Habitat
Reptiles			
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Threatened	Bouse Wash, Canoa Ranch, Christensen, Ehrenberg, Haviland, Mazatzal, McGuireville, Meteor Crater, Painted Cliffs, Parks, Sacaton, Salt River Canyon, San Simon, Sunset Point, Texas Canyon
Sonoyta Mud Turtle	*Kinosternon sonoriense longifemorale*	Endangered	Canoa Ranch
Sonoran Desert Tortoise	*Gopherus morafkai*	Protected under a Candidate Conservation Agreement	Bouse Wash, Burnt Well, Canoa Ranch, Ehrenberg, Hassayampa, Haviland, Mazatzal, Mohawk, Sacaton, Sentinel, Sunset Point
Amphibians			
Chiricahua Leopard Frog	*Rana chiricahuensis*	Threatened	Canoa Ranch, Mazatzal, McGuireville, Texas Canyon
Fishes			
Bonytail	*Gila elegans*	Endangered	Ehrenberg
Desert Pupfish	*Cyprinodon macularius*	Endangered	Sunset Point
Gila Chub	*Gila intermedia*	Endangered	Mazatzal, McGuireville, Sunset Point
Gila Topminnow (incl. Yaqui)	*Poeciliopsis occidentalis*	Endangered	Sunset Point
Loach Minnow	*Tiaroga cobitis*	Endangered	McGuireville
Razorback Sucker	*Xyrauchen texanus*	Endangered	Ehrenberg, Salt River Canyon
Spikedace	*Meda fulgida*	Endangered	Mazatzal, McGuireville
Zuni Bluehead Sucker	*Catostomus discobolus yarrowi*	Endangered	Painted Cliffs
Insects			
Monarch Butterfly	*Danaus plexippus*	Candidate	Bouse Wash, Burnt Well, Canoa Ranch, Christensen, Ehrenberg, Hassayampa, Haviland, Mazatzal, McGuireville, Meteor Crater, Mohawk, Painted Cliffs, Parks, Sacaton, Salt River Canyon, San Simon, Sentinel, Sunset Point, Texas Canyon

Common Name	Scientific Name	Federal Status	Rest Areas Near Potential Habitat
Plants			
Arizona Cliffrose	*Purshia (=Cowania) subintegra*	Endangered	McGuireville
Pima Pineapple Cactus	*Coryphantha scheeri var. robustispina*	Endangered	Canoa Ranch
Wright's Marsh Thistle	*Cirsium wrightii*	Proposed Threatened	Texas Canyon
Zuni Fleabane	*Erigeron rhizomatus*	Threatened	Painted Cliffs

2.3.2. Presence and Absence of Environmental Resources

Each of the 19 rest area locations owned and operated by ADOT was reviewed for the presence or absence of resources in a variety of environmental resource categories. The review included a 0.25-mile buffer around each rest area to account for potential impacts to resources in proximity to the rest areas. For a general environmental review, 0.25 mile is assumed to be a typical distance within which impacts could occur. The following resources are not included in the table because no such resources are located near the rest areas or would be affected by new construction or expansion:

- Wild and scenic rivers
- Navigable waters
- Prime or unique farmland
- Section 4(f) wildlife or waterfowl refuges
- Section 6(f) properties
- Scenic roads or byways

In addition, the following resource categories are better evaluated during preliminary or final design:

Biological Resources: Table 2-2 identifies threatened and endangered species within the vicinity of each rest area. Species information is summarized in **Table 2-3**. Additional biological survey and coordination would be required to determine whether species and habitats occur within the vicinity (0.25 mile) of each rest area and whether expansion or construction would affect those species or habitats.

Section 404 Waters and Section 401 Water Quality Certification: Impacts to waters of the U.S. will determine the appropriate Section 404/401 permitting requirements. At least 14 of the rest areas have washes, streams, or creeks in close proximity. Fieldwork would be required to determine the appropriate level of jurisdictional delineation and, as necessary, wetland delineations. Work within Tribal waters would require an Individual Section 401 Water Quality Certification.

Sole Source Aquifer: Because the Canoa Ranch Rest Area is located within the Upper Santa Cruz and Avra Basin Sole Source Aquifer, construction/expansion at this location would require, at a minimum, a notification letter to the EPA.

Air Quality: The Burnt Well Rest Area and the Sacaton Rest Area are both located within nonattainment areas that do not meet the applicable National Ambient Air Quality Standard (NAAQS). The Burnt Well Rest Area is located within the Phoenix ozone nonattainment area, while the Sacaton Rest Area is located within the West Pinal PM_{10} (particulate matter 10 microns or less in diameter) nonattainment area (ADEQ 2022a and ADEQ 2022b) [2], [3]. No federally funded project may cause or contribute to any new NAAQS violation, increase the frequency or severity of any existing NAAQS violation, or delay attainment of any NAAQS (42 United States Code § 7506(c)(1)). Any proposed expansion or modifications provided by federal funding at any rest area would not be significant enough to cause any areas within attainment to reach nonattainment of any NAAQS or contribute to the nonattainment status within the Phoenix ozone nonattainment area or the West Pinal PM_{10} nonattainment area.

Noise Impacts: Table 2-3 presents noise-sensitive receptors (homes, parks, schools) in proximity to each rest area. Coordination with ADOT Environmental Planning is recommended to determine if proposed construction/expansion plans constitute a "substantial alteration" of an existing rest area. "Substantial alterations" would trigger a noise analysis.

Hazardous Materials: Based on a review of existing environmental database records and aerial photographs, all the rest areas present potential hazardous materials issues with a relatively high degree of risk. The "high" rankings are derived primarily from the regulatory process required for wastewater permit modification for renovation/expansion and well abandonment for closure, as well as the potential for asbestos-containing materials and lead-based paint issues associated with the existing rest area structures and ancillary facilities. A summary of hazardous materials at each rest area can be found in **Appendix C**.

Cultural Resources: Cultural resources data were obtained from AZSITE, Arizona's Cultural Resource Inventory, and addresses a 0.25-mile radius around each rest area. The data provide a limited snapshot of the sites near each rest area; the scope of research for this review does not include site information from sources such as BLM, State Historic Preservation Office, U.S. Forest Service (USFS), or Tribes. Additional sites may be discovered during subsequent cultural resources investigation and survey. A summary of cultural resources at each rest area can be found in **Appendix D**.

Socioeconomic Impacts, including Environmental Justice/Title VI: Table 2-3 identifies the presence of environmental justice (EJ) populations within the vicinity of each rest area by identifying low-income

[2] Arizona Department of Environmental Quality (ADEQ). 2022a. Phoenix | Ozone Nonattainment Area. February 1. Available at: https://azdeq.gov/phoenix-ozone-nonattainment-area.

[3] Arizona Department of Environmental Quality (ADEQ). 2022b. West Pinal | Particulate Matter (PM-10) Nonattainment Area. March 17. Available at: https://azdeq.gov/west-pinal-particulate-matter-pm-10-nonattainment-area.

and minority populations for the U.S. Census block group each rest area is located in compared to the proportion of low-income and minority populations for the county the rest area is in and for the entire state. Environmental justice populations are considered present if the proportion of low-income or minority residents within the block group exceeds that of the county or state. None of the rest areas are located near residential neighborhoods or commercial districts. In addition, most impacts from rest area construction or expansion would be borne equally by the traveling public and are, therefore, not considered to be disproportionately high and adverse to any specific population. If impacts to homes and businesses would result from new ROW requirements, an EJ analysis should be considered when ROW requirements are identified. Regarding rest areas on Tribal lands, coordination should be undertaken to address unpermitted vending during construction/expansion work.

Table 2-3. Rest Area Environmental Overview

Rest Areas		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Mohawk	Sentinel	Ehrenberg	Bouse Wash	Burnt Well	Sacaton	Texas Canyon	San Simon	Sunset Point	Canoa Ranch	Haviland	Painted Cliffs	Hassayampa	Salt River Canyon	Mazatzal	McGuireville	Parks	Meteor Crater	Christensen
Natural Environment	Special-Status Species	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Natural Environment	Critical Habitat	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Natural Environment	Other Wildlife and Habitat Concerns	Habitat Block, Sentinel Plain Linkage	Habitat Block, Sentinel Plain Linkage	Habitat Block	Habitat Block	Bighon Belmont – Saddle Mountain Linkage	Habitat Block	Galliuro – Winchester – Dragoon Linkage	Habitat Block, Pinaleno – Dos Cabezas – San Simon Valley Linkage	Habitat Block	None	Habitat Block	None	Wickenburg – Hassayampa Linkage	Habitat Block, Sevenmile – Sevenmile East US 60 Linkage	Habitat Block	Habitat Block, Northern I-17 Corridor Linkage	Habitat Block, Valle – Bellemont Linkage	Mogollon Rim – Navajo Nation Linkage	Habitat Block, Oak Creek Canyon – Munds Park Linkage
Natural Environment	Wetland Areas	No	No	No	No	No	No	No	No	No	Potential wetlands	No	No	Potential wetlands	No	No	No	No	No	No
Natural Environment	Riparian Areas	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Natural Environment	100-Year Floodplain (FEMA[a], FIRM6[b] Number)	No (04027C1725E)	Zone D[c]7 (04013C3705L)	Yes (04012C1501C and 04012C1505C)	Yes (04012C1240C)	Zone D[c] (04013C1550M)	Zone D[c] (04021C0800E)	No (04003C0980F)	No (040003C0900F)	No (04025C3225G)	Yes (04019C3945L)	Yes (04015C5450G)	Zone D[C] (04001C3000E)	Yes (04013C0345M)	Zone D[C] (04007C1375D)	Zone D[C] (04007C0625D)	Zone D[C] (04025C1820G)	No (04005C6800G)	No (04005C7300G)	Yes (04005C7460G)
Natural Environment	Section 404 Waters	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Unnamed washes	Potential wetlands; Santa Cruz River; unnamed washes	Unnamed washes	Unnamed washes	Potential wetlands; Hassayampa River; unnamed washes	Salt River	Unnamed washes	Unnamed washes	No	Unnamed washes	Unnamed washes
Natural Environment	Section 401 Water Quality Certification	Conditional with Nationwide Permit (NWP)	Conditional with NWP	Conditional with NWP	Conditional with NWP	Conditional with NWP	Individual Certification	Conditional with NWP	Conditional with NWP	Conditional with NWP	Conditional with NWP; Individual with IP	Conditional with NWP	Individual Certification	Conditional with NWP; Individual with IP	Individual Certification	Conditional with NWP	Conditional with NWP	No	Conditional with NWP	Conditional with NWP
Natural Environment	Sole Source Aquifer	No	No	No	No	No	No	No	No	No	Upper Santa Cruz & Avra Basin	No	No	No	No	No	No	No	No	No
Physical Environment	Noise-Sensitive Receptors	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	Residence	No sensitive receptors	Residence	Residence	Residence	Residence	Residence
Physical Environment	Hazardous Materials Relative Risk Assessment (refer to Appendix A)	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High

Rest Areas		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Mohawk	Sentinel	Ehrenberg	Bouse Wash	Burnt Well	Sacaton	Texas Canyon	San Simon	Sunset Point	Canoa Ranch	Haviland	Painted Cliffs	Hassayampa	Salt River Canyon	Mazatzal	McGuireville	Parks	Meteor Crater	Christensen
Section 4(f) Resources	Section 4(f) Historic Site	Yes	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No
	Section 4(f) Park or Recreational Site	No	No	No	No	No	No	No	No	Potential (Agua Fria National Monument)	No	No	No	No	No	Potential (Tonto National Forest)	Potential (Coconino National Forest)	Potential (Kaibab National Forest)	No	Potential (Coconino National Forest)
Cultural Resources	Archaeologica l/ Historic Resources	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Visual Resources	Visual Resource Management Requirements	No	Yes (BLM Visual Quality Objectives)	No	Yes (BLM Visual Quality Objectives)	No	No	No	Yes (BLM Visual Quality Objectives)	Yes (BLM Visual Quality Objectives)	No	Yes (BLM Visual Quality Objectives)	No	No	No	Yes (USFS Visual Resource Managem ent System)	Yes (USFS Visual Resource Manageme nt System)	Yes (USFS Visual Resource Manageme nt System)	No	Yes (USFS Visual Resource Manageme nt System)
Socioeconomic Resources	Existing Development	Union Pacific Railroad (UPRR); caretaker's residence	Caretaker's residence	Caretaker's residence; Morgan Corporation	Caretaker's residence; Central Arizona Project Canal; wastewater treatment	Caretaker's residence	Caretaker's residence	Caretaker's residence	Caretaker's residence; UPRR	Caretaker's residence; wastewater treatment	Caretaker's residence	Caretaker's residence	Caretaker's residence; Atchinson Topeka Santa Fe Railroad; residences, businesses	Burlington Northern Santa Fe (BNSF) Railroad; residences	None	Caretaker' s residence	Caretaker's residence; wastewater treatment; planned residential developme nt	Caretaker's residence; BNSF railroad; mining pit	Caretaker's residence; wastewater treatment	Caretaker's residence
	Ownership	ASLD, Military (Barry M. Goldwater Air Force Range), Private	ASLD, BLM, Private	ASLD, Bureau of Reclamation , Private	BLM	ASLD, BLM, Private	Tribal (Gila River Indian Community)	Private, BLM	BLM	BLM, Private	Private	BLM	Private, Tribal (Navajo Indian Reservation)	Private, BLM	Tribal (San Carlos Indian Reservation)	USFS (Tonto National Forest)	USFS (Coconino National Forest), Private	USFS (Kaibab National Forest), Private, Military (Navajo Army Depot)	ASLD, Private	USFS (Coconino National Forest), Private
	Socioeconomi cs, including Title VI/EJ	No EJ population present (BG[a] 0402701210 02)	EJ population present (BG 0401372330 52)	EJ population present (BG 0401202060 22)	No EJ population present (BG 0401202010 03)	EJ population present (BGs 0401305060 31 and 0401305060 32)	EJ population present (BGs 0402194120 02 and 0402194130 01)	No EJ population present (BGs 0400300030 31 and 0400300030 21)	EJ population present (BG 0400300010 01)	No EJ population present (BG 0402500140 11)	No EJ population present (BG 0401900432 41)	No EJ population present (BG 0401595480 02)	No EJ population present (BG 0400194500 21)	No EJ population present (BG 0401304051 52)	No EJ population present (BG 04007940400 1)	No EJ populatio n present (BG 04007000 6001)	EJ population present (BG 0402500160 33)	EJ population present (BG 0400500220 04)	EJ population present (BG 0400500150 03)	No EJ population present (BG 0400500150 02)

[a] *FEMA = Federal Emergency Management Agency*
[b] *FIRM = Flood Insurance Rate Map*
[c] *Zone D indicates areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted.*

2.4. Transportation System Overview

2.4.1. Roadway Functional Classification

Functional classification is the categorization of streets and highways according to the character of travel service each roadway provides. The three major functional classification categories are defined by the Federal Highway Administration (FHWA) as Arterial, Collector, and Local. **Figure 2-5** presents the functional classification of roadways adjacent to rest areas.

2.4.2. Lanes and Posted Speed Limit

The posted speed limits and number of lanes adjacent to rest areas were verified through use of as-built plans, field visits, and GIS. **Figure 2-5** presents the number of lanes and posted speed limits on the mainline roadway adjacent to rest areas.

2.4.3. Bridge Conditions

The conditions of the existing bridges within the vicinity of rest areas were verified through coordination with the ADOT Bridge Group. The information obtained includes the latest sufficiency rating and condition of each bridge at or near rest areas. On **Figure 2-6**, bridges with ratings only occur at or near five rest areas. In rest areas where rivers/washes are present but there is no bridge indicated, the water passes through a culvert.

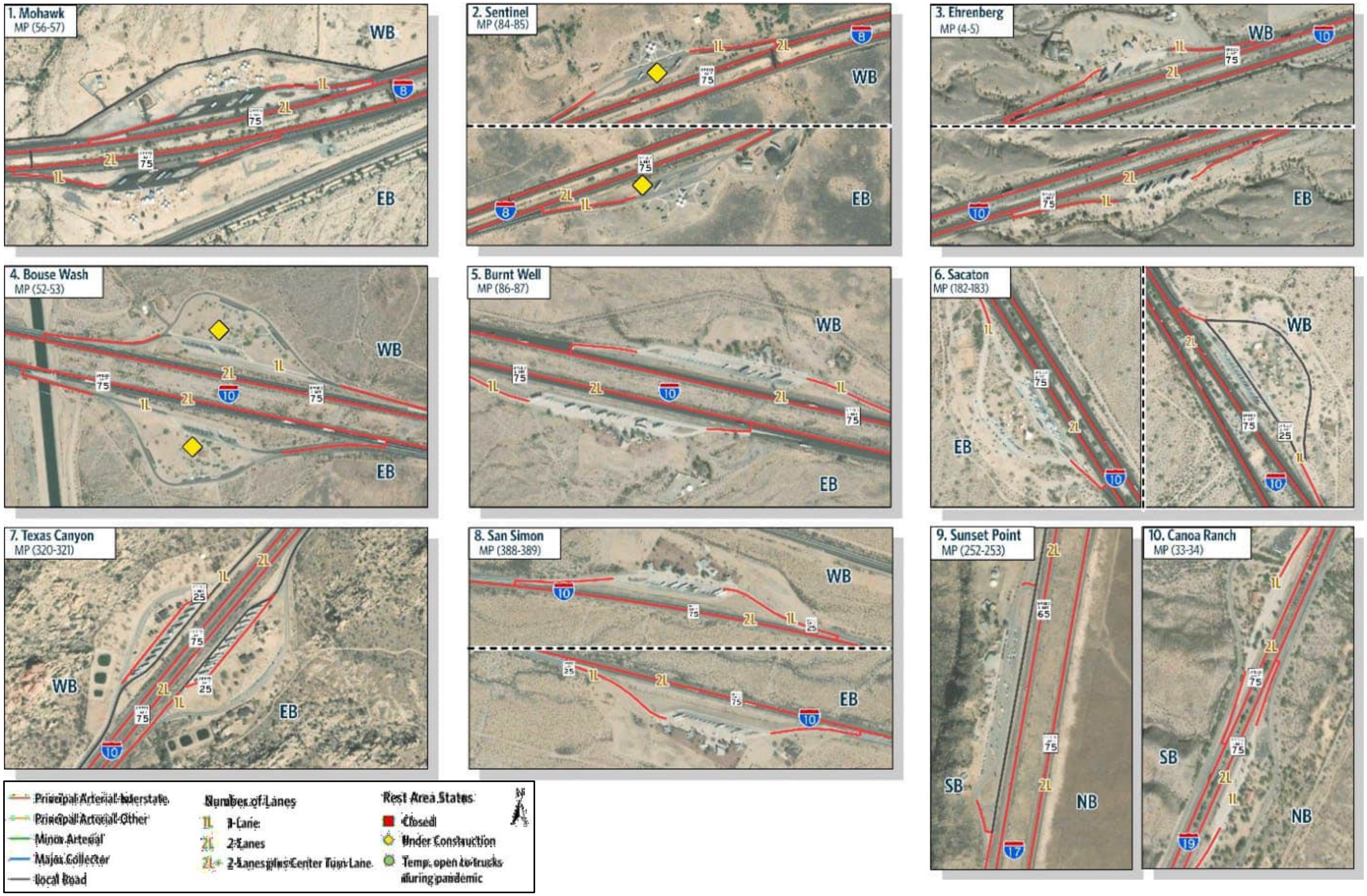

Figure 2-5. Roadway Characteristics (Page 1 of 2)

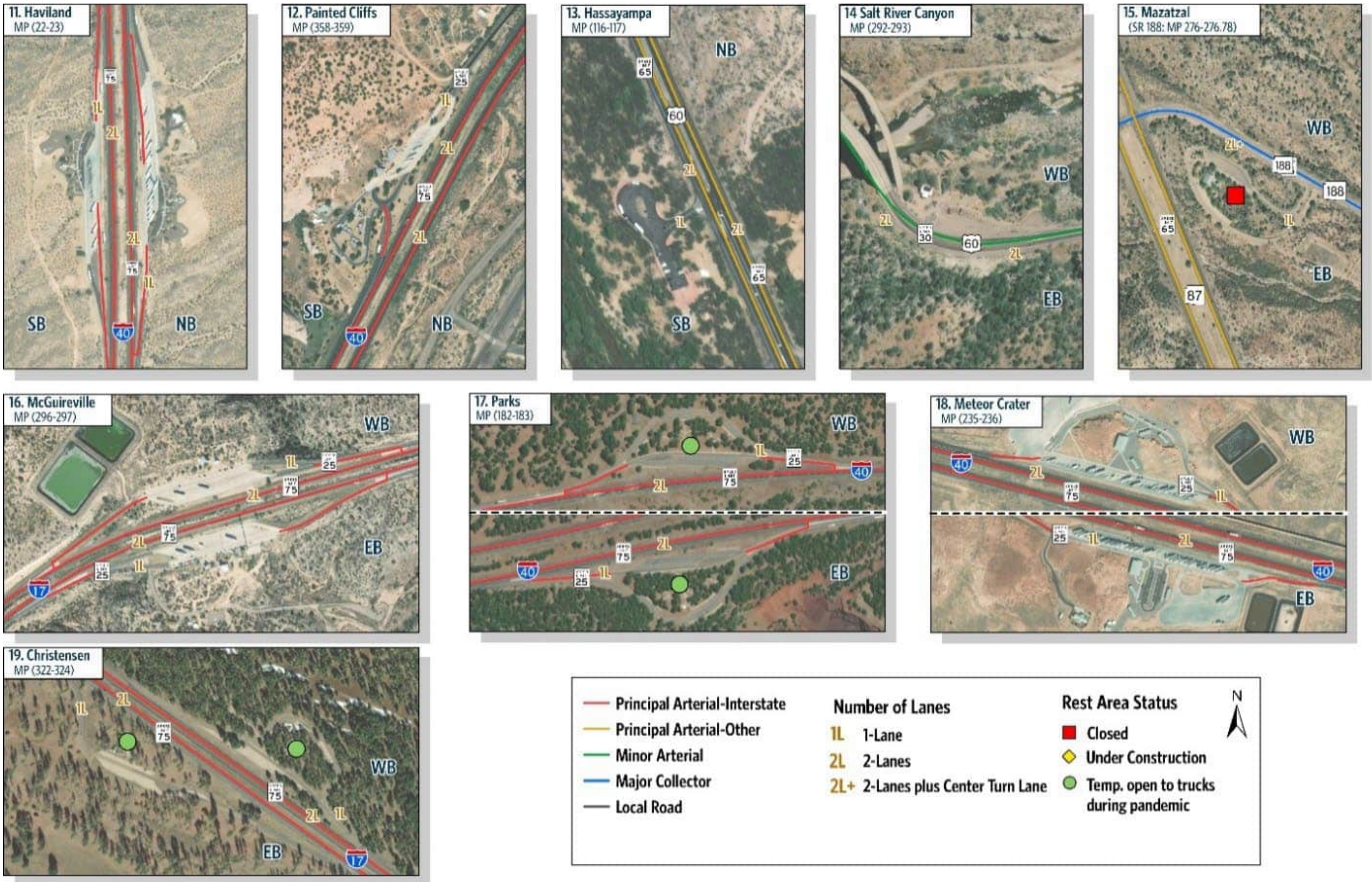

Figure 2-5. Roadway Characteristics (Page 2 of 2)

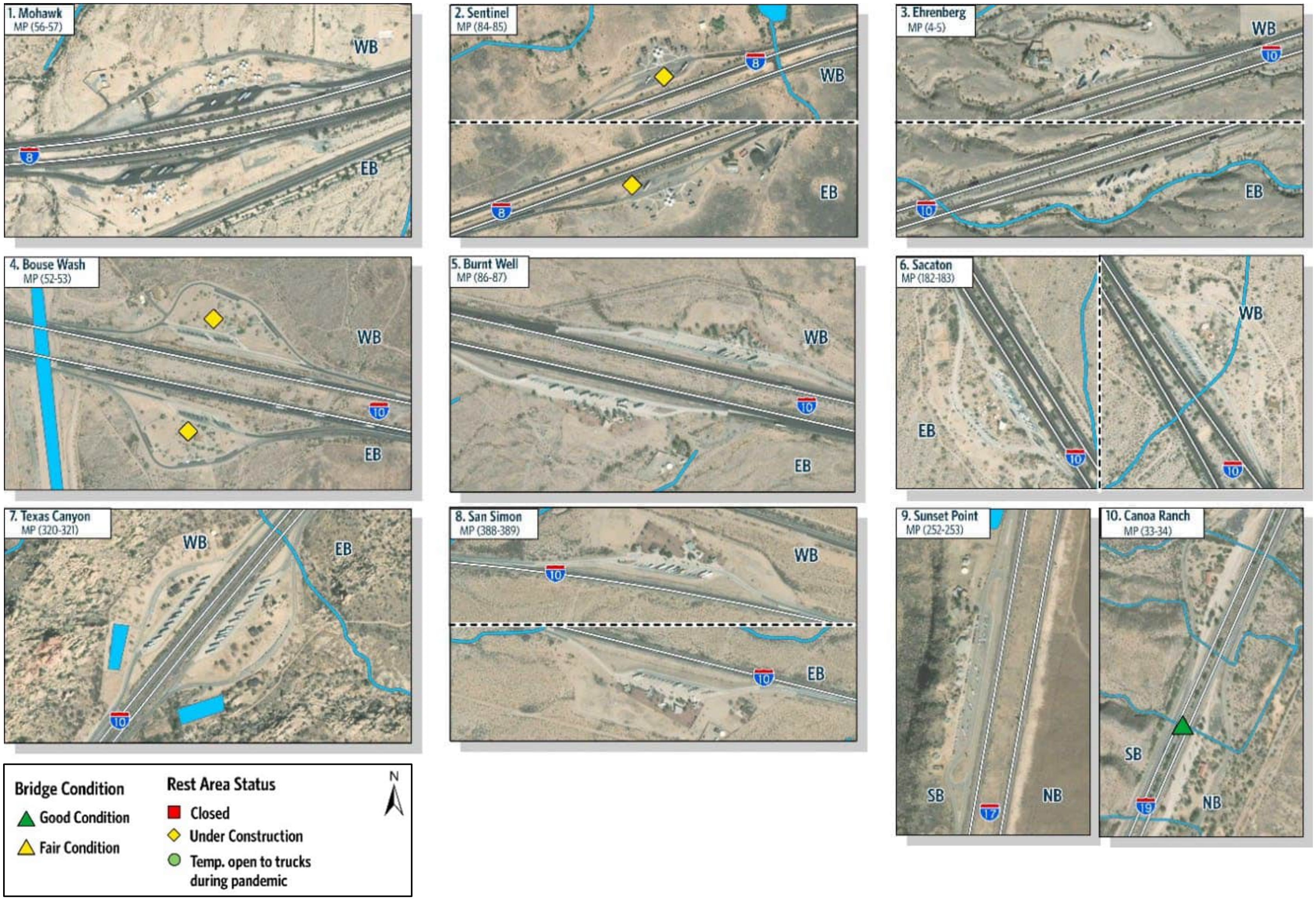

Figure 2-6. Bridge Conditions (Page 1 of 2)

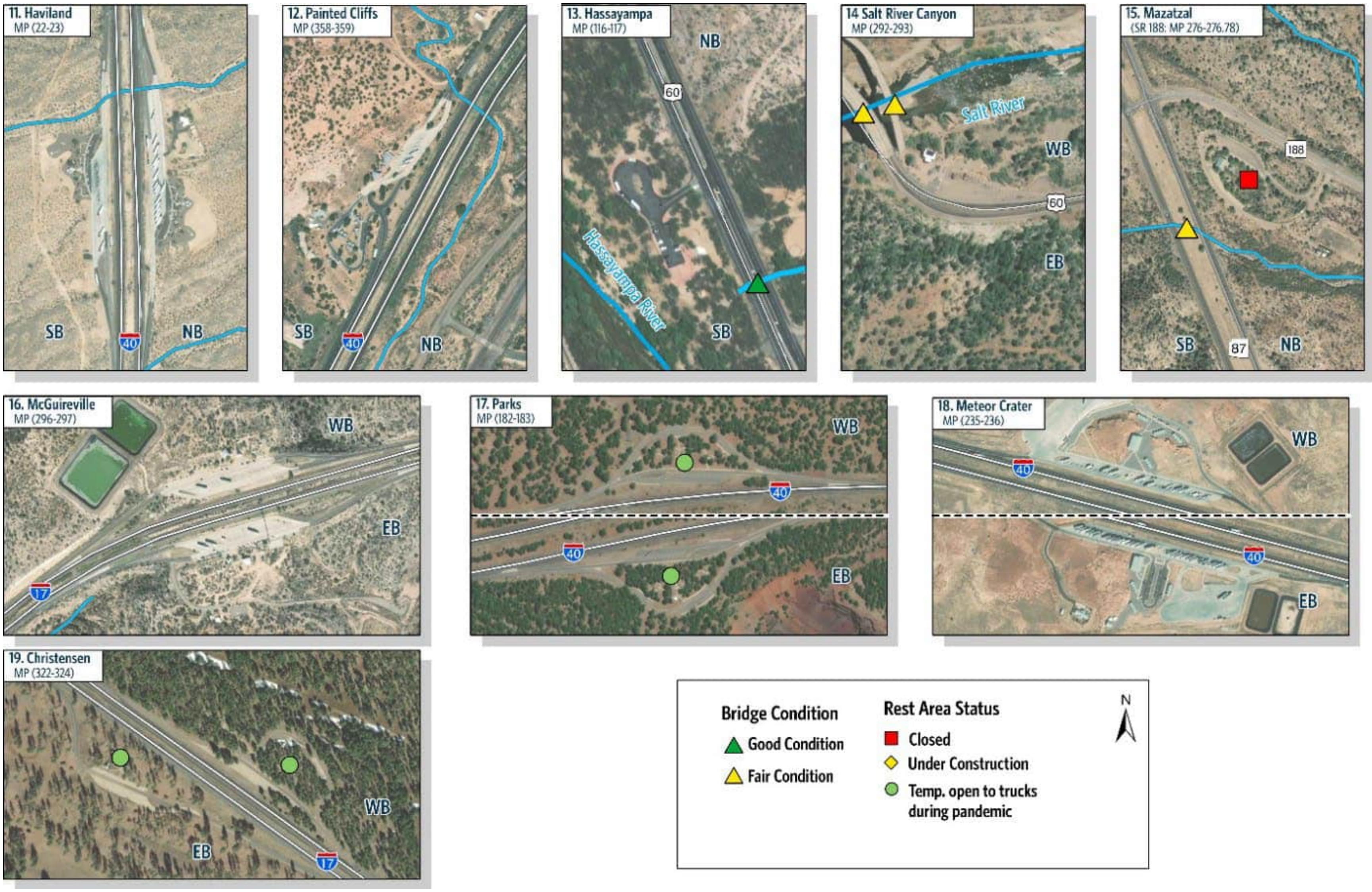

Figure 2-6. Bridge Conditions (Page 2 of 2)

3. Safety Overview

3.1. Crash Analysis

Data from ADOT's Accident Location Identification Surveillance System database were used to analyze crashes over a 5-year period. Crashes were gathered for a 1-mile radius on either side of the rest area measured from the intersection and the mainline/on- or off-ramp intersections. The crashes included those on the on-/off-ramps to the rest areas, roads in the rest areas, on the mainline roadway, and 1 mile on either side of the mainline on-/off-ramp intersection.

All crashes occurring between January 1, 2017, and December 31, 2021, were included in the analysis. A total of 1,256 crashes occurred in the study area over the 5-year period. Crash analysis was conducted for the rest areas in the study area to identify trends, patterns, and predominant causes of the crashes. The following information was discovered:

- The majority of the crashes occurred at or near the rest areas in Sacaton (22%), Sunset Point (18%), and McGuireville (8%).
- 96% of the total crashes occurred on the mainline, and 4% of the crashes occurred along the on-/off-ramps to the rest areas or in the parking lots.
- 97% of the total crashes at the 19 rest areas appeared to have no relation to the rest areas.
- 51% of the total crashes involved a single vehicle, 26% were rear-end crashes, and 16% were sideswipe crashes.
- 15% of the total crashes were the result of collision overturning/jackknife, 19% were from a collision with a fixed object, and 46% involved a collision with another motor vehicle.
- There were 22 fatal crashes (1.8%), 3% were suspected serious injury, 17% were suspected minor injury, and 9% were possible injury.

Figure 3-1 illustrates the crashes per location at each of the rest areas over the 5-year analysis period. An analysis and brief discussion for each rest area, including summaries of the various types of crash patterns, is provided in **Appendix B.**

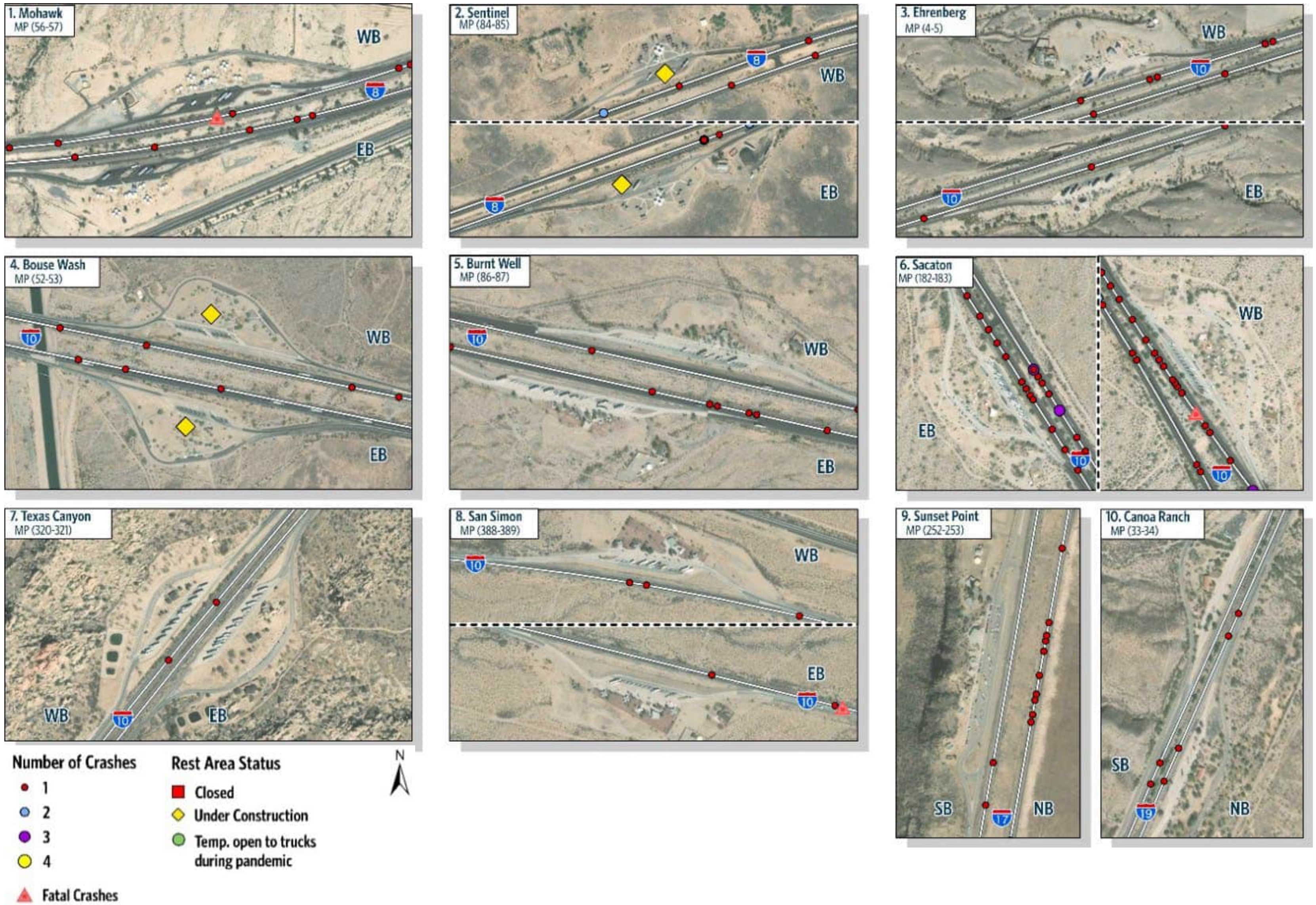

Figure 3-1. Crashes Near Rest Areas from 2017 to 2021 (Page 1 of 2)

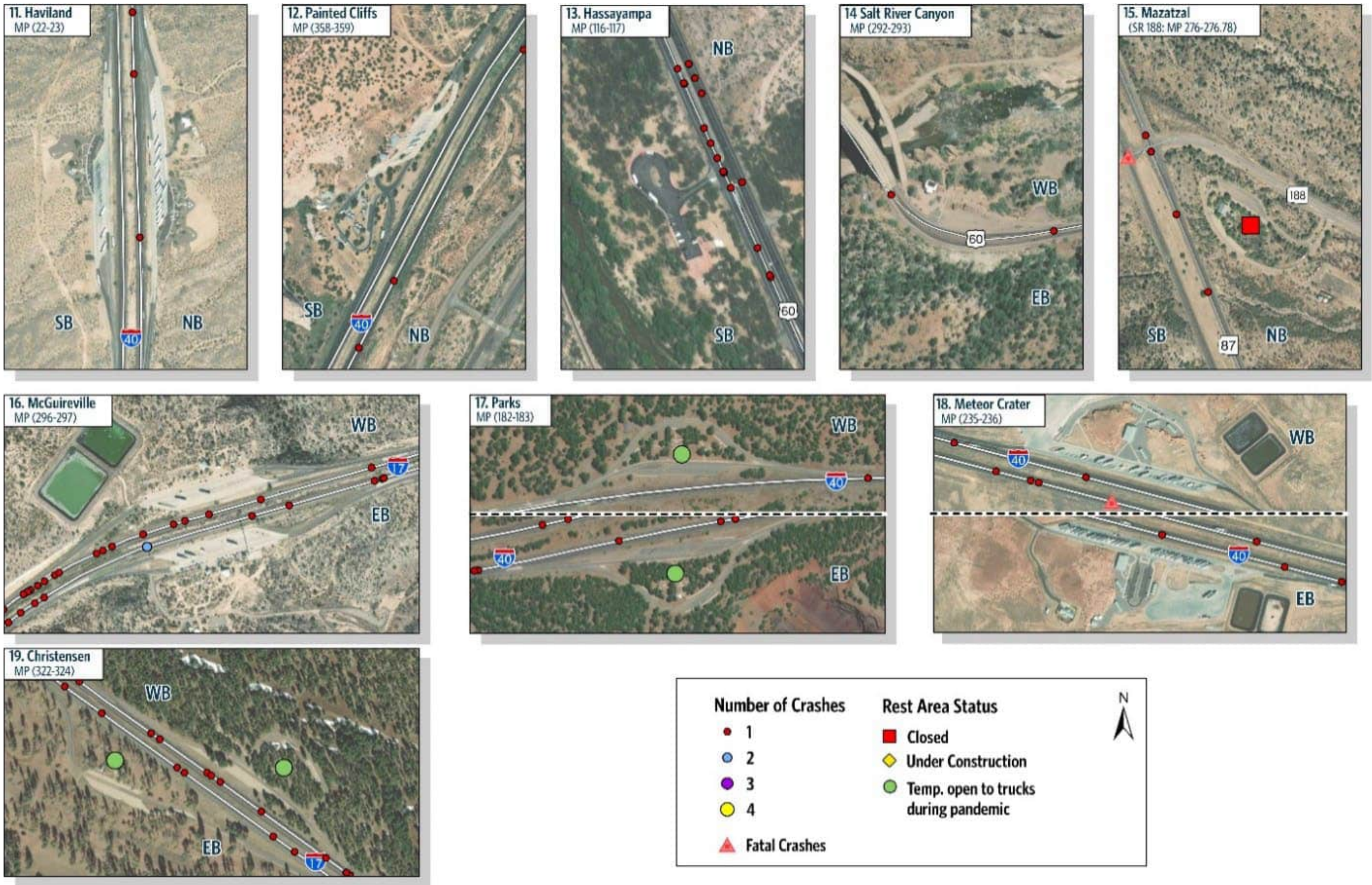

Figure 3-1. Crashes Near Rest Areas from 2017 to 2021 (Page 2 of 2)

3.2. Emergency and Safety Management

Because of Arizona's size, geography, and changing environmental conditions, rest areas are key to supporting ADOT's emergency management efforts. They serve several purposes, as follows:

- **Rest areas are used for staging during emergency situations.** Information provided by ADOT Facilities Management indicates that rest areas are used as staging areas during emergency situations and are sometimes used by the Arizona Department of Public Safety to support ongoing emergency efforts.
- **Rest areas provide safe harbor from weather events and dangerous driving conditions.** Travelers along Arizona's highways sometimes must contend with rapidly changing weather conditions, and rest areas provide relief during such events. For instance, the 10-mile segment between mileposts 209 and 219 along I-10 experiences sudden dust storms that reduce driver visibility and create hazardous driving conditions. In response, ADOT has implemented a Dust Storm Detection System for this stretch of I-10. When events such as this occur in other portions of Arizona, rest areas provide drivers the ability to exit the interstates and highways safely to wait until driving conditions have improved.
- **Rest areas serve as "Safe Phone Zones" to reduce distracted driving.** Since the previous study, Geico Insurance and ADOT have partnered to provide branded signs prior to rest areas, which call attention to upcoming rest areas as places for drivers to stop and safely use their mobile devices.[4] In addition, the use of mobile devices has increased drastically since 2011, which has resulted in a national epidemic of distracted driving, particularly among teens and commercial drivers. The "Safe Phone Zones" partnership not only promotes rest areas as places for drivers to safely use their devices on trips, but it also provides new, non-toll and non-tax revenue to ADOT that can offset the operation and maintenance costs associated with rest areas.[5]
- **Rest areas add capacity during national emergencies (COVID-19).** Rest areas also provide opportunities to support indirect effects caused by national and state emergencies. For instance, two rest areas that have been permanently closed (Christensen and Parks) were temporarily reopened to allow for commercial vehicle parking to support the increased demand during the COVID-19 pandemic. These reopened rest areas do not provide amenities and only allow for truck parking.

[4] https://azdot.gov/adot-news/adot-and-geico-encourage-motorists-use-safe-phone-zones

[5] http://safephonezone.com/about.html

4. Rest Area Inventory

The following sections summarize the existing rest area inventory and associated data.

4.1. Age of Facilities

Many of ADOT's rest areas were first opened to the public in the 1970s, with the oldest (McGuireville) being opened in 1961. Although most rest areas have been renovated since first being built, the age of ADOT rest areas ranges from 27 to 61 years, as summarized in **Table 4-1**.

Table 4-1. Rest Area Facility Age

Map No.[a]	Rest Area	Route	Traffic Direction Served	Milepost[b]	First Opened to the Public	Age of Facility (years)
1	Mohawk	I-8	EB	55.8	1971	51
1	Mohawk	I-8	WB	56.5	1971	51
2	Sentinel	I-8	EB	83.6	1973	49
2	Sentinel	I-8	WB	84.9	1973	49
3	Ehrenberg	I-10	EB	4.4	1972	50
3	Ehrenberg	I-10	WB	5.3	1972	50
4	Bouse Wash	I-10	EB	52.2	1986	36
4	Bouse Wash	I-10	WB	52.9	1986	36
5	Burnt Well	I-10	EB	86.0	1975	47
5	Burnt Well	I-10	WB	86.8	1975	47
6	Sacaton	I-10	EB	181.7	1973	49
6	Sacaton	I-10	WB	183.5	1973	49
7	Texas Canyon	I-10	EB	320.2	1985	37
7	Texas Canyon	I-10	WB	320.8	1985	37
8	San Simon	I-10	EB	388.4	1972	50
8	San Simon	I-10	WB	389.0	1972	50
9	Sunset Point	I-17	Both	252.8	1970	52
10	Canoa Ranch	I-19	NB	32.7	1978	44
10	Canoa Ranch	I-19	SB	33.7	1978	44
11	Haviland	I-40	EB	22.6	1984	38
11	Haviland	I-40	WB	23.2	1984	38
12	Painted Cliffs	I-40	Both	359.0	1979	43
13	Hassayampa	US 60	Both	116.1	1982	40
14	Salt River Canyon	US 60	Both	292.9	1994	28
15	Mazatzal	SR 87	Both	235.7	1995	27
16	McGuireville	I-17	NB	296.5	1961	61
16	McGuireville	I-17	SB	297.1	1961	61

Map No.[a]	Rest Area	Route	Traffic Direction Served	Milepost[b]	First Opened to the Public	Age of Facility (years)
17	Parks	I-40	EB	181.6	1976	46
17	Parks	I-40	WB	182.7	1976	46
18	Meteor Crater	I-40	EB	235.2	1973	49
18	Meteor Crater	I-40	WB	236.4	1973	49
19	Christensen	I-17	NB	323.8	N/A	--[c]
19	Christensen	I-17	SB	324.3	N/A	--[c]

[a] Map No. = Rest area number corresponding to Figure 2-1.
[b] Milepost = Location of mainline off-ramp intersection for rest area.
[c] No data available

4.2. Operation and Maintenance

4.2.1. Operation and Maintenance Costs

The 2011 Study documented operational and maintenance costs for each rest area to be between $79,000 and $286,000, annually. The variation in costs were representative of the number of sites at each rest area, the size of facilities at each rest area, utility types, and overall usage. Since 2011, the costs to operate and maintain each rest area have risen slightly. According to ADOT Facilities Management, the cost to operate and maintain ADOT's rest areas, as of 2021, is approximately $300,000 annually (or $25,000 per month), which includes water and wastewater-related costs.

4.2.2. ADOT Rest Area Maintenance

Rest areas are maintained to ensure that each facility is safe, attractive, clean, sanitary, and operable 24 hours a day, 7 days a week. To maintain each facility, ADOT provides onsite caretaker residences for the contractor who maintains the rest areas. Caretaker's residences are provided at each rest area (one residence per pair of rest areas), except for the Hassayampa and Salt River Canyon rest areas, where no caretaker's residence is provided. **Table 4-5** summarizes rest area amenities, including listing those with caretaker's residences.

In 2019, ADOT entered a Public-Private Partnership with the Diamond Ridge Development Corporation to perform daily custodial services at rest areas. The contractor ensures the interior and exterior areas of rest areas are maintained and performs weekly and monthly services such as parking lot cleaning and heating, ventilation, and air conditioning maintenance. The contractor also is responsible for repairs, as feasible. The vending machines are maintained, stocked, and repaired by vending operators. In addition to regular maintenance and care of rest areas, ADOT has implemented hourly cleaning of contact surfaces to reduce the potential spread of viruses in response to the COVID-19 pandemic.

4.3. Existing Utilities

Water source and wastewater system utilities for each rest area was verified and documented using the most recent record drawings, and further verified during field visits. In addition, coordination with

ADOT's utility engineers was conducted to obtain all documented and permitted power, gas, and telephone utilities at or adjacent to rest areas. **Table 4-2** presents all known utilities at or adjacent to each of the 19 rest area locations. Per ADOT's request, pump houses used to facilitate water usage at rest areas were geolocated during field visits and verified using GIS. Because the Parks, Christensen, and Mazatzal Rest Areas are permanently closed, pump houses at these locations were not geolocated. In addition, a new pump house was being constructed for the Sentinel Rest Area during the period field visits were conducted. Therefore, the pump house location at the Sentinel Rest Area represents its location prior to construction. **Figure 4-1** presents the location of existing groundwater well pump houses for each rest area.

Table 4-2. Existing Utilities

Map No.[a]	Rest Area	Route	Traffic Direction	Water Source (Existing)	Wastewater System (Existing)	Heating or Air Conditioning (Yes or No)	Existing Permitted Utilities (Location)
1	Mohawk	I-8	EB	Groundwater Well	Septic System	Yes	Telephone: Mountain States Telephone & Telegraph Co. (Underground)
1	Mohawk	I-8	WB	Groundwater Well	Septic System	Yes	
2	Sentinel	I-8	EB	Groundwater Well	Septic System	--[b]	--[b]
2	Sentinel	I-8	WB	Groundwater Well	Septic System	--[b]	
3	Ehrenberg	I-10	EB	Groundwater Well	Septic System	Yes	Power: Arizona Public Service (APS) (Underground); Water: El Paso Natural Gas (Underground)
3	Ehrenberg	I-10	WB	Groundwater Well	Septic System	Yes	
4	Bouse Wash	I-10	EB	Groundwater Well	Septic System	--[b]	--[b]
4	Bouse Wash	I-10	WB	Groundwater Well	Septic System	--[b]	
5	Burnt Well	I-10	EB	Groundwater Well	Septic System	Yes	Power: APS (Underground)
5	Burnt Well	I-10	WB	Groundwater Well	Septic System	Yes	
6	Sacaton	I-10	EB	American Water Company	Septic System	No	AE Power: Bureau of Indian Affairs
6	Sacaton	I-10	WB	American Water Company	Septic System	No	
7	Texas Canyon	I-10	EB	Groundwater Well	Septic System	No	Power: Sulphur Springs Valley Electric Cooperative, Inc. (Underground); Telephone: Mountain States Telephone & Telegraph Co. (Underground)
7	Texas Canyon	I-10	WB	Groundwater Well	Septic System	No	
8	San Simon	I-10	EB	Groundwater Well	Septic System	No	Power: Sulphur Springs Valley Electric Cooperative, Inc. (Underground)
8	San Simon	I-10	WB	Groundwater Well	Septic System	No	
9	Sunset Point	I-17	Both	Groundwater Well	Septic System	Yes	--[b]

Map No.[a]	Rest Area	Route	Traffic Direction	Water Source (Existing)	Wastewater System (Existing)	Heating or Air Conditioning (Yes or No)	Existing Permitted Utilities (Location)
10	Canoa Ranch	I-19	NB	Groundwater Well	Septic System	No	Telephone: Mountain Bell (Underground); Telephone: Mountain States Telephone Co. (Underground); AE Power: Tucson Gas & Electric
10	Canoa Ranch	I-19	SB	Groundwater Well	Septic System	No	
11	Haviland	I-40	EB	Groundwater Well	Septic System	Yes	Power: UNS Electric, Inc. (Underground)
11	Haviland	I-40	WB	Groundwater Well	Septic System	Yes	
12	Painted Cliffs	I-40	Both	Groundwater Well	Septic System	Yes	Water: Whiting Bros. Oil Co. (Underground)
13	Hassayampa	US 60	Both	Groundwater Well	Septic System	No	Power: APS (Underground)
14	Salt River Canyon	US 60	Both	Groundwater Well	Septic System	No	--[b]
15	Mazatzal	SR 87	Both	--[b]	--[b]	--[b]	--[b]
16	McGuireville	I-17	NB	Groundwater Well	Septic System	Yes	Power: APS (Underground)
16	McGuireville	I-17	SB	Groundwater Well	Septic System	Yes	
17	Parks	I-40	EB	--[b]	--[b]	--[b]	Power: APS (Underground); Telephone: Mountain Bell (Underground)
17	Parks	I-40	WB	--[b]	--[b]	--[b]	
18	Meteor Crater	I-40	EB	Groundwater Well	Septic System	Yes	--[b]
18	Meteor Crater	I-40	WB	Groundwater Well	Septic System	Yes	
19	Christensen	I-17	NB	--[b]	--[b]	--[b]	Power: APS (Underground)
19	Christensen	I-17	SB	--[b]	--[b]	--[b]	

Sources: ADOT, ADOT Repository of Online Archived Documents, Jacobs (March 2022)
[a] RA Map No. = Rest area number corresponding to Figure 2-1
[b] No data available

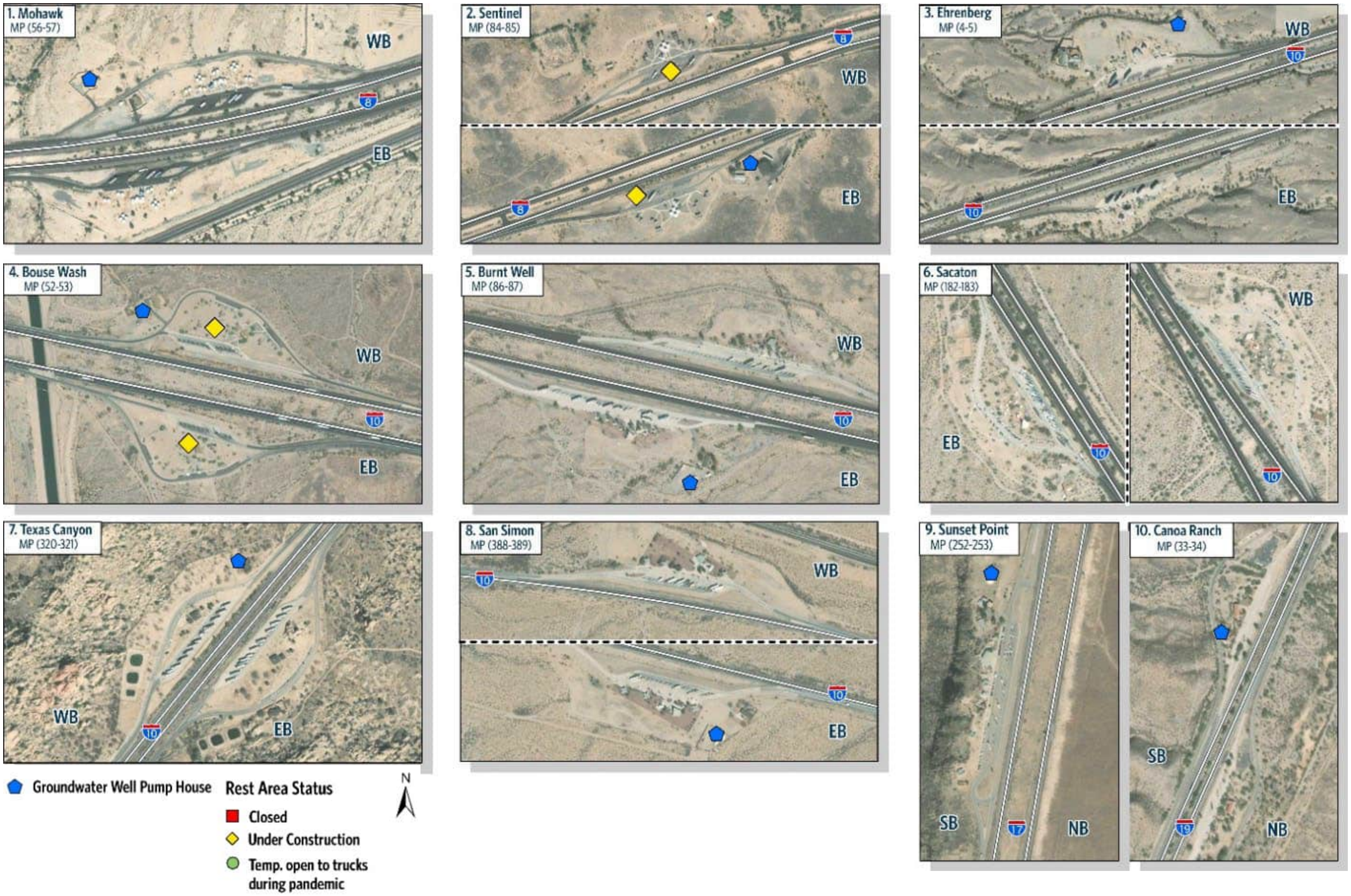

Figure 4-1. Groundwater Well Pump Houses (Page 1 of 2)

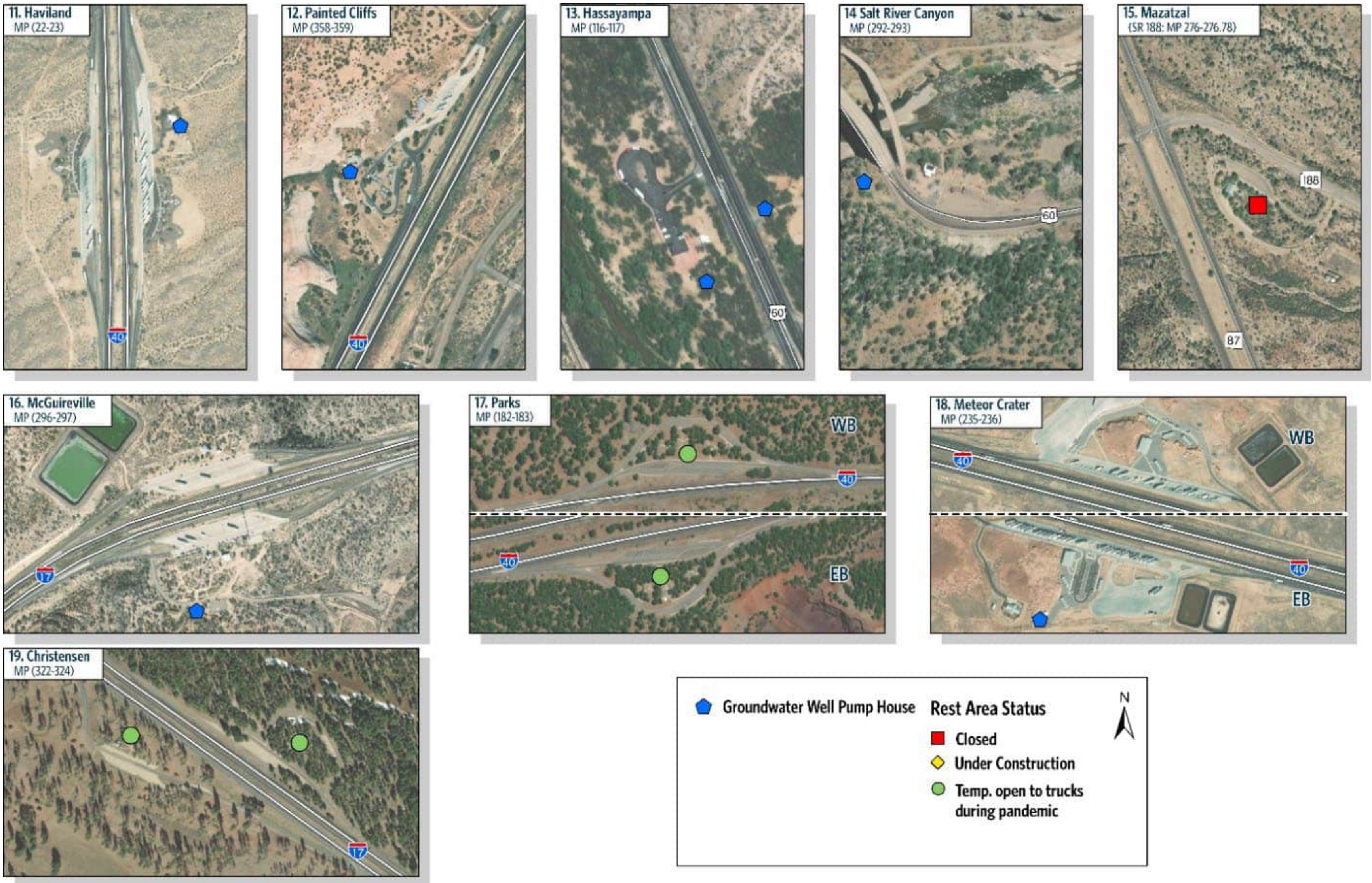

Figure 4-1. Groundwater Well Pump Houses (Page 2 of 2)

Figure 4-2. Water Conservation Pump, Meteor Crater Rest Area (EB)

As documented in the previous sections, 15 rest areas have undergone improvements since 2011. Many of these included improvements to existing rest area utilities, such as well and well pump enhancements, electrical rehabilitation, and septic system improvements. In addition, ADOT has made water saving policy changes since the previous study to reduce water use at rest areas (**Figure 4-2**). The water and wastewater system enhancements summarized in later sections (Section 12.2.1) are representative of ADOT's commitment to save 40,000 gallons of water per day at rest areas across Arizona. Water usage reduction efforts include the installation of low-flow sinks and toilets, metered faucets, and replacing liquid soap dispensers with foam soap dispensers (requires less water to rinse). Other steps to reduce water usage include the new valve-exercise program, where valves are regularly inspected to reduce the chance of failure; similarly, daily water meter readings are taken to track potential spikes in water usage caused by leaks.[6]

Technological improvements along ADOT's highway network and at rest areas also have occurred or are under way at the time of this study. To meet the growing demand and changes in the transportation technology landscape, ADOT is expanding its fiber optic cable network, with recent installation of fiber optic node buildings at the northbound McGuireville Rest Area and Sunset Point Rest Area.

4.4. Traffic Conditions

4.4.1. Mainline AADT

The COVID-19 pandemic resulted in dramatic changes to traffic patterns nationwide and throughout Arizona. Therefore, 2019 annual average daily traffic (AADT) was used to better represent traffic conditions prior to the pandemic. The 2019 AADT was projected to 2022 using site-specific growth rates derived from ADOT's traffic monitoring data. **Table 4-3** shows the combined total 2022 AADT for both travel directions for roadway segments adjacent to the rest areas.

[6] https://aashtojournal.org/2019/05/31/arizona-dot-adopts-new-water-conservation-policies-for-rest-areas/

Table 4-3. Mainline AADT Adjacent to Rest Areas

RA MAP No.[a]	Rest Area	Route	Traffic Direction	Milepost[b]	2022 Mainline AADT
1	Mohawk (EB)	I-8	EB	55.8	11,400
1	Mohawk (WB)	I-8	WB	56.5	
2	Sentinel (EB)	I-8	EB	83.6	11,300
2	Sentinel (WB)	I-8	WB	84.9	
3	Ehrenberg (EB)	I-10	EB	4.4	29,500
3	Ehrenberg (WB)	I-10	WB	5.3	
4	Bouse Wash (EB)	I-10	EB	52.2	28,500
4	Bouse Wash (WB)	I-10	WB	52.9	
5	Burnt Well (EB)	I-10	EB	86.0	26,100
5	Burnt Well (WB)	I-10	WB	86.8	
6	Sacaton (EB)	I-10	EB	181.7	66,800
6	Sacaton (WB)	I-10	WB	183.5	
7	Texas Canyon (EB)	I-10	EB	320.2	19,100
7	Texas Canyon (WB)	I-10	WB	320.8	
8	San Simon (EB)	I-10	EB	388.4	15,300
8	San Simon (WB)	I-10	WB	389.0	
9	Sunset Point	I-17	Both	252.8	40,100
10	Canoa Ranch (NB)	I-19	NB	32.7	18,300
10	Canoa Ranch (SB)	I-19	SB	33.7	
11	Haviland (EB)	I-40	EB	22.6	19,200
11	Haviland (WB)	I-40	WB	23.2	
12	Painted Cliffs	I-40	Both	359.0	25,300
13	Hassayampa	US 60	Both	116.1	19,400
14	Salt River Canyon	US 60	Both	292.9	2,900
15	Mazatzal	SR 87	Both	235.7	13,900
16	McGuireville (NB)	I-17	NB	296.5	27,500
16	McGuireville (SB)	I-17	SB	297.1	
17	Parks (EB)	I-40	EB	181.6	21,600
17	Parks (WB)	I-40	WB	182.7	
18	Meteor Crater (EB)	I-40	EB	235.2	19,820
18	Meteor Crater (WB)	I-40	WB	236.4	
19	Christensen (NB)	I-17	NB	323.8	24,400
19	Christensen (SB)	I-17	SB	324.3	

[a] RA Map No. = Rest area number corresponding to Figure 2-1
[b] Milepost = Location of mainline off-ramp intersection for rest area

As population, tourism, and development grow throughout Arizona, traffic demand along Arizona's highway network does as well. The 2011 AADT volumes from the previous study were compared to 2022 AADT to determine changes in traffic demand at rest areas since the previous study. Because the 2022 AADT represents the combined traffic for both travel directions adjacent to rest areas, the 2011 AADT also was combined for both travel directions to allow for a more accurate comparison of change in AADT between 2011 and 2022. The Christensen, Painted Cliffs, and Hassayampa Rest Areas experienced the largest percentage increase (approximately 59%, 59%, and 49%, respectively) in adjacent mainline traffic since 2011.

The Canoa Ranch Rest Areas are the only rest areas that experienced a decrease in AADT since 2011 (-12%). The Sentinel, Burnt Well, Texas Canyon, and San Simon Rest Areas saw the smallest percentage increase (4.6%, 10.6%, 11.7%, and 12.5%, respectively) during this timeframe. **Figure 4-3** presents the changes in AADT volumes from 2011 to 2022 at each of ADOT's managed rest areas.

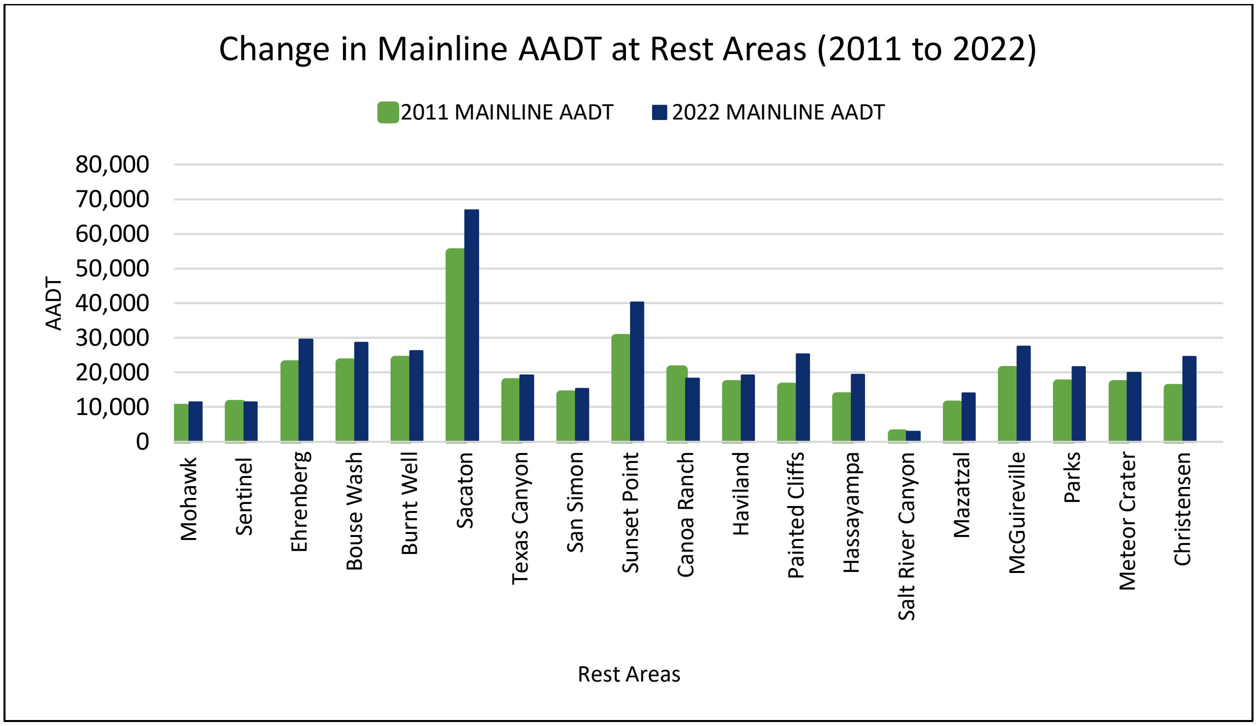

Figure 4-3. Change in Mainline AADT at Rest Areas (2011 – 2022)
Source: ADOT MPD Data Analytics, 2011 Arizona Statewide Rest Area Study

4.4.2. Truck Traffic

According to the *2017 Arizona State Freight Plan*, Arizona's state highway network is the most used freight infrastructure in Arizona. Furthermore, most freight movement along the highway system is documented as being through-traffic (39%). This through-traffic is representative of traffic moving from major ports in Los Angeles and Long Beach to interior portions if the United States.[7] Rest areas provide key stopping and rest opportunities for these commercial vehicles.

On Arizona interstates and highways adjacent to ADOT rest areas, the 2022 annual average daily truck traffic (AADTT) was highest at the Ehrenberg, Burnt Well, and Bouse Wash Rest Areas (10,900, 9,300, and 9,100 vehicles, respectively). This large amount of truck traffic adjacent to these rest areas aligns with findings documented in the *2017 Arizona State Freight Plan*, which noted I-10 as being Arizona's most used freight corridor.[8] In addition, the highest percentage of truck traffic (relative to total traffic) was adjacent to the Meteor Crater, Haviland, and San Simon Rest Areas (40.9%, 38.5%, and 38.6%, respectively). The lowest AADTT was documented at the Mazatzal and Salt River Canyon Rest Areas (700 and 100 vehicles, respectively). Since the 2011 Study, the Haviland and Painted Cliffs Rest Areas have seen dramatic increases in truck traffic (291% and 312%, respectively). Changes in truck traffic volumes adjacent to rest areas between 2011 and 2022 are summarized in **Table 4-4**, while the change in the percentage of truck traffic (relative to total traffic) adjacent to rest areas is presented on **Figure 4-4**.

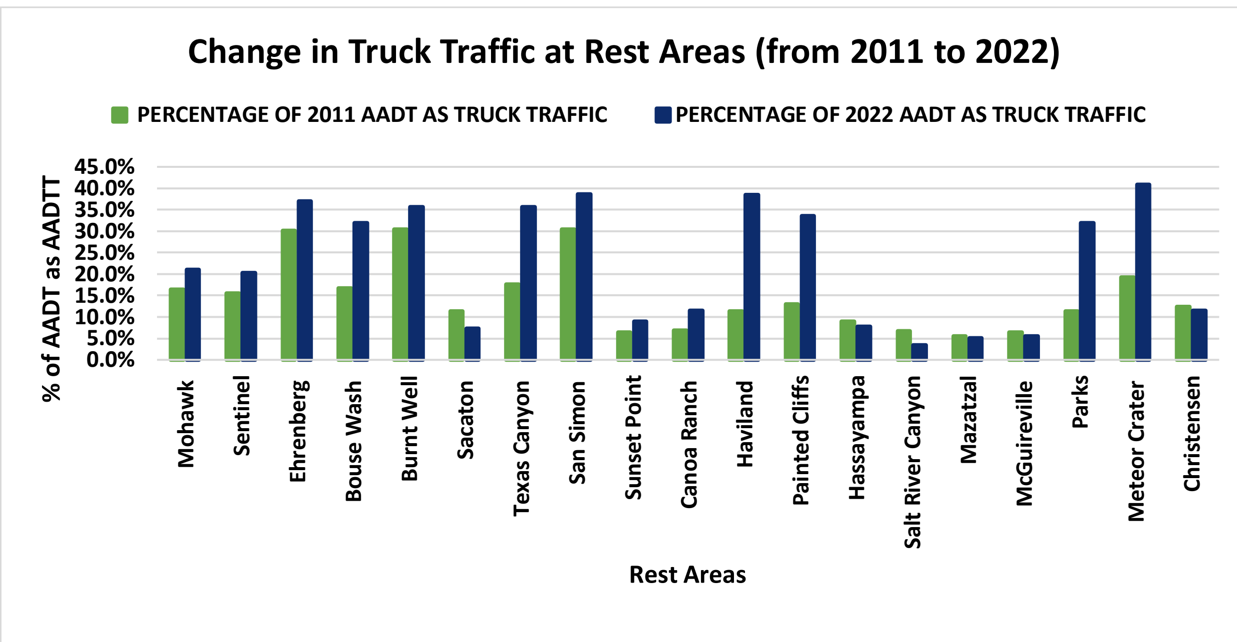

Figure 4-4. Change in Percentage of AADT as Truck Traffic (2011 to 2022)

[7] https://azdot.gov/sites/default/files/2019/08/arizona-state-freight-plan-110917.pdf

[8] https://azdot.gov/sites/default/files/2019/08/arizona-state-freight-plan-110917.pdf

Table 4-4. Truck Traffic Volumes

Map No.[a]	Rest Area	Route	Traffic Direction	2011 Mainline Traffic Volume (AADT)	2022 Mainline Traffic Volume (AADT)	2011 Mainline Truck Traffic Volume (AADTT[b])	2022 Mainline Truck Traffic Volume (AADTT[b])	Percentage of 2011 AADT as AADTT[b]	Percentage of 2022 AADT as AADTT[b]
1	Mohawk	I-8	EB	9,700	11,400	1,590	2,400	16.4%	21.1%
1	Mohawk	I-8	WB						
2	Sentinel	I-8	EB	10,800	11,300	1,670	2,300	15.5%	20.4%
2	Sentinel	I-8	WB						
3	Ehrenberg	I-10	EB	22,300	29,500	6,705	10,900	30.1%	36.9%
3	Ehrenberg	I-10	WB						
4	Bouse Wash	I-10	EB	22,800	28,500	3,799	9,100	16.7%	31.9%
4	Bouse Wash	I-10	WB						
5	Burnt Well	I-10	EB	23,600	26,100	7,181	9,300	30.4%	35.6%
5	Burnt Well	I-10	WB						
6	Sacaton	I-10	EB	54,500	66,800	6,195	4,900	11.4%	7.3%
6	Sacaton	I-10	WB						
7	Texas Canyon	I-10	EB	17,100	19,100	3,010	6,800	17.6%	35.6%
7	Texas Canyon	I-10	WB						
8	San Simon	I-10	EB	13,600	15,300	4,148	5,900	30.5%	38.6%
8	San Simon	I-10	WB						
9	Sunset Point	I-17	Both	29,800	40,100	1,923	3,600	6.5%	9.0%
10	Canoa Ranch	I-19	NB	20,800	18,300	1,423	2,100	6.8%	11.5%
10	Canoa Ranch	I-19	SB						
11	Haviland	I-40	EB	16,600	19,200	1,890	7,400	11.4%	38.5%
11	Haviland	I-40	WB						
12	Painted Cliffs	I-40	Both	15,900	25,300	2,062	8,500	13.0%	33.6%

Map No.[a]	Rest Area	Route	Traffic Direction	2011 Mainline Traffic Volume (AADT)	2022 Mainline Traffic Volume (AADT)	2011 Mainline Truck Traffic Volume (AADTT[b])	2022 Mainline Truck Traffic Volume (AADTT[b])	Percentage of 2011 AADT as AADTT[b]	Percentage of 2022 AADT as AADTT[b]
13	Hassayampa	US 60	Both	13,000	19,400	1,170	1,500	9.0%	7.7%
14	Salt River Canyon	US 60	Both	2,400	2,900	163	100	6.8%	3.4%
15	Mazatzal[c]	SR 87	Both	10,700	13,900	584	700	5.5%	5.0%
16	McGuireville	I-17	NB	20,600	27,500	1,333	1,500	6.5%	5.5%
16	McGuireville	I-17	SB						
17	Parks[d]	I-40	EB	16,800	21,600	2669	6900	11.4%	31.9%
17	Parks[d]	I-40	WB						
18	Meteor Crater	I-40	EB	16,600	21,500	3,187	8,800	19.2%	40.9%
18	Meteor Crater	I-40	WB						
19	Christensen[d]	I-17	NB	15,356	24,400	1,907	2,800	12.4%	11.5%
19	Christensen[d]	I-17	SB						

[a] *RA Map No. = Rest area number corresponding to Figure 2-1.*
[b] *AADTT = Annual Average Daily Truck Traffic (FHWA vehicles C8-C13 - four or more axle vehicles, and single and multi-trailer vehicles)*
[c] *Permanently closed.*
[d] *Permanently closed, but temporarily open to truck parking during the pandemic.*

4.5. Amenities

The list of amenities provided at each rest area was updated from the previous 2011 Study based on recent improvements provided by ADOT; amenities were confirmed through field visits conducted in March 2022. The Bouse Wash and Sentinel Rest Areas were under construction during the period when field visits were conducted; however, the list of amenities offered at these locations was updated following construction based on final record drawings.

As documented in Section 12.2.1, multiple rest areas have undergone improvements since 2011. These improvements include bathroom expansion at the Haviland Rest Areas, as well as electric, mechanical, and structural rehabilitation of ramadas, restrooms, vending machine areas, and caretaker residences at multiple rest areas. Ramadas are roofed shelters similar to pavilions with open sides where travelers can sit and rest. The existing amenities offered at ADOT rest areas, and the amenities added or removed since 2011, are summarized in **Table 4-5**. **Table 4-6** provides the number of restroom stalls and urinals, ramadas, pet areas, and picnic areas available at each rest area.

At the time the previous study was completed, Painted Cliffs, Hassayampa, and Meteor Crater Rest Areas did not have ADA accessibility to the main buildings/bathrooms or other facilities. Since the release of the previous study, all rest areas have been updated to meet ADA compliance. **Figure 4-5** presents a few examples of the updated rest areas.

Meteor Crater (WB)

Meteor Crater (WB)

Meteor Crater (EB)

Painted Cliffs

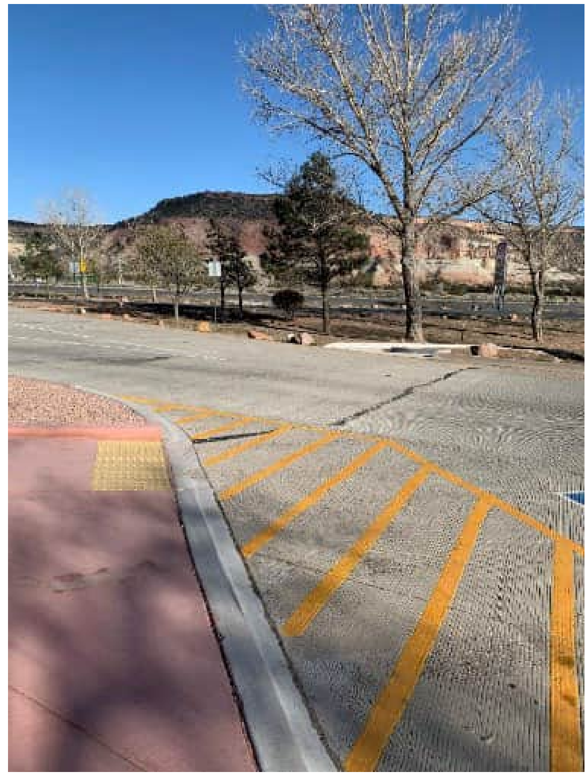

Figure 4-5. ADA Improvements at Rest Areas

Table 4-5. Rest Area Amenities and ADA Compliance

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Caretaker's Residence	ADA Compliance			Amenities							
						Parking	Ramps	Restrooms	Restrooms	Traveler Info	Vending Machines	Drinking Fountains	Ramadas	Picnic Areas[b]	Pet Areas	Public Telephones
1	Mohawk	I-8	EB	Southwest	No	YES	YES	YES	YES	YES	NEW	YES	YES	YES	NEW	RMV
1	Mohawk	I-8	WB	Southwest	Yes	YES	YES	YES	YES	YES	NEW	YES	YES	YES	NEW	RMV
2	Sentinel	I-8	EB	Southwest	Yes	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
2	Sentinel	I-8	WB	Southwest	No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
3	Ehrenberg	I-10	EB	Southwest	No	YES	YES	YES	YES	YES	NEW	YES	YES	YES	NEW	N/A
3	Ehrenberg	I-10	WB	Southwest	Yes	YES	YES	YES	YES	YES	NEW	YES	YES	YES	NEW	N/A
4	Bouse Wash	I-10	EB	Southwest	No	YES	YES	YES	YES	NEW	YES	YES	YES	YES	YES	N/A
4	Bouse Wash	I-10	WB	Southwest	Yes	YES	YES	YES	YES	NEW	YES	YES	YES	YES	YES	N/A
5	Burnt Well	I-10	EB	Southwest	Yes	YES	YES	YES	YES	YES	YES	YES	YES	NEW	YES	N/A
5	Burnt Well	I-10	WB	Southwest	Yes	YES	YES	YES	YES	YES	YES	YES	YES	NEW	YES	N/A
6	Sacaton	I-10	EB	Southcentral	Yes	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
6	Sacaton	I-10	WB	Southcentral	Yes	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
7	Texas Canyon	I-10	EB	Southcentral	Yes	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
7	Texas Canyon	I-10	WB	Southcentral	No	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Caretaker's Residence	ADA Compliance			Amenities							
						Parking	Ramps	Restrooms	Restrooms	Traveler Info	Vending Machines	Drinking Fountains	Ramadas	Picnic Areas[b]	Pet Areas	Public Telephones
8	San Simon	I-10	EB	Southeast	Yes	YES	YES	YES	YES	YES	NEW	YES	YES	NEW	YES	N/A
8	San Simon	I-10	WB	Southeast	No	YES	YES	YES	YES	YES	NEW	YES	YES	NEW	YES	NEW
9	Sunset Point	I-17	Both	Northwest	Yes	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	N/A
10	Canoa Ranch	I-19	NB	Southcentral	No	YES	YES	YES	YES	NEW	NEW	YES	YES	YES	YES	N/A
10	Canoa Ranch	I-19	SB	Southcentral	Yes	YES	YES	YES	YES	NEW	YES	YES	YES	YES	YES	N/A
11	Haviland	I-40	EB	Northwest	Yes	YES	YES	YES	YES	YES	NEW	YES	YES	YES	YES	N/A
11	Haviland	I-40	WB	Northwest	No	YES	YES	YES	YES	YES	NEW	YES	YES	YES	YES	N/A
12	Painted Cliffs	I-40	Both	Northeast	Yes	YES	NEW	YES	YES	NEW	YES	YES	YES	YES	YES	RMV
13	Hassayampa	US 60	Both	Northwest	No	YES	YES	NEW	YES	YES	N/A	N/A	N/A	YES	YES	N/A
14	Salt River Canyon	US 60	Both	Southeast	No	YES	YES	YES	YES	NEW	N/A	YES	N/A	YES	YES	N/A
15	Mazatzal	SR 87	Both	Southeast	No	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]
16	McGuireville	I-17	NB	Northcentral	Yes	YES	YES	YES	YES	NEW	YES	NEW	YES	YES	YES	N/A
16	McGuireville	I-17	SB	Northcentral	No	YES	YES	YES	YES	NEW	YES	NEW	YES	YES	YES	N/A

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Caretaker's Residence	ADA Compliance			Amenities							
						Parking	Ramps	Restrooms	Restrooms	Traveler Info	Vending Machines	Drinking Fountains	Ramadas	Picnic Areas[b]	Pet Areas	Public Telephones
17	Parks	I-40	EB	Northcentral	No	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]
17	Parks	I-40	WB	Northcentral	No	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]
18	Meteor Crater	I-40	EB	Northcentral	Yes	YES	NEW	YES	YES	NEW	YES	YES	YES	NEW	YES	N/A
18	Meteor Crater	I-40	WB	Northcentral	No	YES	NEW	YES	YES	NEW	YES	YES	YES	NEW	YES	N/A
19	Christensen	I-17	NB	Northcentral	No	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]
19	Christensen	I-17	SB	Northcentral	No	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]	--[c]

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
[b] Picnic Areas = Tables with attached benches for seating.
[c] No data available, rest area is closed.
Notes:
YES = Amenity or ADA available
NEW = Amenity added between 2011 and 2022
N/A = Amenity not available
RMV = Amenity removed between 2011 and 2022

Table 4-6. Number of Select Amenities at ADOT Rest Areas

Map No.[a]	Rest Area	Route	Traffic Direction Served	Restrooms/Stalls				Ramadas	Pet Areas	Picnic Areas
				Men	Women	Family	Total			
1	Mohawk	I-8	EB	7	7	0	14	6	2	2
1	Mohawk	I-8	WB	7	7	0	14	6	2	2
2	Sentinel	I-8	EB	6	6	2	14	6	3	7
2	Sentinel	I-8	WB	6	6	2	14	6	3	7
3	Ehrenberg	I-10	EB	6	7	0	13	6	2	0
3	Ehrenberg	I-10	WB	6	7	0	13	6	2	0
4	Bouse Wash	I-10	EB	4	4	0	8	5	3	8
4	Bouse Wash	I-10	WB	4	4	0	8	5	3	8
5	Burnt Well	I-10	EB	6	7	0	13	6	2	6
5	Burnt Well	I-10	WB	6	7	0	13	4	2	4
6	Sacaton	I-10	EB	6	6	0	12	7	1	10
6	Sacaton	I-10	WB	6	6	0	12	7	2	11
7	Texas Canyon	I-10	EB	6	6	0	12	3	2	12
7	Texas Canyon	I-10	WB	6	6	0	12	3	2	12
8	San Simon	I-10	EB	6	7	0	13	3	2	12
8	San Simon	I-10	WB	6	7	0	13	3	2	12
9	Sunset Point	I-17	Both	8	8	1	17	6	3	9
10	Canoa Ranch	I-19	NB	8	8	1	17	3	1	7
10	Canoa Ranch	I-19	SB	8	8	1	17	3	1	8
11	Haviland	I-40	EB	8	6	0	14	4	2	12
11	Haviland	I-40	WB	8	6	0	14	4	2	12
12	Painted Cliffs	I-40	Both	6	6	0	12	5	2	16

Map No.[a]	Rest Area	Route	Traffic Direction Served	Restrooms/Stalls				Ramadas	Pet Areas	Picnic Areas
				Men	Women	Family	Total			
13	Hassayampa	US 60	Both	2	2	0	4	0	1	7
14	Salt River Canyon	US 60	Both	5	5	0	10	0	1	2
15	Mazatzal	SR 87	Both	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
16	McGuireville	I-17	NB	6	6	0	12	4	3	7
16	McGuireville	I-17	SB	6	6	0	12	5	2	9
17	Parks	I-40	EB	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
17	Parks	I-40	WB	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
18	Meteor Crater	I-40	EB	8	8	1	17	3	2	12
18	Meteor Crater	I-40	WB	8	8	1	17	4	4	16
19	Christensen	I-17	NB	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
19	Christensen	I-17	SB	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
[b] No data available, rest area is closed.

4.6. Parking

As part of this study's goals and objectives, and considering the importance of assessing existing traveler needs, data for designated parking at rest areas were compiled and documented during field reviews. While most rest areas have designated parking for both cars and commercial vehicles, the Salt River Canyon and Hassayampa Rest Areas do not have designated truck parking. The following sections summarize the existing parking conditions at rest areas (**Table 4-7**), as well as private truck parking locations and utilization.

Table 4-7. Existing Parking

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Existing Parking	
					Cars	Trucks
1	Mohawk	I-8	EB	Southwest	25	10
1	Mohawk	I-8	WB	Southwest	28	10
2	Sentinel[b]	I-8	EB	Southwest	28	14
2	Sentinel[b]	I-8	WB	Southwest	28	15
3	Ehrenberg	I-10	EB	Southwest	26	15
3	Ehrenberg	I-10	WB	Southwest	25	15
4	Bouse Wash[b]	I-10	EB	Southwest	42	20
4	Bouse Wash[b]	I-10	WB	Southwest	32	20
5	Burnt Well	I-10	EB	Southwest	50	30
5	Burnt Well	I-10	WB	Southwest	45	30
6	Sacaton	I-10	EB	Southcentral	56	21
6	Sacaton	I-10	WB	Southcentral	44	18
7	Texas Canyon	I-10	EB	Southcentral	35	21
7	Texas Canyon	I-10	WB	Southcentral	35	22
8	San Simon	I-10	EB	Southeast	32	18
8	San Simon	I-10	WB	Southeast	42	18
9	Sunset Point	I-17	Both	Northwest	56	27
10	Canoa Ranch	I-19	NB	Southcentral	44	18
10	Canoa Ranch	I-19	SB	Southcentral	53	18
11	Haviland	I-40	EB	Northwest	28	29
11	Haviland	I-40	WB	Northwest	26	23
12	Painted Cliffs	I-40	Both	Northeast	34	9
13	Hassayampa	US 60	Both	Northwest	27	0
14	Salt River Canyon	US 60	Both	Southeast	19	0
15	Mazatzal	SR 87	Both	Southeast	--[c]	--[c]

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Existing Parking	
					Cars	Trucks
16	McGuireville	I-17	NB	Northcentral	45	20
16	McGuireville	I-17	SB	Northcentral	45	20
17	Parks	I-40	EB	Northcentral	--[d]	15
17	Parks	I-40	WB	Northcentral	--[d]	15
18	Meteor Crater	I-40	EB	Northcentral	32	57
18	Meteor Crater	I-40	WB	Northcentral	31	64
19	Christensen	I-17	NB	Northcentral	--[d]	11
19	Christensen	I-17	SB	Northcentral	--[d]	15
				Totals	**1,013**	**638**

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
[b] Represents the number of parking spaces available following construction.
[c] No data available, rest area is closed or under construction.
[d] Rest area temporarily open to trucks only.

4.6.1. Car Parking at Rest Areas

Designated parking for cars is provided at each of the 19 rest area locations. While visitors are encouraged to stay at the rest areas to reduce driving fatigue, no overnight camping is permitted.

- The Parks, Christensen, and Mazatzal Rest Areas are permanently closed to car parking.
- Designated car parking spaces at rest areas vary among all facilities, with the number of car parking spaces ranging between 19 and 56 spaces.

Table 4-7 summarizes the number of car parking spaces available at each rest area.

4.6.2. Truck Parking at Rest Areas

Since the previous rest area study in 2011, key legislation changes have been implemented, such as the amendment to the Federal Motor Carrier Safety Regulations requiring that electronic logging devices for commercial drivers do not exceed their allowable hours of service (HOS; consecutive driving time-limit) and that drivers take mandatory rest periods.[9] In addition, Jason's Law was implemented to bring attention to the lack of available truck parking nationwide (**Figure 4-6**). As a result of these new laws, truck parking has become a major concern both nationally and within Arizona.

[9] https://www.govinfo.gov/content/pkg/FR-2015-12-16/pdf/2015-31336.pdf

Figure 4-6. Trucks Parked at the Ehrenberg Rest Area (WB)

The *2019 Arizona Truck Parking Study* was initiated by ADOT following the findings of the *2017 Arizona State Freight Plan*, which concluded that inadequate truck parking was a major issue affecting freight movement throughout Arizona.[10] The *2019 Arizona Truck Parking Study* found that the growing truck parking demand in areas close to the Arizona/California border, and in major cities such as Phoenix and Flagstaff, resulted in 5 rest areas sites (Bouse Wash EB and WB, Painted Cliffs, Haviland EB and WB) being among the top 15 most utilized truck parking locations at night. As documented in the study, and as noted by ADOT Facilities Management, most truck parking spaces at rest areas are full by 3:00 a.m. This high utilization results in commercial drivers parking in undesignated locations at or adjacent to the rest areas, thereby creating unsafe conditions and increased infrastructure damage. Undesignated truck parking is further detailed in the following sections.

Since those documents were published, ADOT has focused on improving and expanding public truck parking at rest areas. To address deficiencies in truck parking throughout Arizona, ADOT has begun implementing multiple projects that aim to not only provide more public truck parking, but also to efficiently disseminate real-time parking information for commercial drivers.

The most recent initiatives include the newly established I-10 Corridor Coalition, which is a joint effort among departments of transportation (DOTs) for California, Arizona, New Mexico, and Texas. This coalition was awarded a grant by the U.S. Department of Transportation to implement a Truck Parking Availability System (TPAS) along the I-10 corridor between California and Texas (**Figure 4-7**).

[10] https://azdot.gov/sites/default/files/2019/08/final-report-arizona-truck-parking-study.pdf

Figure 4-7. I-10 Coalition Project Map
Source: I-10 Connects Website

The TPAS project is being designed to detect truck parking availability at rest areas and to disseminate this information in real-time to commercial drivers. One goal of this project is to reduce the amount of time drivers spend looking for available parking, thereby reducing driver fatigue, as well as reducing the chance that drivers will park in undesignated locations. The result of this project is expected to improve mobility and safety, reduce infrastructure damage and emissions, and reduce lost earnings for commercial drivers through increased efficiency and productivity.[11] TPAS is being implemented at four ADOT rest areas (eight sites) along the I-10 corridor in Arizona, which include the Ehrenberg, Bouse Wash, Texas Canyon, and San Simon Rest Areas. When complete, truck parking availability at those rest areas will be disseminated to drivers through use of dynamic messaging signs (DMSs) located before each rest area exit, as well as on the ADOT 511 website. According to ADOT, construction of TPAS at these four rest areas is expected to be complete in the winter of 2023. In addition, ADOT plans to evaluate the potential for standardizing TPAS at the remaining rest areas following a period of operation and evaluation.

[11] https://i10connects.com/node/4656

As mentioned in previous sections, ADOT has made numerous improvements to rest areas since the 2011 rest area study. These improvements have included:

- Truck parking expansion at the Haviland and Meteor Crater Rest Areas, where more than 100 additional truck parking spaces have been added between the two locations.
- Truck parking expansion at the Sentinel and Bouse Wash Rest Areas, which included 20 additional truck parking spaces between both rest areas.

The existing total number of truck parking spaces at all ADOT's 19 rest areas is approximately 638, an increase from the 454 designated spaces documented as part of the *2019 Arizona Truck Parking Study*.[12] **Table 4-7** summarizes the number of truck parking spaces at each rest area.

Figure 4-8. Truck Parking at Ehrenberg Rest Area (EB)

As part of the field visit data collection, the number of truck parking spaces being used was collected. The number of spaces used, as well as the calculated utilization rates, are provided in **Table 4-8**. Although the number of truck parking spaces being used during the field visits is not a reliable indicator of each rest area's overall truck parking utilization, it does provide some insight for truck parking at ADOT rest areas. Truck parking utilization was collected during peak truck parking hours (5:00 p.m. to 5:00 a.m.), as suggested by ADOT. Among the rest areas studied, only the eastbound Texas Canyon and eastbound Ehrenberg Rest Areas were observed as having a truck parking utilization greater than 75% (**Table 4-8**). Also, the Hassayampa Rest Area does not have designated truck parking spaces, which is why the utilization is greater than 100%.

[12] https://azdot.gov/sites/default/files/2019/08/wp3-truck-parking-supply-demand-and-gaps.pdf

Table 4-8. Observed Truck Parking Utilization (5:00 p.m. – 5:00 a.m.)

Rest Area	Route	Date of Visit	Available Truck Parking Spaces	Occupied Truck Parking Spaces	Utilization Rate
Sacaton EB	I-10	3/1/2022	21	10	47.6%
Sacaton WB	I-10	3/1/2022	18	8	44.4%
Salt River Canyon	US 60	3/3/2022	0	0	0.0%
San Simon EB	I-10	3/7/2022	18	7	38.9%
San Simon WB	I-10	3/8/2022	18	11	61.1%
Texas Canyon EB	I-10	3/8/2022	21	19	90.5%
Texas Canyon WB	I-10	3/8/2022	22	6	27.3%
Burnt Well EB	I-10	3/8/2022	30	--[a]	--[a]
Burnt Well WB	I-10	3/8/2022	30	--[a]	--[a]
Ehrenberg EB	I-10	3/8/2022	15	12	80.0%
Ehrenberg WB	I-10	3/8/2022	15	8	53.3%
Canoa Ranch NB	I-19	3/8/2022	18	8	44.4%
Canoa Ranch SB	I-19	3/8/2022	18	10	55.6%
Hassayampa	US 60	3/9/2022	0	5	500.0%
Haviland EB	I-40	3/9/2022	29	12	41.4%
Haviland WB	I-40	3/9/2022	23	3	13.0%
Sentinel EB	I-8	3/9/2022	10	5	50.0%
Sentinel WB	I-8	3/9/2022	10	2	20.0%
Mohawk EB	I-8	3/10/2022	10	1	10.0%

[a] No data available

4.6.3. Private Truck Parking Locations

The *2019 Arizona Truck Parking Study* found that most of the available truck parking spaces in Arizona are private truck parking locations. In fact, that study found that private truck parking locations provide more than 12 spaces for every one truck parking space provided by ADOT. In total, private truck parking spaces in Arizona equaled approximately 6,511, with more than 93% of those located adjacent to the interstate highways. These private truck parking locations, such as a Pilot Flying J or TA-Petro, offer truck parking availability and reservation systems, allowing commercial drivers to plan ahead. In addition, these private locations provide expanded amenities not available at ADOT rest areas, including fueling stations, showers, laundry facilities, and more. **Figure 4-9** is from the *2019 Arizona Truck Parking Study* and presents the density of private truck parking locations throughout Arizona.

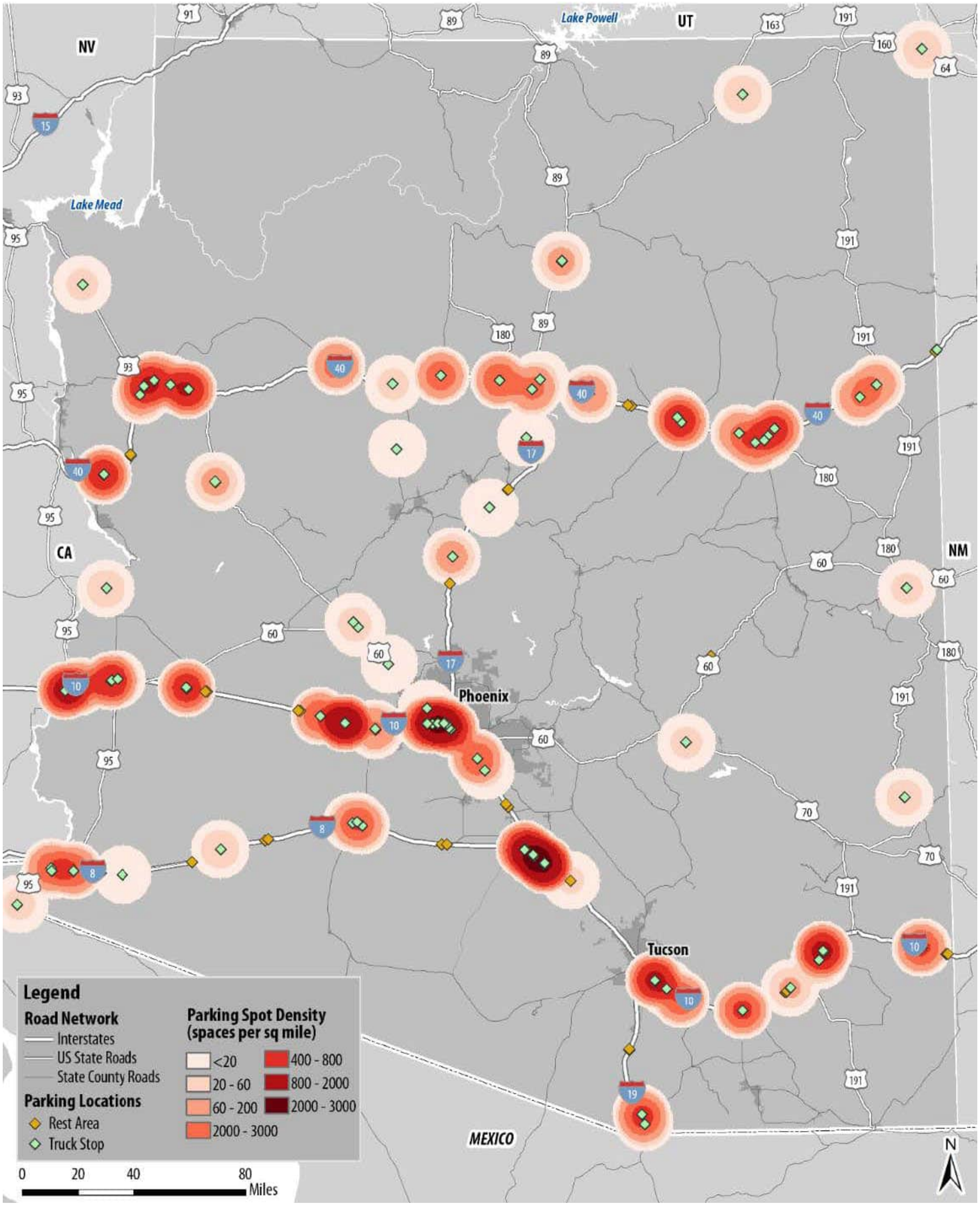

Figure 4-9. Private Truck Parking Density (2019)

Source: 2019 Arizona Truck Parking Study

4.6.4. Undesignated Truck Parking

Undesignated truck parking is defined as trucks parking at on-/off-ramps, on roadway shoulders, and in vacant lots. As documented in the *2019 Arizona Truck Parking Study*, more than 50% of commercial drivers spend 15 minutes or more searching for available parking, and more than 63% begin searching for parking 30 minutes before their required stop time. This time spent looking for parking results in reduced productivity and earnings. As a result, drivers often fail to find parking before they reach their hours-of-service limit and are forced to park in undesignated locations. Survey results from the *2019 Arizona Truck Parking Study* found that approximately 50% of surveyed drivers park in undesignated locations in Arizona at least once per week, which creates unsafe conditions for other motorists and causes increased infrastructure damage to roadways.

The *2019 Arizona Truck Parking Study* found that five ADOT rest areas were among the top 15 locations where undesignated truck parking occurs. The five rest areas referenced in the study include the Haviland, Sunset Point, Texas Canyon, Ehrenberg, and Meteor Crater Rest Areas. It also noted that the exits near the Bouse Wash Rest Area were among the top 15 locations for undesignated truck parking.

Following the truck parking study, ADOT Facilities Management began keeping track of the number of trucks parked in undesignated locations for the Painted Cliffs, Meteor Crater, Haviland, McGuireville, and Sunset Point Rest Areas. Those data were provided for this study and an analysis of the most recent 6 months (August 2021 to January 2022) was conducted. According to the data provided by ADOT, the Haviland (eastbound/westbound) and Sunset Point Rest Areas experienced the highest total of undesignated truck parking (1,985/974 and 881, respectively), as well as the highest average number of trucks parked in undesignated locations per day (10.8/5.3 and 4.8, respectively). It should be noted that undesignated parking at or near the Painted Cliffs may be partially caused by a vertical clearance constraint for large trucks exiting from the eastbound direction. Specifically, vehicles exiting I-40 from the eastbound direction at Exit 359 must travel under the existing bridge to reach the Painted Cliffs Rest Area. The vertical clearance for this bridge is 13 feet, 11 inches, which results in some large trucks not being able to access the rest area from this route. **Table 4-9** summarizes the analysis of undesignated truck parking at the five rest areas for the 6-month period.

Table 4-9. Analysis of Undesignated Truck Parking at Select Rest Areas

Rest Area	Route	Total # of Trucks Parked in Undesignated Locations	Average # of Trucks Parked in Undesignated Locations per Day
Painted Cliffs	I-40	782	4.3
Meteor Crater (EB)	I-40	308	1.7
Meteor Crater (WB)	I-40	110	0.6
Haviland (EB)	I-40	1985	10.8
Haviland (WB)	I-40	974	5.3
McGuireville (NB)	I-17	113	0.6
McGuireville (SB)	I-17	625	3.4
Sunset Point	I-17	881	4.8

4.7. Rest Area Spacing

The distance between ADOT rest areas was determined by measuring the distance in miles between each ADOT rest area along the same corridor or highway within Arizona. Some rest areas do not have another rest area for several miles in the same travel direction, as summarized in **Table 4-10**. Although some rest areas are spaced beyond the American Association of State Highway and Transportation Officials (AASHTO) recommended 60 miles or 1-hour drive time, all rest areas have alternative stopping opportunities (ASOs) within the recommended distance.

4.8. Alternative Stopping Opportunities

ASOs are defined as private facilities that offer similar amenities as those at ADOT rest areas (restrooms, parking, etc.) and are open 24 hours a day and 7 days a week. The distance between the nearest existing ASOs and ADOT rest areas was updated from the previous study and is summarized in **Table 4-10**.

Table 4-10. Rest Area Spacing and Distance to Alternative Stopping Opportunities

Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Milepost[b]	Distance to Nearest Rest Area (mi)		Distance to Nearest ASO[c] (mi)	
						N or E	S or W	N or E	S or W
1	Mohawk	I-8	EB	Southwest	55.8	28	None	11	14
1	Mohawk	I-8	WB	Southwest	56.5	28	None	11	14
2	Sentinel	I-8	EB	Southwest	83.6	None	28	32	17
2	Sentinel	I-8	WB	Southwest	84.9	None	28	32	17
3	Ehrenberg	I-10	EB	Southwest	4.4	48	None	1	4
3	Ehrenberg	I-10	WB	Southwest	5.3	48	None	1	4
4	Bouse Wash	I-10	EB	Southwest	52.2	34	48	42	7
4	Bouse Wash	I-10	WB	Southwest	52.9	34	48	42	7
5	Burnt Well	I-10	EB	Southwest	86.0	97	34	8	41
5	Burnt Well	I-10	WB	Southwest	86.8	97	34	8	41
6	Sacaton	I-10	EB	Southcentral	181.7	138	97	7	8
6	Sacaton	I-10	WB	Southcentral	183.5	138	97	7	8
7	Texas Canyon	I-10	EB	Southcentral	320.2	68	138	2	13
7	Texas Canyon	I-10	WB	Southcentral	320.8	68	138	2	13
8	San Simon	I-10	EB	Southeast	388.4	None	68	7	10
8	San Simon	I-10	WB	Southeast	389.0	None	68	7	10
9	Sunset Point	I-17	Both	Northwest	253	45	None	11	21
10	Canoa Ranch	I-19	NB	Southcentral	32.7	None	None	30	20
10	Canoa Ranch	I-19	SB	Southcentral	33.7	None	None	30	20

Map No.[a]	Rest Area	Route	Traffic Direction Served	District	Milepost[b]	Distance to Nearest Rest Area (mi)		Distance to Nearest ASO[c] (mi)	
						N or E	S or W	N or E	S or W
11	Haviland	I-40	EB	Northwest	22.6	159	None	22	13
11	Haviland	I-40	WB	Northwest	23.2	159	None	22	13
12	Painted Cliffs	I-40	Both	Northeast	359.0	None	123	<1	20
13	Hassayampa	US 60	Both	Northwest	116.1	175	None	4	14
14	Salt River Canyon	US 60	Both	Southeast	292.9	None	175	47	38
15	Mazatzal[d]	SR 87	Both	Southeast	235.7	None	None	15	47
16	McGuireville	I-17	NB	Northcentral	297	27	45	40	10
16	McGuireville	I-17	SB	Northcentral	297	27	45	40	10
17	Parks[e]	I-40	EB	Northcentral	181.6	54	159	3	19
17	Parks[e]	I-40	WB	Northcentral	182.7	54	159	3	19
18	Meteor Crater	I-40	EB	Northcentral	235.2	123	54	19	35
18	Meteor Crater	I-40	WB	Northcentral	236.4	123	54	19	35
19	Christensen[e]	I-17	NB	Northcentral	324	None	27	13	37
19	Christensen[e]	I-17	SB	Northcentral	324	None	27	13	37

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
[b] Milepost = Location of mainline off-ramp intersection for rest area.
[c] Alternative Stopping Opportunity
[d] Permanently Closed.
[e] Permanently closed, but temporarily open to truck parking during the pandemic.
Notes:
E = east
mi = mile(s)
N = north
S = south
W = west

5. Benchmarking and Peer States

AASHTO provides the leading guidance and recommendations on the best practice standards for planning, designing, and operating/maintaining rest areas. AASHTO provides general guidelines for best practice standards for the following benchmarking factors considered in this report:

- Parking layout and capacity
- Building and restroom facilities
- ADA compliance
- Operations and maintenance
- Green/environmentally friendly technologies and practices
- Signing
- Telecommunications
- Landscaping and lighting

This report also references rest area design and operating standards from other states leading in the implementation and development of best practice standards, including the California Department of Transportation (Caltrans), Texas Department of Transportation (TxDOT), Minnesota Department of Transportation (MnDOT), and other state DOTs.

5.1. Access and Pedestrian Circulation

5.1.1. Rest Area Access

Chapter 4, Section B(1) and B(3) of the AASHTO Guide[13] provide guidance on the best practice design standards for rest area access and pedestrian circulation. These standards are for new rest areas and as such should apply to the design of any planned improvements or upgrades at existing rest areas and in developing/designing new rest areas in Arizona.

Regarding the design of on-/off-ramps for ingress/egress to the rest area, the AASHTO Guide provides the general recommendations that vehicles "…should be directed from or into the mainline according to typical ramp terminal designs used at freeway interchanges and as shown in the current version of the [AASHTO] 'Green Book.'"[14]

The AASHTO Guide provides the following specific recommendations regarding the development of rest area access ramps:

- Both tapered and parallel designs are applicable (**Figure 5-1**, **Figure 5-2**).
- Ramp terminals should be developed on tangent sections of mainline highways for safety and operational reasons.
- Developing ramp terminals connecting to a mainline curve to the right is an acceptable design feature. However, ramp terminals adjoining a mainline curve to the left should be avoided.

[13] *Guide for Development of Rest Areas on Major Arterials and Freeways*, 3rd Edition, AASHTO, 2018.

[14] The AASHTO "Green Book" has the formal title of "A Policy on Geometric Design of Highways and Streets."

- Ramp "… terminals should be properly spaced in relation to nearby interchanges."
- Adequate sight distance should be provided along the mainline to the gore nose of an exit ramp terminal. This affords time for travelers to decide whether to exit to the rest area and to make necessary lane changes.
- To improve safety and traffic operations at exit/entrance ramp terminals, full-pavement depth stabilized shoulders should be located adjoining these terminals pavements.
- Entrance ramp terminals and the ramp layout beyond the terminal should be designed to provide sufficient separation between the mainline traveled way and onsite parking. This distance will discourage motorists from stopping on the mainline and walking over to the rest area facilities. A minimum buffer width of 10 meters (30 feet) and desirable separation of 50 meters (150 feet) are recommended.
- Ramp layout beyond the entrance ramp terminal may be on a tangent section, on a set of compound curves, or on a set of reverse curves.
- When using compound or reverse curves, the second curve should be designed as flat as possible. In both these situations, the most desirable design for the second curve is to provide a curved alignment requiring only a normal cross slope for drainage and no superelevation. Avoiding superelevation eliminates the potential problem of excessive crossover crown and rollovers where the entrance ramp splits into separate roads for cars and trucks.
- Specific ramp design depends on the proposed layout of parking areas and the amount of ROW available within the rest area.
- With entrance ramp layout, sufficient distance must be provided between the gore nose of the entrance ramp terminal and the point where the ramp splits into two separate roads. This distance is important because it allows drivers to decelerate comfortably from mainline highway speeds to desirable lower speeds within the site. Providing sufficient distance also allows proper use of advance guide signs along the entrance ramp telling drivers which road to take before the ramp splits.

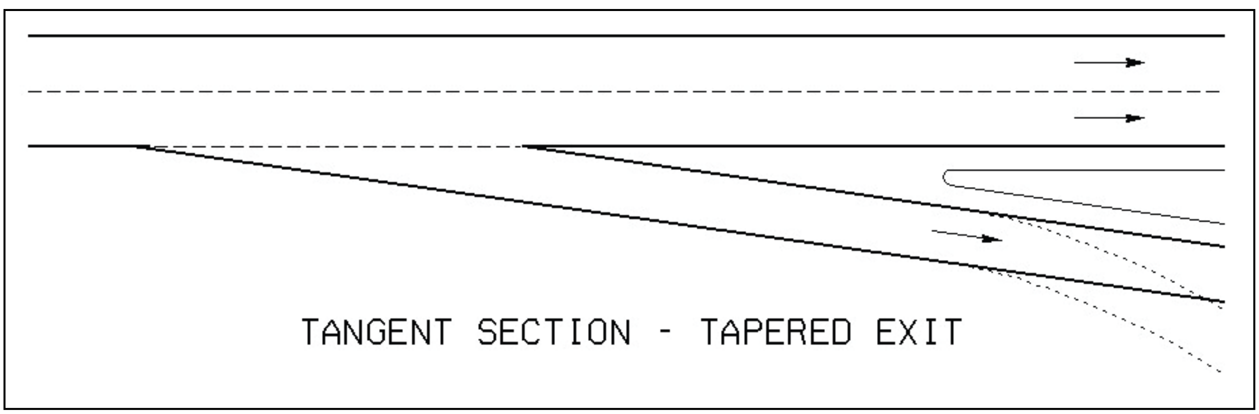

Figure 5-1. Tapered Ramp Design

Source: AASHTO (2018)

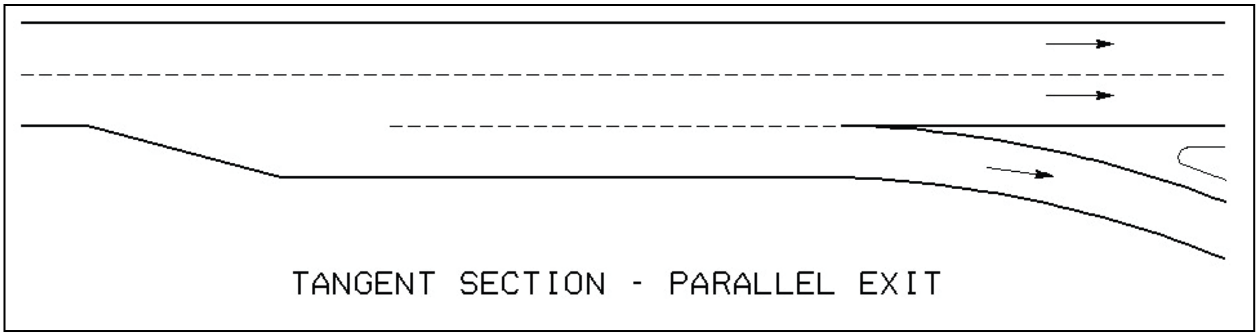

Figure 5-2. Parallel-type Ramp Design

Source: AASHTO (2018)

5.1.2. Pedestrian Circulation

The AASHTO Guide indicates that the following three elements are important considerations in designing rest area pedestrian circulation: “(1) safety, (2) accessibility to all services for persons with disabilities, and (3) all other elements enhancing the site and available natural and cultural resources.”

The AASHTO Guide provides the following general recommendations regarding pedestrian circulation:

- Pedestrian circulation should take advantage of site contours and accentuate natural features.
- Grading and drainage should not interfere with pedestrian traffic.
- Signing and lighting should be designed to support a coherent, secure pedestrian environment.
- Use advance guide signs along the entrance ramp telling drivers which road to take before the ramp splits.

The AASHTO Guide provides the following recommendations regarding safe pedestrian access within the rest area:[15]

- Pedestrians should be assured a safe environment when leaving their vehicles and using various rest area facilities.
- Drivers and their passengers must leave their vehicles safely and gather on a travel way separated from vehicular traffic.
- Sidewalks and marked crossings provide easily identifiable pedestrian routes. Primary walkways provide pedestrians with access to primary site facilities. Walkways should be firm, stable, slip-resistant, physically separated from vehicular paths, and wide enough to accommodate peak usage.
- Pedestrians should be protected from the dangers of rock outcrops, precipices, or other significant changes in grade by railings, barriers, separation from feature, or other means. Waterways or other water features should be similarly treated—access by pedestrians, particularly small children, should be restricted.
- Trees and shrubs should not encroach on the walkway, including low limbs over paths. Nearby plant material should not obstruct views or be dense enough to present security problems.

[15] Ibid.

Existing vegetation that may be problematic, including poisonous species or plants with spikes and thorns, should be removed if near primary walkways.

- Tripping hazards should be avoided or eliminated. Heaved and severely cracked or spalled sidewalks must be replaced. Existing stairs should be minimized and removed, or if necessary, should contain at least three risers. Stairs with fewer than three risers are difficult to discern and often cause fall accidents. Pedestrian ramps should be constructed instead of such stairways.
- Pedestrian areas must be well-drained and pedestrian-related features should not be located where runoff or ice will collect. Particular attention should be given to building roof eaves and any associated drains. Need for snow removal, and control of blowing and drifting snow and sand, also should be considered.

5.1.3. ADOT Design Standards for Rest Area Access and Pedestrian Circulation

ADOT has indicated that the standards applied in developing access ramps to rest areas are similar to those specified for interchange ramps. Indeed the *ADOT Roadway Design Guidelines* states that “Rest Area Entrance and Exit Ramps are computed similarly as Interchange Ramps….” The *ADOT Roadway Design Guidelines* state that “This manual is complementary to AASHTO’s ‘A Policy on Geometric Design of Highways and Streets, 2004’ and is to be used in conjunction with that document.” Because the *ADOT Roadway Design Guidelines* for interchanges reference the AASHTO Green Book, and since the AASHTO interchange ramp design standards are considered appropriate designs for developing rest area access ramps, ADOT generally is employing best practice standards in developing access to rest areas in Arizona.

ADOT has reported that design of rest area pedestrian circulation is site specific, depending on the nature of the physical features and constraints of the rest area site. Therefore, ADOT does not follow a set of established guidelines considering pedestrian circulation within the rest area. Although the AASHTO Guide provides very general guidance for pedestrian circulation, it is recommended that ADOT consider these guidelines as appropriate objectives when considering pedestrian circulation, particularly those standards relating to safe access of rest area facilities.

5.2. Parking Layout and Capacity

The AASHTO Guide provides the following recommendations regarding the development of rest area parking.

5.2.1. Parking Lot Scale

Parking lots should be only as large as required by design calculations while also providing a logical circulation pattern. Oversized lots can confuse motorists and appear harsh and uninviting as drivers approach buildings. Where scale of a lot is very large or linear, landscaped parking bays and islands should be considered to soften the expanse of pavement and reduce its visual impact.

5.2.2. Auto/Truck Parking Separation

Separate lots should be provided for trucks, with appropriate access and circulation patterns. Three examples of different site layouts are depicted in **Figure 5-3**, **Figure 5-5**, and **Figure 5-4**.

5.2.3. Use of Curbs

Curbs along entrance roadways and around parking lots provide excellent traffic delineation. When ramps approaching parking lots are constructed with shoulders but no curbs, the ramp edges often are rutted by truck traffic, becoming unsightly and creating a continual maintenance problem. If curbs are substituted for shoulders, this problem can be avoided. Although concrete or stone curbs increase construction costs and sometimes maintenance costs, many states accept that cost for the visual and aesthetic benefits. Barrier curbs should not be used on high-speed portions of the ramps. Curbs are recommended around all parking lots, on approach ramps, and for islands separating car and truck lots.

5.2.4. Parking-Space Dimensions

States developing rest areas should review AASHTO's guidelines and their own experience elsewhere in modifying parking-space dimensions.

5.2.5. Surface Consistency

Pavements for entrance/exit ramps, roadways, and parking areas should be designed to provide consistent surface types and structural strengths throughout the entire facility.

5.2.6. Parking Area Grade

Parking areas typically should be designed with a 2% cross slope. The maximum grade is 5%, and the minimum is 0.5% (to allow for adequate drainage). If practical, pavement slope of parking spaces reserved for persons with disabilities should not exceed a 1% grade.

5.2.7. Other Layout Considerations

Layout of paved areas should include consideration of parking lot dimensions, types of drainage systems required, paving material used, and locations of curbs and islands. These visual effects should be as carefully considered as the durability of various paving materials or potential maintenance problems.

5.2.8. Other Paving Considerations

Other paving plan elements that should be considered include sidewalk scoring patterns, surface textures, and locations of curb ramps and crosswalks. The most current *Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities, Transportation Vehicles* (U.S. Architectural and Transportation Barriers Compliance Board) must be used. These features should be adapted so that they match the site-development concept. Paving plans and site-development plans must be coordinated.[16]

5.2.9. Amount of Auto and Truck Parking

AASHTO provides specific calculations to estimate the number of auto and truck parking spaces required at a given rest area location. Critical inputs to these calculations include: current mainline AADT, 20-year AADT growth factors, peak hour AADT, capture rate—that is, the proportion of the mainline traffic stopping at the rest area, average vehicle length of stay for different vehicle types, and mainline traffic composition—proportions of autos and trucks.

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[16] "Guide for Development of Rest Areas on Major Arterials and Freeways, 3rd Edition," AASHTO, 2001; pages 62-70.

An important consideration for designing parking layouts is the separation between auto and truck parking. Providing this separation minimizes the risk of collisions between autos and trucks by improving vehicular circulation/maneuvering and creates a sense of smaller-scale parking lots that are quieter and create a more inviting environment for rest area users.

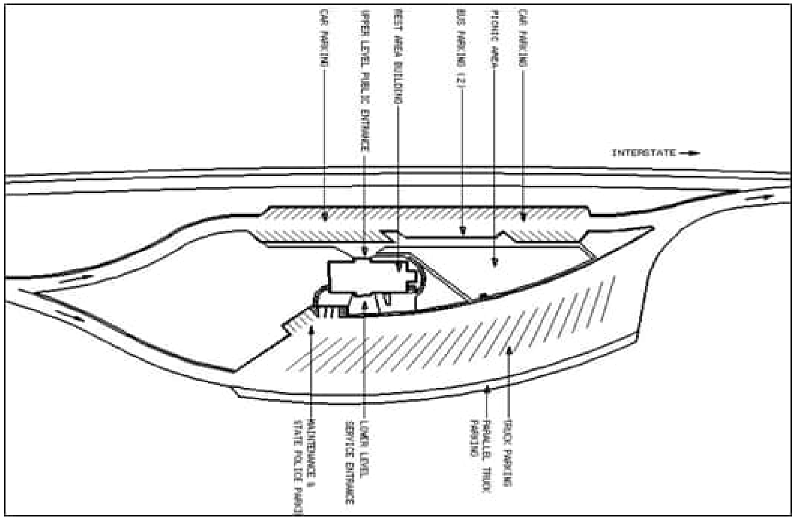

Figure 5-3. Parking Layout A (AASHTO 2001)

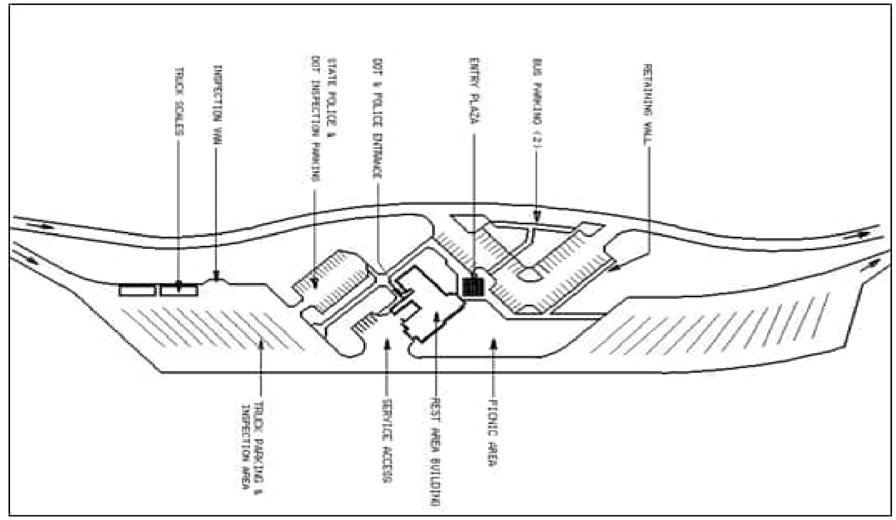

Figure 5-5. Parking Layout B (AASHTO 2001)

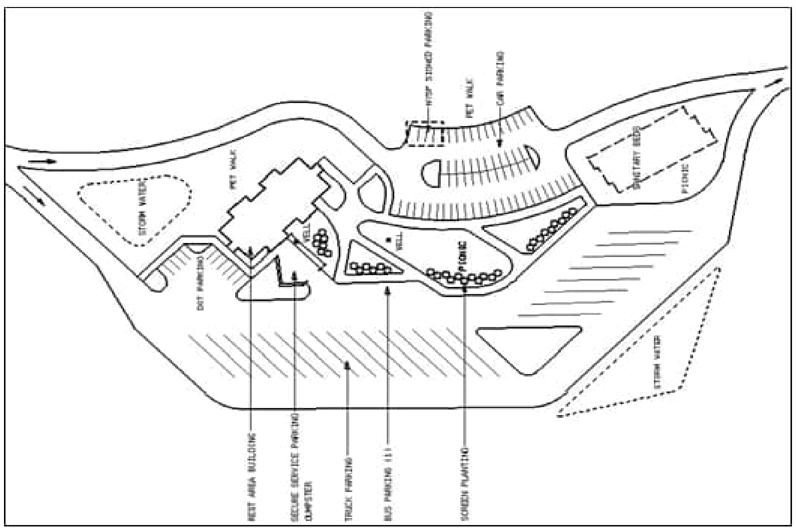

Figure 5-4. Parking Layout C (AASHTO 2001)

5.2.10. ADOT Design Standards Parking Layout and Parking Need

ADOT has indicated that the Department follows AASHTO's design guidelines and methodologies when calculating the number of auto and truck/bus parking spaces required at a particular rest area location. Therefore, in estimating the amount and mix of parking at a given rest area over its design life, ADOT is judged to be applying the best practice standards recommended by AASHTO. In terms of rest area parking area layout design standards, the *ADOT Roadway Design Guidelines* simply state that "Rest Area Parking Areas and irregular features may be computed by hand-plotted cross sections, or with differential surface modeling techniques." ADOT staff has commented that parking area layout design is site specific and therefore applying a single parking area layout design standard can be ineffective.[17]

However, although parking area layouts will be site specific, the AASHTO recommendations for parking area design are general in nature and can be applied to a range of different designs. It is recommended that ADOT consider the AASHTO parking layout recommendations when developing new or improving existing rest area parking areas.

Based on a review of satellite images of the 19 ADOT-owned rest areas included in this analysis, rest area parking area layouts appear to be designed in conformance with the general layouts specified in **Figure 5-3**, **Figure 5-5**, and **Figure 5-4**. However, at a number of rest areas in Arizona, auto and truck parking areas are located directly adjacent to each other instead of being separated by landscaping and building features/structures as recommended by AASHTO. Greater separation between auto and truck/bus parking areas would tend to improve traffic/pedestrian circulation, reduce noise pollution associated with concentrated vehicle parking, and create a sense of smaller-scale parking that is both more inviting and more visually appealing to motorists.

5.3. Building and Restroom Facilities

5.3.1. Building Design Considerations

Recognizing the diversity and uniqueness of rest area site conditions, the AASHTO Guide does not recommend specific rest area building designs. Instead, the AASHTO Guide provides more general guidance regarding the design factors and objectives that should be considered when developing rest area facilities. Common rest area building elements include:

- Restrooms
- Lobby/information areas
- Picnic shelters
- Custodial offices
- Storage structures

The AASHTO Guide states that "a major requirement for a well-designed building is that it functions smoothly with minimal maintenance. Floor plans must permit easy access to restrooms, adequate

[17] Input provided by Mark Hoffman, ADOT Multimodal Planning Division and LeRoy Brady, ADOT Intermodal Transportation Division (Roadside Development group), during a project conference call on May 13, 2011.

circulation space within the entry and inner lobby, and sufficient space for mechanical equipment and maintenance operations. Other program requirements, such as information centers, interpretive facilities, and vending machines, should be considered in preliminary architectural design." [18]

Figure 5-6 presents appropriate access requirements for the core lobby area of the main rest area building.

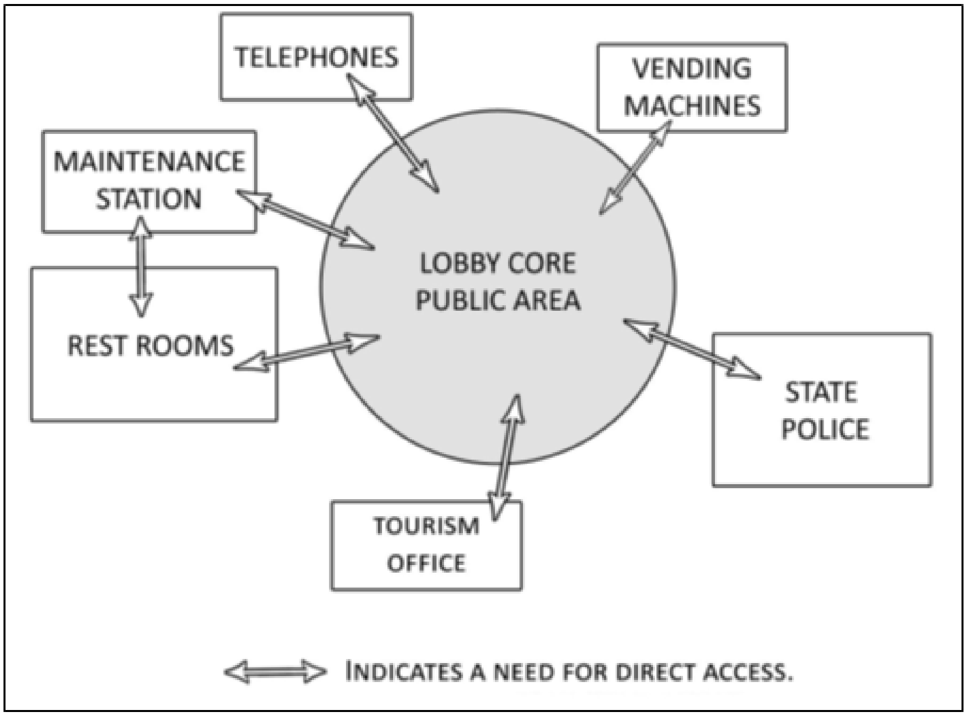

Figure 5-6. Rest Area Main Building: Features to be Accessed Through Lobby (NYDOT)

In **Figure 5-6**, the "Tourism Office" cell also might be substituted with areas with information displays and computer kiosks or Wi-Fi internet access points.

The AASHTO Guide highlights the fact that the main or principal building is "the most important element of the rest area, serving as the focal point and as a tool for disseminating information to travelers." The main rest area building is also the largest and most noticeable structure within the rest area and, as such, the AASHTO Guide highlights the fact that "designing an attractive and interesting building fosters a good impression of site development and the state responsible for it." Considering this fact, the AASHTO Guide indicates that "exterior treatments and architectural forms should be explored that may be distinctive, interesting, and appropriate" and that typically "a stripped-down building will not save much money but may leave a negative impression on visitors." Regarding the relative cost of designing an architecturally unique rest area building compared to a more utilitarian, stripped-down facility, the AASHTO Guide points out that "a common misconception is that a more attractive building having a distinctive architectural style is expensive." Instead, the AASHTO Guide suggests that an architecturally

[18] *Guide for Development of Rest Areas on Major Arterials and Freeways*, 3rd Edition, AASHTO, 2001; page 77.

distinct facility is not necessarily more expensive, stating that “a building’s exterior treatment seldom represents a major part of its cost. Mechanical and plumbing elements normally consume a greater portion of that cost.”[19]

Therefore, a clear objective in designing the central rest area building should be to design/construct facilities that are architecturally interesting and attractive, particularly considering that according to AASHTO, doing so does not necessarily represent significant increases in overall project costs.

The AASHTO Guide recommends that state DOTs develop a “written building and site design program” that will provide rest area designers with guidance regarding the optional building designs and considerations. According to the AASHTO Guide, the building/site design program should:

- “Identify all specific requirements of the building and site, as well as use of equipment and materials.
- Budget constraints for all structures and the entire project should also be stated early in the program document.
- Identify any requirements for buildings that are energy-efficient or meet pertinent national, state, and local building codes.”

As a way to reduce maintenance costs, the AASHTO Guide recommends the use of “low-maintenance and vandal-resistant materials.” For interior building features, these include "quarry-tile floors, tile walls, epoxy paints, and sturdy, well-built restroom fixtures.” Exterior building features also should be constructed from materials that require a minimum amount of maintenance. ADOT has indicated that rest areas in Arizona typically employ steel and masonry materials, which are favored over wood, as these materials tend to better withstand the arid desert conditions in Arizona.

5.3.2. Restrooms

The AASHTO Guide does not provide specific guidelines regarding optimal restroom design or configurations. However, the guide does specify the calculations that should be followed when estimating the need for the number of toilets and urinals for both men and women’s restrooms. The calculations consider the following variables:

- Mainline design year AADT
- Number of restroom users per vehicle
- Peak hour usage
- Capture rate—proportion of the mainline traffic stopping at the rest area
- Restroom users per hour per fixture
- The default AASHTO formula for estimating the total number of toilets/urinals is:
  (Design year AADT) x (Capture rate) x (0.0117)

The constant of 0.0117 is based on applying standard default values for the numbers of restroom users per vehicle, peak hour use factors, and restroom users per hour per fixture based on a 2-minute cycle. Location-specific factors, such as peak hour usage factors, should be used when available because they

[19] Ibid, page 78.

provide more accuracy compared to default factors. The AASHTO Guide specifies that 60% of the total number of toilets/urinals required should be devoted to the women's restroom, while the remaining 40% should be located in the men's restroom. Regarding the split between urinals and flush toilets in the men's restroom, the AASHTO Guide is silent. However, the *California Highway Design Manual* recommends that the number of fixtures in the men's restrooms should be divided evenly between urinals and flush toilets.

Regarding the layout/design of restrooms, the AASHTO Guide states that designers should "consider providing dual restrooms at each area to allow at least one for each sex to remain open during cleaning. Individual unisex units also permit continued use during cleaning."[20] Several state DOTs provide specific and useful design guidance for the development of restrooms. For example, the *California Highway Design Manual* recommends that:[21]

- Entrances to restrooms should be visible from the parking area. They should be well lighted and clearly identified with signs and/or graphics.
- Restroom entrances should not be located in areas of dead-end circulation.
- Facilities intended for general public use should not be located near restroom entrances.
- Privacy screens at restroom entrances should allow visibility from the ground to a height of 12 inches to 18 inches above the ground.
- Lockable steel doors should be provided for entrances to restrooms.
- Two [additional] restrooms should be provided for each gender to allow for uninterrupted public access to facilities during janitorial cleaning operations.

5.3.3. ADOT Design Standards for Buildings & Restrooms:

Existing ADOT design publications do not provide specific standards or guidance for designing and developing rest area buildings and restrooms. Considering the importance of these facilities, it is recommended that the general guidelines specified by AASHTO be considered by ADOT in developing rest area building and restroom design standards.

ADOT currently uses the AASHTO formulas to estimate the quantity of restroom fixtures required to meet demand in both men's and women's restrooms. Therefore, ADOT is considered to currently be applying the best practice standards for estimating restroom capacities at rest areas in Arizona.

In general, rest areas in Arizona are judged to conform to the general building layout and access standards specified by AASHTO, with rest area buildings reflecting unique and interesting designs, and with central buildings and restrooms providing convenient and functional access to motorists.

5.4. ADA Compliance

All design considerations relating to access of rest area facilities by persons with disabilities should conform to the latest version of the *Americans with Disabilities Act Accessibility Guidelines* ([ADAAG]

[20] Ibid, page 21.

[21] California Highway Design Manual, Chapter 910, page 910-6; Available online at: https://dot.ca.gov/-/media/dot-media/programs/design/documents/chp0910-a11y.pdf

2006 Standards or later), which provides extensive guidelines/construction requirements for developing a range of rest area features, including pedestrian routes, ramps, doors and windows, restroom facilities, vending machines, signs, and telephones. The FHWA has ruled that when “Federal-aid highway program funds are used for parking facilities, or buildings such as transit facilities, rest areas, information centers, transportation museums, historic preservation projects, or other projects where pedestrians are expected, the project must meet the current applicable accessibility standards, whether or not the project is within the public right-of-way.”[22] In this case, FHWA considers “current applicable accessibility standards” for all new or altered rest area facilities, including buildings, parking areas, curbs, ramps, and walkways, to be those standards specified by ADAAG. Therefore, in cases where ADOT constructs new or alters existing rest areas, the accessibility designs must meet and reflect those specified by ADAAG.

5.5. Operation and Maintenance

Regarding rest area maintenance standards, the AASHTO Guide recommends developing “a one- to five-year maintenance and site-management plan, identifying tasks that must be completed and also relative timing and coordination of each activity.”[23] The AASHTO Guide indicates that the primary tasks that might be addressed in this plan would include:

- Building maintenance and management
- Mowing and turf management
- Fertilization
- Vegetation maintenance and pruning
- Site irrigation
- Snow removal
- Road pavement care
- Wetland and wildlife habitat
- Equipment maintenance and management

The AASHTO Guide recommends that “a maintenance and operation plan should be developed for each rest area to ensure that critical maintenance activities are appropriately considered as part of ongoing rest-area operations.” AASHTO further recommends that “maintenance and operation requirements should be identified in the maintenance and operations plan, including frequency for each activity.”[24]

As part of the operation manual for new or renovated rest areas, the AASHTO Guide recommends that “During construction, the equipment installed, wiring diagrams, water lines, sewerage, pumps, septic-drainage fields, water coolers, faucets, lighting fixtures, etc., all should be documented as to locations, types, model numbers, parts, etc. This information should be collected and included in an operations manual, so that persons maintaining the facility have a ready reference concerning equipment information and maintenance schedules.” The AASHTO Guide indicates that other items to be included

[22] Federal Highway Administration website: http://www.fhwa.dot.gov/programadmin/pedestrians.cfm

[23] Guide for Development of Rest Areas on Major Arterials and Freeways, 3rd Edition, AASHTO, 2001; Page 70.

[24] Ibid, page 71.

in the operations manual are "a list of emergency contacts (with telephone numbers and addresses), copies of all permits (such as sewer outlets), fire emergency plans, any agreement for facility operation and/or maintenance, and all equipment maintenance books or manuals."[25]

Maintenance activities and schedules will vary depending on a range of factors, including level of average daily use, age/condition of facilities, types of landscaping provided, level of amenities/facilities onsite, type of water/wastewater and other utility systems, and environmental/climatic conditions. Rest area building/restroom maintenance standards should be clearly defined with frequency of maintenance activities dependent primarily on the level of use. The lack of scheduled building maintenance can cause the facility to deteriorate more rapidly and result in higher costs to repair and remediate deficiencies because of delayed preventative maintenance.

MnDOT is considered a leader in rest area maintenance standards and provides useful guidelines for the maintenance of rest area buildings and restrooms. For example, MnDOT recommends the following building maintenance activities for an hourly, daily, weekly, monthly, and annual basis for rest areas open to the public 24 hours per day, year-round:[26]

Several Times Daily (frequency to depend on traffic/usage at rest area):

- Remove wastepaper from floor.
- Mop problem areas in restrooms, lobby, and entry areas.
- Clean smudges and smears on windows, doors, walls, and partitions.
- Clean sinks and mirrors.
- Clean water closets, urinals, and drinking fountains.
- Check toilet tissue dispensers.
- Clean sanitary napkin containers.
- Empty waste receptacles, if required.

Once Daily:

- Clean windowsills, ledges, grills, soap dispensers, shelves, and mirrors.
- Clean light fixtures and lenses.
- Clean walls, floors, and partitions.
- Clean and empty exterior ash trays.
- Check operation of utilities such as heating and cooling systems, sewage systems, water systems, and electrical systems.
- Record nighttime truck usage at select rest areas.
- Store lost and found items and document in log.
- Raise and lower flags honoring half-staff declarations.

[25] Ibid, page 105.

[26] Mn/DOT "Maintenance Manual," Chapter 12; Available online at: https://www.dot.state.mn.us/maintenance/pdf/manual/chapter-10-maintenance-of-rest-areas.pdf

Weekly:

- Check and clean floor drains.
- Add water to low use floor drains.
- Wash all interior and exterior windows (except during winter periods).
- Make sewage treatment pond observations, if applicable.

Monthly:

- Wipe off electric motors to keep free of dust.
- Check filters installed in air, fuel, and water systems.
- Check fire extinguishers.
- Replenish water treatment chemical feeders.
- Inspect drain field monitoring pipes.
- Clean all air vent grills.

Annually:

- Clean all light fixtures.
- Wash walls and ceilings.
- Strip, clean, and refinish floors.
- Install display case graphics at MnDOT request, typically every other year.

As Needed:

- Paint, stain, varnish, or seal all trim, doors, partitions, and exposed wood surfaces as required with colors that match existing finishes.
- Make minor building and site repairs.
- Pump septic tanks once per year or as use requires.

5.5.1. ADOT Rest Area Maintenance Standards

ADOT issues and awards contracts for the maintenance of rest areas in Arizona that provide specific and detailed recommendations regarding the type of maintenance, standards, and frequency for which maintenance activities are to be performed. Prior to 2013, ADOT had several separate and independent contracts overseeing rest areas. In 2013, the Public-Private Partnerships (P3) Office successfully bundled rest area maintenance into one statewide contract (with the exception of water source and wastewater system utilities).[27] In 2019, ADOT entered a Public-Private Partnership with Diamond Ridge Development Corporation, which took over maintenance and operations of 14 rest areas throughout Arizona.[28] ADOT maintenance contracts reflect and largely conform to the AASHTO maintenance recommendations and are similar to standards recommended by states considered to be leaders in rest area maintenance. The ADOT maintenance contracts specify detailed maintenance requirements for all rest area facility

[27] https://azdot.gov/adot-blog/public-private-partnership-manage-states-highway-rest-areas

[28] Information provided by ADOT's P3 Office on May 4, 2022.

components, including restrooms, reception areas, information and vending kiosks, ramadas, picnic tables/areas, all landscaped areas, walkways, and parking areas. Several rest areas in Arizona provide onsite housing within the rest area for contract maintenance staff and, therefore, provide 24-hour presence in case of maintenance emergencies.

5.6. Green Technologies and Practices

Regarding the use of “green” or environmentally friendly practices, the AASHTO Guide only provides basic guidance, stating that state DOTs “are encouraged to explore alternative-energy sources for building heating and cooling systems. Not only will these reduce operating costs, but because rest areas are very visible, alternative-energy technology can be presented effectively to the public in informational displays, etc.”[29]

Arizona Executive Order 2005-05, “Implementing Renewable Energy and Energy Efficiency in New State Buildings,” established in February 2005 by Governor Napolitano, sets objectives and standards for state agencies, including ADOT, in implementing renewable and efficient energy measures in newly constructed state buildings. Specifically, the Executive Order states that:

- “All new state-funded buildings constructed after the date of this Executive Order shall be designed and constructed to derive at least 10 percent (10%) of their energy from a renewable resource.
- All state-funded buildings constructed after the date of this Executive Order shall meet at least the ‘silver’ LEED standard.”[30]

ADOT is one of several state agencies named in the Order as being required to submit an annual report to the Governor summarizing actions taken to achieve the goals set forth in the Executive Order and indicating the degree to which the goals of the Executive Order have been achieved.

Because rest areas buildings typically are state-funded buildings, new and possibly reconstructed rest areas in Arizona would likely need to meet the energy requirements specified in the Executive Order. Regarding the requirement that state buildings use 10% of their energy from a renewable resource, the Order states that “A renewable resource may include: solar, wind, or the use of thermal energy from biomass fuels for heating and or cooling. This goal may also be met through the purchase of renewable energy credits (as defined by the Department of Commerce Energy Office) from an energy producer.”[31]

One of the best potential renewable energy sources for rest areas might come from solar power, particularly considering the amount of clear, sunny weather in many regions of Arizona. Considering the improvements in solar cell technology during the last decade, which have translated into more efficient and lower cost systems, the use of solar power may be a cost-effective and appropriate source of renewable energy to meet the minimum 10% goal specified in the Executive Order.

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[29] *Guide for Development of Rest Areas on Major Arterials and Freeways*, 3rd Edition, AASHTO, 2001; Page 77.

[30] Arizona “Executive Order 2005-05: Implementing Renewable Energy and Energy Efficiency in New State Buildings,” February 11, 2005.

[31] Ibid.

The U.S. Green Building Council LEED standards are one of the best sources of green building standards available. The Executive Order sets the objective that new state buildings should strive to meet at least the Silver LEED standard. Currently, there are four levels of LEED certifications, with Silver being a mid-level certification earning between 50 and 59 points out of a total of 100 possible points (the higher the point score, the more the building conforms to LEED green building standards). The objective of the LEED performance standards leading to certification is "…to promote healthful, durable, affordable, and environmentally sound practices in building design and construction." The LEED performance standards for certification focus on seven different topic areas, where points are earned in each topic area corresponding to the extent to which the design/construction of a facility meets the LEED standards.

The seven topic areas include:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation in Design
- Regional Priority

The LEED standards for each of these topic areas are too numerous and detailed to be summarized here; therefore, it is recommended that ADOT review these standards available at the U.S. Green Building Council's LEED website.[32]

Although the LEED standards represent one of the best sources of green building practices, building/designing rest areas to LEED specifications and using green technologies (solar cells) has the potential to increase project costs and constrain project development in some cases. Considering the budgetary challenges facing Arizona, it is important to carefully weigh the tradeoffs between environmental benefits associated with conforming to LEED standards and using green technologies and the higher project costs that might be incurred as a result. It is recommended that ADOT strive to meet LEED standards and use green technologies where practical and possible and in cases where doing so would not result in significant additional costs that would make the development of new rest areas financially infeasible.

5.6.1. ADOT Green Technologies and Practice Standards

According to ADOT, the Department does not have a set of specific standards or policies relating to the use of green technologies/practices in designing and constructing rest areas in Arizona. ADOT indicated that the Department last investigated the use of solar power at rest areas in the 1980s when the cost of solar technology was considerably higher than it is now. Another green technology that ADOT investigated in the past was the use of cool towers, which is an evaporative system using gravity developed by the University of Arizona Environmental Research Lab. However, a trial use of cool towers

[32] U.S. Green Building Council's LEED webpage is available at: http://www.usgbc.org/DisplayPage.aspx?CategoryID=19

was found to be ineffective in providing sufficient air conditioning at rest areas in Arizona, and the concept was abandoned. ADOT has indicated that rest areas in Arizona use infrared heating rather than forced air heating, where insulation is used to maintain heat, reduce energy consumption, and minimize utility expenses.

Recognizing the reality of budgetary constraints in Arizona, a primary issue and objective is how to develop rest areas that are efficient and cost effective. In some cases, implementing green building practices and using green technologies could prove to be cost prohibitive considering budgetary realities. Therefore, it is recommended that, in considering the use of green practices and technologies for specific projects, similar to those discussed previously, ADOT should seek to analyze the comparative costs between green and non-green practices/technologies to fully understand what, if any, additional costs green building practices/technologies entail.

5.7. Signing

The FHWA publishes the *Manual on Uniform Traffic Control Devices* (MUTCD) (2003 and 2009 versions), which represents the definitive collection of national standards for all traffic control devices, including road markings, highway signs, and traffic signals located on all public roads and highways. The MUTCD provides specific recommendations and examples for advance guide and entrance signing for rest areas. The MUTCD does not provide guidance for signing within rest areas, however. The AASHTO Guide offers guidelines for providing signing within the rest area facility. Specifically, the AASHTO Guide recommends that:

- "Signing within the site should be limited to avoid confusing drivers. An overall sign system should be developed during site design for their most effective use. Signing along ramps and parking lots should identify intended directional flow of traffic.
- Pedestrian signs should provide concise directions, orientation, and other information, while respecting the site environment and being consistent in style with overall site design. They should be sized and placed with pedestrian sight lines in mind, as well as being visually pleasing and well-designed. Effects of sign placement, materials, and ADAAG should be considered when creating a complete signing plan.
- Sign placement depends on site circulation and special features. They can be situated throughout the site or clustered neatly with other design elements. A common sign material is wood, with a routed message, but metal, plastic, or fiberglass can also be used. Effects of site signing and messages presented must be carefully considered. Negative messages should be avoided.
- Metal signs mounted at heights meeting Interstate standards will be ineffective for pedestrians. Signs intended for pedestrian use in parking areas or along walkways may be at other heights than interpretive signs and may be governed by special requirements for character height and

proportion. ADAAG gives guidelines for all aspects of sign placement and construction, including character size, proportion, finish, height, and location."[33]

5.7.1. ADOT Signing Standards

ADOT has adopted the 2003 MUTCD and has not yet updated to the revised 2009 MUTCD standards. ADOT uses the MUTCD signing standards for rest areas and is therefore judged to be using the best practice design standards with respect to advance guide signing for rest areas. Based on a review of ADOT design publications, the Department does not appear to have a set of specific design standards for signage within the rest area facility. Therefore, it is recommended that ADOT consider the general guidance provided by AASHTO in developing design standards for signage within rest areas in Arizona.

5.8. Telecommunications

Traditionally, public payphones have been considered a universal and necessary amenity at most rest areas. At a minimum, public payphones provide an important security feature in that they offer travelers a way to telephone in emergencies to reach outside assistance. The AASHTO Guide provides the following recommendations on providing public payphones:[34]

- Wall-mounted telephone units are preferable to outdoor phone booths.
- Phones should be in areas protected from weather, lighted, and visible from major-use areas, such as building lobbies.
- Emergency numbers should be posted on or near the phones.
- In compliance with ADAAG, the number of volume-controlled and Telecommunications Device for the Deaf units in public facilities is based on required service level.
- Rest area planners may want to consider the installation of phones with credit-card slots and fax/computer jacks, adding to convenience and profitability of phone service.
- In large rest areas, a secondary phone may be located away from the building or in the truck parking lot. When secondary phone service is provided for commercial truck drivers, these may be mounted at heights convenient for use from a truck cab.

In recent years, a number of states developed additional telecommunications at rest areas, including most notably Wi-Fi internet. Texas and Iowa have led in the development of Wi-Fi at rest areas, and many if not all rest areas in these states have either Wi-Fi or direct internet access. These states have contracted with private companies, such as Zoom Information Systems or Coach Connect, to provide the software and information management systems. The Governor's Office, the Arizona Commerce Authority, and ADOT are partnering to bring broadband to much more of Arizona. Within this partnership, and as such, the implementation of Wi-Fi access has been considered and may be coming to rest areas throughout the state.[35]

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[33] *Guide for Development of Rest Areas on Major Arterials and Freeways*, 3rd Edition, AASHTO, 2001; Pages 78-79.

[34] Ibid, page 87.

[35] Information provided by ADOT's P3 Office on May 4, 2022.

5.8.1. ADOT Telecommunication Standards

There is some question regarding whether public payphones are still needed at rest areas in Arizona, considering the rise of cell phone usage and the continuing expansion of cell phone coverage. A check of amenities at Arizona rest areas showed public payphones either did not previously exist or were removed before 2022, except for the westbound San Simon Rest Area, where a public payphone has been added since 2011.

In 2013, ADOT entered a P3 with Infrastructure Corporation of America to take over the maintenance and operations of 14 rest areas. Within this partnership, the implementation of Wi-Fi access has been considered and may be coming to rest areas throughout the state.

5.9. Landscaping and Lighting

5.9.1. Landscaping

The AASHTO Guide provides general guidance regarding rest area landscape development. It is important to recognize that landscaping design is site specific and that, in Arizona, the availability of water is a critical issue that impacts landscaping options and decisions.

The AASHTO Guide provides the following general guidelines regarding landscape development:

- General Considerations. “Landscape design should consider site layout, public safety, native plantings, erosion control, wind and sun protection, sustainable landscape, and minimal use of water, labor, and chemicals in long-term maintenance of landscape.”
- Layout. “Landscape design should begin near the beginning of the deceleration ramp, continue throughout the rest area, and extend back to the highway. Landscape design elements include plant materials, hardscape materials, gradients, and alignments. These elements should flow from the highway into and from the rest area. Abrupt change detracts from unified design.”
- Plant Use. “Use of plant materials should be considered an essential part of rest-area design. They offer opportunities to define spaces, provide shade, accent and direct views, and create focal points Trees and shrubs can become architectural elements affecting climate, providing aesthetic stimulation, and creating wildlife habitat.”
- Plant Selection. “Select hardy plants suitable to the site’s soils and growing conditions, and adaptable to roadside locations. When possible, native plants, forbs, and ground covers should be established in construction areas. This maximizes their survival over the life of the project and minimizes maintenance costs. Native grasses can be used in areas where mowing will be infrequent and herbicide/fertilizer use minimal. In arid regions, use of xeric plant material should be considered to avoid extensive irrigation. In forested settings, consider locating rest areas where areas of significant forest canopy can be preserved. Occasionally, selective cutting may improve scenic views or reveal other scenic features.”
- Maintenance. “Maintenance problems should be anticipated. Landscape design objectives should include establishing and maintaining low-maintenance lawn and landscape, using low-impact horticultural practices and minimal amounts of chemicals. Use of fertilizers, herbicides, and other pesticides in high-use pedestrian areas should be limited. Maintenance practices

should be integrated to combine mechanical, cultural, biological, and selective chemical techniques."[36]

5.9.2. ADOT Landscape Standards

ADOT has reported that there is no single set of defined standards applied or used regarding rest area landscape development. ADOT has indicated that, in all cases, the Department seeks to use indigenous and native plant species and materials. ADOT also has indicated that the Department seeks to implement landscape designs that minimize maintenance and water usage, particularly considering the extremely limited water supply at many rest areas in Arizona. These basic landscape objectives specified by ADOT generally conform to the AASHTO standards discussed previously. It is recommended that ADOT consider adopting the general landscape guidelines recommended by AASHTO when and where appropriate. Since landscape design is site specific, only general guidelines and recommendations are useful.

5.9.3. Lighting

The AASHTO Guide indicates that there are four primary types of lighting for exterior uses, each of which have different characteristics. The lighting types and their associated qualities include:

- Mercury vapor. "Fair color characteristics, gives off blue-green light. Lighting cost and efficiency is poor."
- Metal halide. "Good color characteristics. Light color is white, and accurately brings out colors. Efficiency is moderate."
- High-pressure sodium. "Poor color characteristics. Light is yellow. Efficiency is good."
- Low-pressure sodium. "Very poor color characteristics. Light is yellow. Efficiency is very good."

The AASHTO Guide provides the following recommendations and considerations regarding rest area lighting design:

- Lighting-type Selection. "When selecting among lighting types, consideration should be given to light color in addition to cost. In general, white light (i.e. metal halide lighting) is preferable to yellow light (i.e. high-low pressure sodium lighting) due the harshness of yellow lighting."
- Illumination Levels. "At night, physical safety is a major issue—illumination levels must be high enough to provide well-lit paths from parking areas to building entryways. Peripheral lighting must give enough illumination to discourage loitering or criminal activity. If light levels are inadequate, travelers will feel unsafe and uncomfortable when stopping."
- Lighting Areas. "Lighting should reflect the scale of the area to be lit. Two levels are important in rest area design: (1) area lighting, and (2) pedestrian lighting. These require different intensity of light and luminaire mounting heights. Area lighting includes entrance and exit ramps, roadways, parking lots, and entry areas. Pedestrian lighting illuminates walkways, building approaches, terraces, and other significant site features."

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[36] Ibid, pages 99-102.

- Lighting Fixture Heights. “Walkway and other site lighting should be at lower, more intimate heights for pedestrians, such as 3.6 meters (10 feet) post-type lights or 1 meter (3 feet) ground-mounted lights. Roadway and parking lighting should have taller poles, often up to 15 meters (50 feet).”
- Lighting Fixture Design. “Colors and styles of luminaires and poles establish strong visual patterns and should be carefully considered. Roadway and pedestrian lighting should be easily differentiated, both in physical structure and intensity. Where possible, one luminaire style should be used for all mounting heights and locations to provide continuity. Lights should be attractive and styled to match materials used elsewhere on the site.”
- High-mast Lighting. “High-mast lighting is sometimes used in parking areas because it requires fewer poles to provide adequate illumination but should be used with caution. Mounting heights of 24 meters (80 feet) and higher can present a massive visual presence within the site that may seem imposing and uncomfortable. Also, if rest areas are located near residential neighborhoods or other areas where these structures might be intrusive, significant community resistance may be encountered.”

Table 5-1 summarizes the rest area lighting levels recommended by the AASHTO Guide.

Table 5-1. AASHTO Recommended Lighting Levels (AASHTO 2001)

Level of Activity	General Parking and Pedestrian Area			Vehicle Use Area (only)		
	Lux (minimum on pavement)	Footcandles (minimum on pavement)	Uniformity Ratio (average/ minimum)	Lux (average on pavement)	Footcandles (average on pavement)	Uniformity Ratio (average/ minimum)
High	10	0.9	1:1	22	2	3:1
Medium	6	0.8	4:1	11	1	3:1
Low	2	0.2	4:1	6	0.5	4:1
Note: *The term “Lux” and “Footcandle” are different measures of illuminance or the intensity of light per unit area.*						

5.9.4. ADOT Rest Area Lighting Standards

The ADOT staff reported that the Department does have a set of established lighting standards or policies for rest area lighting. ADOT staff indicated that high-mast lighting is used at several rest areas in Arizona and is the preferred form of lighting as it is more efficient than other types of lighting.[37] The “mast” of this form of lighting consists of a 50-foot tower with multiple light fixtures at the top. It is recommended that ADOT consider the lighting standards recommended by AASHTO in designing new or redeveloped rest areas. Although ADOT does use high-mast lighting at several rest areas, something AASHTO appears to discourage, the masts are lower than those specified by AASHTO and are in regions

[37] Input provided by Mark Hoffman, ADOT Multimodal Planning Division and LeRoy Brady, ADOT Intermodal Transportation Division (Roadside Development group), during a project conference call on May 13, 2011.

that are typically remote and outside residential areas and therefore do not create the problem of intrusive lighting for residents.

5.10. Peer States and Emerging Trends

Peer state rest area programs were reviewed to identify additional benchmarks and emerging trends for use in this study. Peer states identified include California, Texas, Nevada, Utah, New Mexico, and Florida (**Figure 5-7**).

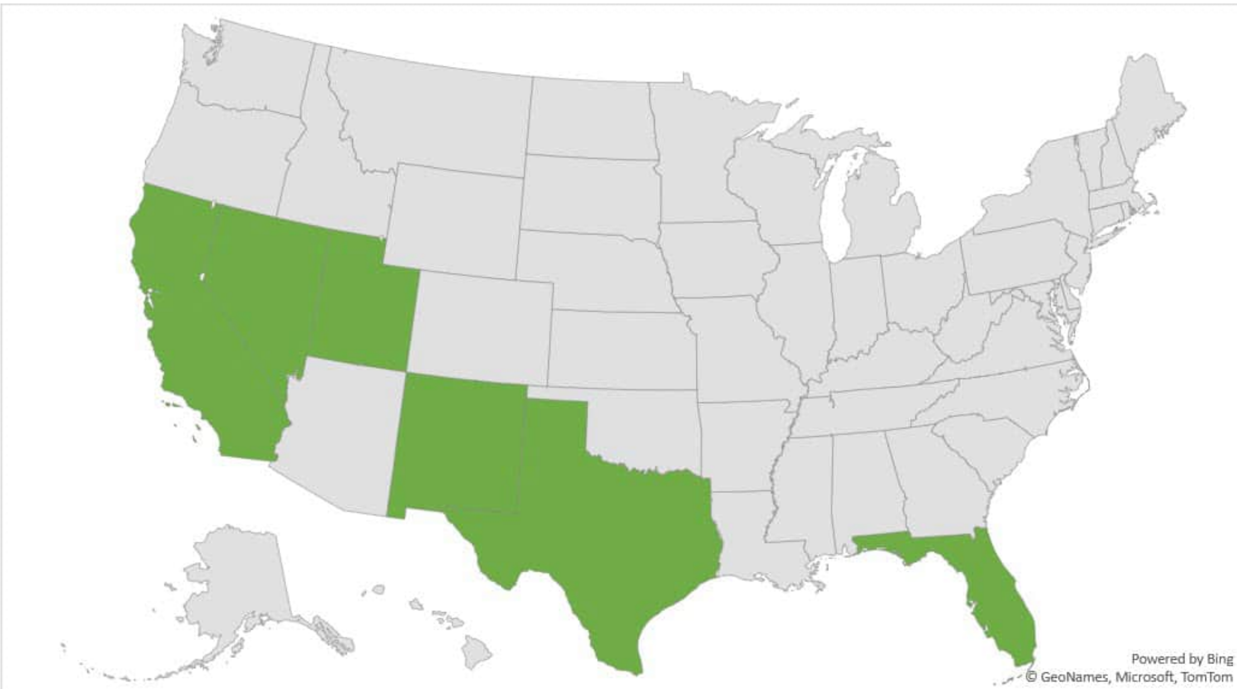

Figure 5-7. Peer States

Although, peer states do have some rest area-related information available on their respective DOT websites, some information was not publicly accessible. Therefore, a peer state questionnaire was developed and distributed to each state's rest area program or facilities manager. Completed questionnaires were returned by TxDOT, Caltrans, Nevada Department of Transportation (NDOT), Utah Department of Transportation (UDOT), and three of the New Mexico Department of Transportation (NMDOT) districts. In 2020, the Florida Department of Transportation (FDOT) completed an update to its statewide rest area long-range plan, which provided sufficient information as to not require a questionnaire being completed. Peer state information received as part of the questionnaire is categorized in the subsequent sections as follows:

- Existing rest area systems
- Safety and security
- Existing amenities
- Long-range plan

- Parking availability and demand
- Funding
- Emerging trends

5.10.1. Existing Peer State Rest Area Systems

Based on input provided by each peer state's DOT and available online data, a list of each peer state's overall rest area systems was compiled. Among the states reviewed, Texas, Florida, and California have the largest total number of rest areas and welcome centers (88, 85, and 86, respectively). These totals are representative of their larger size and population as compared to other peer states. The number of rest areas and welcome centers for each peer state is summarized in **Table 5-2.**

Table 5-2. Existing Peer State Rest Area Systems

Facility Type	Peer States					
	Florida	New Mexico	Utah	California	Nevada	Texas
Rest Area—Interstate Facilities	50	24	17	50	7	46
Rest Area—Off-system Facilities (State Roads and Highways)	1	6	8	35	20	30
Rest Area—Tolled Facilities	8	0	0	0	0	0
Welcome Centers	4	0	4	1	4	12
Truck Comfort/Weigh Stations (with rest area facilities)	20	0	12	--[a]	0	0
Truck-Only Rest Area	2	1	--[a]	0	0	0
Total Facilities	85	31	41	86	31	88

[a] *Data Unavailable*

The overall needs and objectives for each peer state's transportation network may vary, but the visions or goals for their rest area system tend to be aligned. In fact, FDOT, TxDOT, Caltrans, NDOT, and UDOT all envision these facilities as safety rest areas that aim to reduce driver fatigue by providing drivers with opportunities to rest, use restrooms, check vehicles, and discover information related to surrounding areas.

Although peer state rest area programs generally follow the AASHTO and FHWA recommended rest area spacing of 60 miles or a 1-hour drive, specific spacing requirements vary among peer states. For instance, California has implemented a policy that recommends a maximum of 30 miles between rest areas. A study completed by Caltrans found that fatigue-related collisions tended to increase beginning 30 miles from rest areas, suggesting that 30 miles might represent the optimum spacing. Similar to ADOT, NDOT's spacing requirements meet FHWA requirements, but rest area locations also are based on analysis of safety data, existing alternative service locations, and economic value.

5.10.2. Safety, Security, and Emergency Management

5.10.2.1. Safety and Security

All TxDOT-managed rest areas contain security cameras for facility monitoring and maintain footage for up to 30 days. Although security cameras are not currently present at NDOT rest areas, cameras are expected to be included as part of future rest area reconstruction efforts. California and New Mexico rest areas provide cameras at only a few select rest areas, while Utah and Florida rest areas do not have cameras.

Security staff is provided 24 hours per day at all TxDOT rest areas, while FDOT provides nighttime security at each rest area. NMDOT provides security staff at two rest areas located within NMDOT District 5. Caltrans noted that janitorial staff are present at rest areas during business hours and provide a base level for alerting law enforcement of criminal activity. Similarly, ADOT provides onsite caretaker residences at most rest areas, which also provide a base level for alerting law enforcement. Some Caltrans, TxDOT, UDOT, and ADOT rest areas also provide designated parking spaces and offices for law enforcement, which provides an increased level of Highway Patrol presence.

5.10.2.2. Emergency Management

Because the geography, topography, weather conditions, and demographics vary among peer states, each state has different emergency management roles that their rest areas serve. For instance, Caltrans stated that their rest areas are used by first responders on an as-needed basis and can act as staging and operation centers during wildfire events. Rest areas managed by FDOT provide additional capacity and act as staging areas during regional and statewide evacuation efforts, while TxDOT provides tornado shelters at 25 rest areas within high-risk zones. Although not specifically designated for emergency use, Utah rest areas may be used depending on the location of the emergency. Certain Nevada rest areas provide overflow parking when certain roadways become unnavigable or closed because of weather conditions. As stated previously, ADOT rest areas are used as staging areas during emergencies and provide safe harbor for drivers during dangerous weather events.

5.10.3. Existing Amenities

5.10.3.1. Basic Amenities

Existing amenities offered at peer state's rest areas were compiled and compared to determine benchmarks for rest area amenities. A comparison of existing amenities reveals that most peer states provide similar amenities to those offered at ADOT rest areas. Specifically, most peer states provide designated parking for both cars and trucks, restrooms, picnic areas, running water, pet exercise areas, and vending machines. **Table 5-3** summarizes the existing amenities at peer state rest areas.

Table 5-3. Existing Peer State Amenities

Peer State	Florida	Utah	New Mexico	California	Texas	Nevada
Number of Facilities	**65**	**41**	**31**	**86**	**88**	**31**
Basic Amenities						
Restrooms	85	25	30	86	88	24
Running Water	85	--[a]	29	86	88	13
Picnic Area	65	29	30	85	88	30
Vending Machines	85	10	6	31	48	0
Telephone	65	14	--[a]	82	0	3
Pet Exercise Area	65	29	--[a]	85	88	0
Designated Truck Parking	85	29	21	84	51	28
Expanded Amenities						
Wi-Fi	12 (WC & TF)	0	--[a]	0	47	1
Digital/Interpretive Displays	8 (TF)	0	--[a]	86	36	31
Electric Vehicle Charging Stations	8 (TF)	3	--[a]	28	0	4
Cultural/Historic/ Tourism Exhibits	0	29	19	86	36	Yes (# Unknown)
Recreational Trails	1	29	--[a]	2	10	0
Children Play Areas	0	0	--[a]	0	35	0
Recreational Vehicle Dump Stations	0	0	--[a]	10	6	6
Security Staff	65	0	--[a]	0	66	0
Law Enforcement/ Security Office Space	0	4	--[a]	Yes (# Unknown)	30	0

[a] Data unavailable or incomplete
Notes:
TF = tolled facilities
WC = welcome center

5.10.3.2. Expanded Amenities

To identify potential benchmarks for future consideration and implementation at ADOT rest areas, expanded amenities offer a view into peer state's practices and the potential evolving expectations or needs of Arizona travelers. Among the expanded amenities identified within peer state rest area programs, the most prevalent amenities include Wi-Fi; cultural, historical, or tourism exhibits; recreational trails; electric vehicle (EV) charging; and digital displays. The expanded amenities offered at peer state rest areas are summarized in **Table 5-3**.

5.10.4. Long-Range Plans

Based on responses received and available online resources, NDOT, TxDOT, Caltrans, and FDOT have developed or are currently developing long-range plans for their rest areas. In partnership with Michigan State University, NDOT is currently working to produce a long-range plan for the maintenance, reconstruction, rehabilitation, and new development of rest areas. The long-range plan was expected to be available in May 2022. As mentioned previously, FDOT recently completed an update to their rest area long-range plan, which provides recommendations through 2045. Caltrans is actively working to update their 2011 rest area master plan, while TxDOT has developed a 10-year plan to replace or build new rest areas and provide additional truck parking.

5.10.4.1. Rest Area Rehabilitation, Replacement, and Closures

Most TxDOT rest areas have been constructed or modernized beginning in 2000, with 10 to 12 rest areas still expected to be updated. TxDOT noted that although they have not closed any rest areas, they have replaced outdated facilities. The main factors for reconstructing or replacing TxDOT rest areas were based on AADT and parking availability, with those same factors also determining the type of facility constructed (full-service facilities versus limited facilities with expanded parking). In addition, each reconstructed or newly built TxDOT rest area is uniquely designed to be context-sensitive to the area and relies on local community involvement for design. The unique designs result in visitors being more engaged with the facilities and lengths of stays have been extended.

According to the completed questionnaire, NDOT has constructed new rest areas, replaced old facilities, repurposed, or conducted major renovations of older facilities in the last 5 years. These improvements were completed to address ADA compliance, water system issues, and general operating needs. In addition, NDOT rest areas are being designed or rehabilitated to be architecturally appropriate for their respective areas and to ensure they align with Nevada's Department of Tourism and Cultural Affairs branding.

Similarly, Caltrans has replaced or rehabilitated several rest areas in the last 5 years. Currently, 14 existing rest areas are either being designed for rehabilitation or are under construction. These facility improvements were identified due to aging facilities and capacity issues. In addition, traffic studies are conducted at the time of renovation to determine the building, parking, and wastewater treatment capacity needs. Caltrans also noted that while no rest areas have been permanently closed in the last 5 years, temporary rest area closures do happen on a semiregular basis during emergency maintenance work, planned construction, or seasonal weather events.

Several FDOT rest areas also have undergone rehabilitation or renovation within the last 5 years. At the time when FDOT's long-range plan was being updated, 5 rest areas were closed for renovations, while 2 new rest areas were being evaluated for potential construction. On average, 2 FDOT rest areas are renovated per year. Rest area improvements are identified through use of a uniform inspection criterion that occurs annually for each rest area. Rest areas maintenance needs also are identified based on feedback from visitors, which can be provided through use of posted quick response codes (commonly called a QR code) that are located at each rest area.

Per the completed questionnaire provided by NMDOT's District 2, a long-range plan for NMDOT's rest areas is currently being developed. In addition, NMDOT District 2 noted that rest areas that were replaced or renovated were based on capacity, as traffic growth and usage rates outgrew the existing rest area capacity. As part of those improvements, NMDOT District 2 rest areas were upgraded to include ADA-compliant features, baby changing stations, and drinking water. The 10 rest areas and welcome centers located in NMDOT District 4 have all been updated within the last 10 years, but detailed improvements were not specified. The two rest areas in NMDOT District 5 were noted as being more than 30 years old, with no updates or improvements occurring within the last 5 years. In addition, NMDOT District 5 stated that both rest areas require new plumbing, heating, air conditioning, electrical, structural, and landscaping improvements.

Within the last 5 years, UDOT has not closed any rest areas, but instead has replaced two older rest area facilities with prefabricated concrete buildings. These replacements were conducted to increase restroom and truck parking capacity, as well as provide unisex/family restrooms. In addition, some smaller renovations at two other Utah rest areas are expected to include improvements to fixtures, partitions, and lighting.

5.10.5. Parking Availability and Demand

Truck parking shortages and undesignated truck parking is a major issue among all peer states, including Arizona. For example, Caltrans noted that throughout California there is a truck parking shortage of approximately 2,000 spaces. In addition, Caltrans, UDOT, and TxDOT noted that trucks parking in undesignated areas (for example, on exit ramps and shoulders) not only partially block or restrict access, but this practice creates unsafe conditions and has contributed to crashes. Because of these truck parking issues, many peer states have recently studied and published truck parking and freight studies. In fact, UDOT, FDOT, TxDOT, ADOT, Caltrans, and NDOT have already developed or are conducting truck parking studies to identify potential solutions.

One solution being adopted by peer states is the implementation of TPAS at rest areas. As mentioned previously, the newly established I-10 Corridor Coalition is developing and deploying TPAS along the I-10 corridor between California and Texas. The TPAS project is used to detect truck parking availability at rest areas and disseminate this information in real-time to commercial drivers. Similarly, FDOT has implemented TPAS statewide at rest areas throughout Florida, while NDOT has plans to implement a truck parking management system in future years.

5.10.6. Funding

According to the completed questionnaires, funding sources for rest area maintenance and improvements vary among each DOT. The funding source for Caltrans rest areas is derived from California's State Highway Operation and Protection Program (SHOPP), which is used to protect and preserve assets within the state's highway system, including rest areas. Different assets within SHOPP are funded based on inventory condition ratings and desired state of repair for each facility. The SHOPP allocation for rest areas is approximately $35 million per year.

Similar to ADOT, FDOT rest area improvements are funded through the DOT's 5-year work program. The average funding per year for FDOT rest area improvements is similar Caltrans, at approximately $35 million.

Although UDOT does not have a dedicated funding source for rest area capital improvements, its annual operational and maintenance costs for rest area facilities are approximately $4 million per year. Additionally, UDOT noted that the continued growth in AADT and usage has begun to outgrow the existing rest area system. Specific rest area needs include updates or replacements to water and wastewater systems, as well as expanded parking and restroom capacity. The limited available funding for these improvements, combined with inflation of construction costs, have made these improvements difficult to implement.

The funding for NDOT rest area improvements varies greatly dependent on needs and project approval. Capital maintenance projects are completed by NDOT's Architectural group, while each rest area facility is maintained through separate contracts by the NDOT Districts in which they reside. According to NDOT, the completion of the long-range plan is expected to result in a rest area construction or reconstruction budget of approximately $25 million over 5 years.

Although specific amounts were not provided, TxDOT did note that the TxDOT Roadside Facilities is provided an annual budget to support 10-year projection plans.

5.10.6.1. Public-Private Partnerships

P3s for rest areas among peer state DOTs have been relatively nonexistent, mostly because of existing state and federal restrictions. However, some P3s have been possible, such as ADOT's statewide rest area maintenance contract and the Geico-sponsored Safe Phone Zones. These P3s provide opportunity to reduce operational and maintenance costs at rest areas, while also promoting statewide goals.

Despite existing restrictions, opportunities for additional P3s do exist. Notably, the FHWA established guidelines in 2006 to designate oasis (off-system) facilities throughout the nation. The FHWA's Interstate Oasis Program states that oasis facilities are private facilities located no more than 3 miles outside of the interstate ROW that offer additional goods and services for travelers (24 hours per day, 365 days a year), including free public restrooms and free car and commercial truck parking for no less than 10 hours for travelers. These facilities should be located close to exits and geometrically designed to allow vehicles easy access, thereby allowing travelers the ability to quickly return to the highway.[38] The recommendation for locating these facilities outside of the interstate ROW was based on federal regulations that prohibit private or commercial development at rest area facilities.

Although UDOT did provide a completed questionnaire, other state rest area studies have documented some of UDOT's rest area program details. According to New Hampshire's *2016 Statewide Rest Area and Welcome Center Study*, UDOT previously developed several rest areas through a public-private rest stop sponsorship program. The minimum requirements and goals for public-private rest areas aligned closely

[38] https://www.federalregister.gov/documents/2006/02/27/E6-2682/interstate-oasis-program

to those developed by FHWA for the Interstate Oasis Program. [39] However, UDOT noted that this sponsorship program failed because of some outdoor advertising and mainline signage requirements. At the time of this study, all previous P3s have been removed and UDOT is not currently accepting any new P3s.

5.10.7. Emerging Trends

Emerging trends related to peer state's rest areas were evaluated to ensure that ADOT rest areas meet existing and future traveler needs. Emerging trends identified among peer states include EV charging stations, TPAS, and Wi-Fi.

5.10.7.1. EV Charging

Since the previous study, the use of electric vehicles has increased drastically, resulting in the need for access to EV charging stations. In 2022, the federal government provided funding and guidance for implementing EV charging stations nationwide.[40] Specifically, the guidance states that the EV charging stations should be provided every 50 miles and within 1 mile of the interstate exits. However, federal restrictions still exist that limit the placement of EV charging stations within interstate ROW.

While not within interstate ROW, FDOT and NDOT have implemented EV charging at various locations throughout their respective states. Specifically, FDOT now has EV charging stations at each toll road service plaza, while NDOT has implemented EV charging stations along noninterstate highways. Caltrans has implemented EV charging stations at various rest areas throughout California, including rest areas along Interstate 5. As part of this study, further evaluation of existing EV charging policies, federal restrictions, and EV charging locations will be documented.

5.10.7.2. TPAS

A common issue among all peer states, and nationwide, is the shortage of available truck parking. Furthermore, the lack of information related to truck parking availability results in increased safety concerns, reduced productivity and earnings, and infrastructure damage. As a result, all peer states have either developed or are developing TPAS at rest areas. These systems use sensors to determine truck parking availability at rest areas. This information then is disseminated through various platforms, including DMSs, mobile applications, and websites. These systems were developed to help balance the demand for truck parking at rest areas by providing commercial vehicles the necessary information to plan routes and stops accordingly.

As mentioned previously, ADOT, Caltrans, NMDOT, and TxDOT have formed the I-10 Coalition to develop and deploy TPAS at several rest areas along I-10 between Texas and California. If successful, ADOT plans to evaluate the potential for standardizing the TPAS system at the remaining rest areas following a period of operation and evaluation.

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[39] https://www.nh.gov/dot/projects/documents/statewide-rest-area-study-9-2-2016.pdf, pgs. 243-245

[40] https://www.govinfo.gov/content/pkg/FR-2021-11-29/pdf/2021-25868.pdf

5.10.7.3. Wi-Fi

Another emerging trend observed among the peer states was the use and availability of Wi-Fi at rest areas. As travelers continue to use and rely on mobile devices, wireless connectivity at rest areas provides travelers the ability to access needed information such as weather updates, traffic conditions, and directions. States such as Texas and Florida have made Wi-Fi available at many of their facilities. TxDOT uses sponsorships to provide Wi-Fi service at rest areas, which minimized operational and installation costs. These Wi-Fi services also can be used to provide real-time information updates for the digital displays. However, connectivity and service at remote rest area locations are dependent on existing utilities. The Governor's Office, the Arizona Commerce Authority, and ADOT are partnering to bring broadband to much more of Arizona. The implementation of Wi-Fi access has been considered and may be coming to rest areas throughout Arizona.[41]

[41] Information provided by ADOT's P3 Office on May 4, 2022.

6. Summary of Deficiencies and Forecasted Needs

6.1. Traffic Data Collection

Although data about mainline AADT adjacent to rest areas were available for this study, additional traffic data were needed to determine the percentage of traffic stopping at ADOT rest areas, as well as the type of vehicles stopping. Therefore, traffic data were collected between July and September of 2022 to ensure the best possible data to forecast future conditions at ADOT rest areas.

6.2. Forecast Methodologies

A key focus of this study was to understand and consider the existing and future demand. Forecasting ADOT rest area usage through the year 2042 helps to establish rest area needs, determine the best allocation of ADOT resources, and define policy goals for ADOT rest areas over the next 20 years. The forecasts at each of the existing rest areas were calculated for parking, restroom facilities, and water usage. The forecast methodologies are discussed in detail in the following sections.

6.2.1. Parking

Current and future parking needs were estimated based on parking demand equations provided in AASHTO's 2001 *Guide for Development of Rest Areas on Major Arterials and Freeways*. Parking forecasts then were confirmed with ADOT and District staff as a check against realities on the ground for a particular rest area. Rest area parking needs were estimated over 5-, 10-, and 20-year planning periods. Future parking needs were compared to the current number of auto and truck/bus parking spaces available at each rest area, and parking deficiencies were estimated for both automobiles and trucks/buses. Rest areas requiring additional parking then were analyzed to determine whether:

- The rest area could accommodate the necessary parking expansion onsite
- Additional parking is required to be developed offsite, either at a new rest area, by expanding the existing ROW to accommodate more parking area within the existing rest area, or through use of a P3 for providing rest area services.

The following equations, variables, and assumptions from AASHTO's Guide were used in the estimation of future parking demand for the 5-, 10-, and 20-year planning periods for the rest areas [42]: The average length of stay (VHS) in the equation for determining truck parking needs was changed from 20 minutes to 30 minutes. This change provides a more accurate representation of the required HOS break (30 minutes minimum) to which commercial drivers must adhere.

(EQ 1)

$$N_C = \frac{ADT * P * DH * D_C * PF * VHS}{60\ min}$$

(EQ 2)

$$N_T = \frac{ADT * P * DH * D_T * PF * VHS}{60\ min}$$

Where:

N_C = Number of car parking spaces required

N_T = Number of truck parking spaces required

ADT = Mainline directional ADT

P = Capture rate, determined by $\left(\frac{\text{Rest Area Ramp ADT}}{\text{Mainline Direction ADT}}\right)$

DH = Design hourly factor – Per AASHTO specifications:

AADT < 12,500	→	**DH = 0.15**
12,500 < AADT < 30,000	→	**DH = 0.10**
AADT > 30,000	→	**DH = 0.075**

D_C = Percentage of cars using the facility (if no data are available, assume 0.75)

D_T = Percentage of trucks using the facility (if no data are available, assume 0.25)

PF = Peak Hour Factor, the ratio of the average daily usage during the 5 summer months compared with the average daily usage over the entire year, assumed to be 1.8

VHS = Average length of stay for cars and trucks determined on an hourly basis, assumed to be 15 minutes for cars and 30 minutes for trucks (required HOS break time)

6.3. Forecast Constraints

The forecast equation's limitations and constraints may result in forecasts that do not capture all elements affecting rest area parking. For instance, this forecast equation does not account for the presence of privately owned truck parking facilities near rest areas, nor does it account for the observed variations in parking durations at each rest area. In addition, the forecast model was published in 2001,

[42] EQ1 and EQ2 from *A Guide for the Development of Rest Areas on Major Arterials and Freeways*, 2001

and may not reflect recent changes in the transportation landscape, such as commercial driver regulations and industry trends.

In making recommendations regarding the type of parking expansion that ADOT might pursue at particular rest area locations, this analysis first considered the total amount of parking deficiencies at the rest area under each planning period and whether existing ROW at the rest area is sufficient to provide the additional parking required. Judgments on each rest area's potential expansion to satisfy future parking needs will be necessary to provide specific recommendations for each rest area.

Table 6-1 summarizes the parking demand and deficiencies for the 5-, 10-, and 20-year planning horizon at each of the rest areas included in the study.

Table 6-1. Rest Area Parking Forecasts

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT 2022	Mainline AADT 2027	Mainline AADT 2032	Mainline AADT 2042	Rest Area Ramp AADT/ADT[c] Year 2022[d] Cars[e]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Trucks[f]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Percent Cars[e]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Percent Trucks[f]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Total	Capture Rate	Design Hourly Factor (DH)[g]	Parking: Existing (From Field Review) 2022 Cars[e]	Parking: Existing (From Field Review) 2022 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2022 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2022 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2027 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2027 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2032 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2032 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2042 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2042 Trucks[f]	Parking: Excess (+)/Deficiencies (-) in Forecast Years 2022 Cars[e]	2022 Trucks[f]	2027 Cars[e]	2027 Trucks[f]	2032 Cars[e]	2032 Trucks[f]	2042 Cars[e]	2042 Trucks[f]
1	Mohawk	I-8	EB	5,333	2.26%	5,700	6,400	7,100	8,900	267	117	70%	30%	384	6.7%	0.15	25	10	18	16	20	18	22	20	28	25	+7	-6	+5	-8	+3	-10	-3	-15
1	Mohawk	I-8	WB	5,287	2.26%	5,700	6,300	7,100	8,800	400	95	81%	19%	495	8.7%	0.15	28	10	27	13	30	14	34	16	42	20	+1	-3	-2	-4	-6	-6	-14	-10
2	Sentinel	I-8	EB	5,000	2.44%	5,400	6,100	6,800	8,700	402	134	75%	25%	536	9.9%	0.15	28	14	27	18	31	20	34	23	44	29	+1	-4	-3	-6	-6	-9	-16	-15
2	Sentinel	I-8	WB	5,500	2.44%	5,900	6,700	7,500	9,600	194	65	75%	25%	258	4.4%	0.15	28	15	13	9	15	10	17	11	21	14	+15	+6	+13	+5	+11	+4	+7	+1
3	Ehrenberg	I-10	EB	13,695	2.61%	14,800	16,800	19,100	24,800	775	457	63%	37%	1,232	8.3%	0.10	26	15	35	41	40	47	45	53	58	69	-9	-26	-14	-32	-19	-38	-32	-54
3	Ehrenberg	I-10	WB	13,591	2.61%	14,700	16,700	19,000	24,600	463	273	63%	37%	736	5.0%	0.10	25	15	21	25	24	28	27	32	35	41	+4	-10	+1	-13	-2	-17	-10	-26
4	Bouse Wash	I-10	EB	13,741	2.66%	14,900	17,000	19,300	25,100	685	403	63%	37%	1,088	7.3%	0.10	42	20	31	36	35	41	40	47	52	61	+11	-16	0	-21	+2	-27	-10	-41
4	Bouse Wash	I-10	WB	12,598	2.66%	13,600	15,500	17,700	23,000	588	347	63%	37%	935	6.9%	0.10	32	20	26	31	30	36	34	41	45	53	+6	-11	+2	-16	-2	-21	-13	-33
5	Burnt Well	I-10	EB	11,249	2.61%	12,200	13,800	15,700	20,300	1178	494	70%	30%	1,672	13.7%	0.15	50	30	80	67	90	75	102	86	132	111	-30	-37	-40	-45	-52	-56	-82	-81
5	Burnt Well	I-10	WB	12,875	2.61%	13,900	15,800	18,000	23,300	973	409	70%	30%	1,382	9.9%	0.10	45	30	44	37	50	42	57	48	73	62	+1	-7	-5	-12	-12	-18	-28	-32
6	Sacaton	I-10	EB	31,655	2.17%	33,800	37,600	41,800	51,900	861	409	68%	32%	1,270	3.8%	0.075	56	21	29	28	32	31	36	34	45	42	+27	-7	+24	-10	+20	-13	+11	-21
6	Sacaton	I-10	WB	30,974	2.17%	33,000	36,800	40,900	50,700	900	337	73%	27%	1,237	3.7%	0.075	44	18	30	23	34	25	38	28	47	35	+14	-5	+10	-7	+6	-10	-3	-17
7	Texas Canyon	I-10	EB	7,748	2.58%	8,400	9,500	10,800	13,900	496	481	51%	49%	977	11.6%	0.15	35	21	33	65	38	73	43	83	55	107	+2	-44	-3	-52	-8	-62	-20	-86
7	Texas Canyon	I-10	WB	9,934	2.58%	10,700	12,200	13,800	17,800	448	542	45%	55%	990	9.3%	0.15	35	22	30	73	34	83	39	94	50	122	+5	-51	+1	-61	-4	-72	-15	-100
8	San Simon	I-10	EB	7,211	2.61%	7,800	8,900	10,100	13,000	363	320	53%	47%	683	8.8%	0.15	32	18	25	43	28	49	32	56	41	72	+7	-25	+4	-31	0	-38	-9	-54
8	San Simon	I-10	WB	6,907	2.61%	7,500	8,500	9,700	12,500	319	341	48%	52%	660	8.8%	0.15	42	18	22	46	24	52	28	60	36	77	+20	-28	+18	-34	+14	-42	+6	-59
11	Haviland	I-40	EB	9,149	2.76%	9,900	11,400	13,000	17,100	173	337	34%	66%	510	5.2%	0.15	28	29	12	45	13	52	15	60	20	79	+16	-16	+15	-23	+13	-31	+8	-50
11	Haviland	I-40	WB	8,519	2.76%	9,200	10,600	12,100	15,900	189	282	40%	60%	471	5.1%	0.15	26	23	13	38	15	44	17	50	22	66	+13	-15	+11	-21	+9	-27	+4	-43

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT 2022	Mainline AADT 2027	Mainline AADT 2032	Mainline AADT 2042	Rest Area Ramp AADT/ADT[c] Year 2022[d] Cars[e]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Trucks[f]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Percent Cars[e]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Percent Trucks[f]	Rest Area Ramp AADT/ADT[c] Year 2022[d] Total	Capture Rate	Design Hourly Factor (DH)[g]	Parking: Existing (From Field Review) 2022 Cars[e]	Parking: Existing (From Field Review) 2022 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2022 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2022 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2027 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2027 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2032 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2032 Trucks[f]	Parking: Calculated (Per AASHTO Guide) 2042 Cars[e]	Parking: Calculated (Per AASHTO Guide) 2042 Trucks[f]	Parking: Excess (+)/Deficiencies (-) in Forecast Years 2022 Cars[e]	2022 Trucks[f]	2027 Cars[e]	2027 Trucks[f]	2032 Cars[e]	2032 Trucks[f]	2042 Cars[e]	2042 Trucks[f]
17	Parks[i]	I-40	EB	10,925	2.08%	11,600	12,900	14,300	17,500	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.15	10	15	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
17	Parks[i]	I-40	WB	9,391	2.08%	10,000	11,100	12,300	15,100	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.15	10	15	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
18	Meteor Crater	I-40	EB	9,736	2.79%	10,600	12,100	13,900	18,300	415	495	46%	54%	910	8.6%	0.15	32	57	28	67	32	76	37	88	48	115	+3	-10	-1	-19	-6	-31	-17	-58
18	Meteor Crater	I-40	WB	10,084	2.79%	11,000	12,600	14,400	19,000	389	548	42%	58%	937	8.5%	0.15	31	64	26	74	30	85	34	97	45	128	+5	-10	+1	-21	-3	-33	-14	-64
12	Painted Cliffs	I-40	Both	23,129	3.00%	25,300	29,300	34,000	45,600	510	227	69%	31%	737	2.9%	0.10	34	9	23	20	27	24	31	27	41	37	+11	-11	+7	-15	+3	-18	-7	-28
16	McGuireville	I-17	NB	13,700	1.68%	14,400	15,700	17,000	20,100	471	246	66%	34%	717	5.0%	0.10	45	20	21	22	23	24	25	26	30	31	+24	-2	+22	-4	+20	-6	+15	-11
16	McGuireville	I-17	SB	12,423	1.68%	13,100	14,200	15,400	18,200	530	337	61%	39%	867	6.6%	0.10	45	20	24	30	26	33	28	36	33	42	+21	-10	+19	-13	+17	-16	+12	-22
9	Sunset Point[h]	I-17	Both	37,549	2.25%	40,100	44,900	50,100	62,600	1023	341	75%	25%	1,364	3.4%	0.075	56	27	35	23	39	26	43	29	54	36	+21	+4	+17	+1	+13	-2	+2	-9
19	Christensen[i]	I-17	NB	12,508	1.61%	13,100	14,200	15,400	18,100	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.10	10	11	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
19	Christensen[i]	I-17	SB	10,729	1.61%	11,300	12,200	13,200	15,500	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.15	10	15	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
10	Canoa Ranch	I-19	NB	8,618	1.91%	9,100	10,000	11,000	13,300	427	53	89%	11%	480	5.3%	0.15	44	18	29	7	32	8	35	9	42	10	+15	+11	+12	+10	+9	+9	+2	+8
10	Canoa Ranch	I-19	SB	8,696	1.91%	9,200	10,100	11,100	13,400	374	47	89%	11%	421	4.6%	0.15	53	18	25	6	28	7	30	8	37	9	+28	+12	+25	+11	+23	+10	+16	+9
13	Hassayampa	US 60	Both	18,556	1.44%	19,400	20,800	22,300	25,800	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.10	27	0	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
14	Salt River Canyon	US 60	Both	2,788	2.60%	3,000	3,400	3,900	5,000	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.15	19	0	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]
15	Mazatzal[k]	SR 87	Both	13,269	1.53%	13,900	15,000	16,200	18,800	--[j]	--[j]	--[j]	--[j]	--[j]	0.0%	0.10	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]	--[j]

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
[b] Growth rate provided by ADOT/MPD.
[c] When ramp AADT was not available, ADT was used. AADT was available at Ehrenberg, Bouse Wash, Burnt Well, and Sunset Point.
[d] When ramp counts not available, traffic is assumed to be 75% cars, 25% trucks.
[e] FHWA vehicles C1-C3 and C5-C7 (includes motorcycles, passenger cars, two axle vehicles, and single-unit vehicles).
[f] FHWA vehicles C4 and C8-C13 (includes buses, four or more axle vehicles, and single and multi-trailer vehicles).
[g] DH was calculated per AASHTO specifications based on mainline AADT.
[h] Rest area under construction, but temporarily open to truck parking.
[i] Rest area permanently closed, but temporarily open to truck parking.
[j] No data available.
[k] Rest area permanently closed.
Notes:
+ = Excess number of parking spaces
- = Deficient number of parking spaces

6.3.1. Restrooms

Current and future restroom needs were estimated based on equations provided in AASHTO's Guide. The following equations, variables, and assumptions from AASHTO's Guide were used in the estimation of the number of restrooms for the 5-, 10-, and 20-year planning periods for the rest areas [43]:

T = (A)*(UV)*(DH)*(PF)*(P)/UHF

Where:

T_W = T*0.60

T_M = T*0.40

T = Total toilets and urinals

T_W = Number of women's toilets

T_M = Number of men's toilets

A = One-way design year ADT

UV = Restroom users per vehicle [(2 users/car) * (percentage of cars) + (1 user/truck) * (percentage of trucks)]

DH = Design hourly factor – Per AASHTO specifications:

AADT < 12,500	→	**DH = 0.15**
12,500 < AADT < 30,000	→	**DH = 0.10**
AADT > 30,000	→	**DH = 0.075**

PF = Peak Hour Factor (use 1.8)

P = Capture rate, determined by $(\frac{\text{Rest Area Ramp ADT}}{\text{Mainline Direction ADT}})$

UHF = Restroom users per hour per fixture based on 2-minute cycle (use 30)

Table 6-2 summarizes the number of restroom projections and deficiencies for the 5-, 10-, and 20-year planning horizon at each of the rest areas included in the study.

[43] Figure 13 from *A Guide for the Development of Rest Areas on Major Arterials and Freeways*, 2001

Table 6-2. Rest Area Restroom Forecasts

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT				Rest Area Ramp AADT/ADT[c] Year 2022[d]					Capture Rate	Design Hourly Factor (DH)[g]	Existing Restroom Fixtures (Toilets/Urinals)				Calculated Restroom Need (Per AASHTO Guide)								Restroom Excess (+)/Deficiencies (-) in Forecast Years							
																					2022		2027		2032		2042		2022		2027		2032		2042	
						2022	2027	2032	2042	Cars[e]	Trucks[f]	Percent Cars[e]	Percent Trucks[f]	Total			Men	Women	Family	Total	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
1	Mohawk	I-8	EB	5,333	2.26%	5,700	6,400	7,100	8,900	267	117	70%	30%	384	6.7%	0.15	7	7	0	14	2	3	2	3	2	3	3	4	5	4	5	4	5	4	4	3
1	Mohawk	I-8	WB	5,287	2.26%	5,700	6,300	7,100	8,800	400	95	81%	19%	495	8.7%	0.15	7	7	0	14	2	3	3	4	3	4	4	5	+5	+4	+4	+3	+4	+3	+3	+2
2	Sentinel	I-8	EB	5,000	2.44%	5,400	6,100	6,800	8,700	402	134	75%	25%	536	9.9%	0.15	6	6	2	14	3	4	3	4	3	5	4	6	3	2	3	2	3	1	2	0
2	Sentinel	I-8	WB	5,500	2.44%	5,900	6,700	7,500	9,600	194	65	75%	25%	258	4.4%	0.15	6	6	2	14	1	2	1	2	2	2	2	3	+5	+4	+5	+4	+4	+4	+4	+3
3	Ehrenberg	I-10	EB	13,695	2.61%	14,800	16,800	19,100	24,800	775	457	63%	37%	1,232	8.3%	0.10	6	7	0	13	4	6	4	7	5	7	6	10	2	1	2	0	1	0	0	-3
3	Ehrenberg	I-10	WB	13,591	2.61%	14,700	16,700	19,000	24,600	463	273	63%	37%	736	5.0%	0.10	6	7	0	13	2	3	3	4	3	4	4	6	+4	+4	+3	+3	+3	+3	+2	+1
4	Bouse Wash	I-10	EB	13,741	2.66%	14,900	17,000	19,300	25,100	685	403	63%	37%	1,088	7.3%	0.10	8	8	0	16	3	5	4	6	4	7	6	9	5	-3	4	-2	4	-1	-2	-1
4	Bouse Wash	I-10	WB	12,598	2.66%	13,600	15,500	17,700	23,000	588	347	63%	37%	935	6.9%	0.10	8	8	0	16	3	4	3	5	4	6	5	7	+5	+4	+5	+3	+4	+2	+3	+1
5	Burnt Well	I-10	EB	11,249	2.61%	12,200	13,800	15,700	20,300	1178	494	70%	30%	1,672	13.7%	0.10	6	7	0	13	5	8	6	9	7	10	9	13	1	-1	0	-2	-1	-3	-3	-6
5	Burnt Well	I-10	WB	12,875	2.61%	13,900	15,800	18,000	23,300	973	409	70%	30%	1,382	9.9%	0.10	6	7	0	13	4	6	5	7	6	8	7	11	+2	+1	+1	0	+0	-1	-1	-4
6	Sacaton	I-10	EB	31,655	2.17%	33,800	37,600	41,800	51,900	861	409	68%	32%	1,270	3.8%	0.075	6	6	0	12	3	4	3	5	4	6	5	7	3	2	3	1	2	0	1	-1
6	Sacaton	I-10	WB	30,974	2.17%	33,000	36,800	40,900	50,700	900	337	73%	27%	1,237	3.7%	0.075	6	6	0	12	3	4	3	5	4	5	4	7	+3	+2	+3	+1	+2	+1	+2	-1
7	Texas Canyon	I-10	EB	7,748	2.58%	8,400	9,500	10,800	13,900	496	481	51%	49%	977	11.6%	0.10	6	6	0	12	3	5	3	5	4	6	5	8	3	1	3	1	2	0	1	-2
7	Texas Canyon	I-10	WB	9,934	2.58%	10,700	12,200	13,800	17,800	448	542	45%	55%	990	9.3%	0.10	6	6	0	12	3	5	4	5	4	6	5	8	+3	+1	+2	+1	+2	0	+1	-2
8	San Simon	I-10	EB	7,211	2.61%	7,800	8,900	10,100	13,000	363	320	53%	47%	683	8.8%	0.10	6	7	0	13	2	3	2	4	3	4	4	5	4	4	4	3	3	3	2	2
8	San Simon	I-10	WB	6,907	2.61%	7,500	8,500	9,700	12,500	319	341	48%	52%	660	8.8%	0.10	6	7	0	13	2	3	2	4	3	4	3	5	+4	+4	+4	+3	+3	+3	+3	+2
11	Haviland	I-40	EB	9,149	2.76%	9,900	11,400	13,000	17,100	173	337	34%	66%	510	5.2%	0.10	8	6	0	14	2	2	2	3	2	3	3	4	6	4	6	3	6	3	5	2
11	Haviland	I-40	WB	8,519	2.76%	9,200	10,600	12,100	15,900	189	282	40%	60%	471	5.1%	0.10	8	6	0	14	1	2	2	3	2	3	3	4	+7	+4	+6	+3	+6	+3	+5	+2
17	Parks[j]	I-40	EB	10,925	2.08%	11,600	12,900	14,300	17,500	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]
17	Parks[j]	I-40	WB	9,391	2.08%	10,000	11,100	12,300	15,100	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]
18	Meteor Crater	I-40	EB	9,736	2.79%	10,600	12,100	13,900	18,300	415	495	46%	54%	910	8.6%	0.10	8	8	1	17	3	4	3	5	4	6	5	7	5	4	5	3	4	2	3	1
18	Meteor Crater	I-40	WB	10,084	2.79%	11,000	12,600	14,400	19,000	389	548	42%	58%	937	8.5%	0.10	8	8	1	17	3	4	3	5	4	6	5	8	+5	+4	+5	+3	+4	+2	+3	+0
12	Painted Cliffs	I-40	Both	23,129	3.00%	25,300	29,300	34,000	45,600	510	227	69%	31%	737	2.9%	0.075	6	6	0	12	2	3	2	3	2	3	3	5	4	3	4	3	4	3	3	1
16	McGuireville	I-17	NB	13,700	1.68%	14,400	15,700	17,000	20,100	471	246	66%	34%	717	5.0%	0.10	6	6	0	12	2	3	2	4	3	4	3	5	+4	+3	+4	+2	+3	+2	+3	+1
16	McGuireville	I-17	SB	12,423	1.68%	13,100	14,200	15,400	18,200	530	337	61%	39%	867	6.6%	0.10	6	6	0	12	3	4	3	4	3	5	4	6	3	2	3	2	3	1	2	0
9	Sunset Point[h]	I-17	Both	37,549	2.25%	40,100	44,900	50,100	62,600	1023	341	75%	25%	1,364	3.4%	0.075	8	8	1	17	3	5	4	5	4	6	5	7	+5	+3	+4	+3	+4	+2	+3	+1

RA Map No.[a]	Rest Area	Route	Traffic Direction Served	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT				Rest Area Ramp AADT/ADT[c] Year 2022[d]					Capture Rate	Design Hourly Factor (DH)[g]	Existing Restroom Fixtures (Toilets/Urinals)				Calculated Restroom Need (Per AASHTO Guide)								Restroom Excess (+)/Deficiencies (-) in Forecast Years							
																					2022		2027		2032		2042		2022		2027		2032		2042	
						2022	2027	2032	2042	Cars[e]	Trucks[f]	Percent Cars[e]	Percent Trucks[f]	Total			Men	Women	Family	Total	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
19	Christensen[j]	I-17	NB	12,508	1.61%	13,100	14,200	15,400	18,100	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]
19	Christensen[j]	I-17	SB	10,729	1.61%	11,300	12,200	13,200	15,500	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--i	--i	--i	--i	--i	--i	--i	--i
10	Canoa Ranch	I-19	NB	8,618	1.91%	9,100	10,000	11,000	13,300	427	53	89%	11%	480	5.3%	0.10	8	8	1	17	1	2	2	2	2	3	2	3	7	6	6	6	6	5	6	5
10	Canoa Ranch	I-19	SB	8,696	1.91%	9,200	10,100	11,100	13,400	374	47	89%	11%	421	4.6%	0.10	8	8	1	17	1	2	1	2	2	2	2	3	+7	+6	+	+6	+6	+6	+6	+5
13	Hassayampa	US 60	Both	18,556	1.44%	19,400	20,800	22,300	25,800	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	2	2	0	**4**	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--i	--i	--i	--i	--i	--i	--i	--i
14	Salt River Canyon	US 60	Both	2,788	2.60%	3,000	3,400	3,900	5,000	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.15	5	5	0	**10**	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--i	--i	--i	--i	--i	--i	--i	--i
15	Mazatzal[k]	SR 87	Both	13,269	1.53%	13,900	15,000	16,200	18,800	--[i]	--[i]	--[i]	--[i]	--[i]	0.0%	0.10	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--[i]	--i	--i	--i	--i	--i	--i	--i	--i

[a] *RA Map No. = Rest area number corresponding to Figure 2-1.*
[b] *Growth rate provided by ADOT/MPD.*
[c] *When ramp AADT were not available, ADT was used. AADT were available at Ehrenberg, Bouse Wash, Burnt Well, and Sunset Point.*
[d] *When ramp counts not available, traffic is assumed to be 75% cars, 25% trucks.*
[e] *FHWA vehicles C1-C3 and C5-C7 (includes motorcycles, passenger cars, two axle vehicles, and single-unit vehicles).*
[f] *FHWA vehicles C4 and C8-C13 (includes buses, four or more axle vehicles, and single and multi-trailer vehicles).*
[g] *DH was calculated per AASHTO specifications based on mainline AADT.*
[h] *Rest area under construction, but temporarily open to truck parking.*
[i] *No data available.*
[j] *Rest area permanently closed, but temporarily open to truck parking.*
[k] *Rest area permanently closed.*

Notes:
+ = Excess number of restroom stalls
- = Deficient number of restroom stalls

6.3.2. Water Usage

Based on AASHTO research, each rest area uses an average of 1,000,000 gallons of water per year for restrooms, drinking water, and cleanup. Current and future water needs were estimated based on equations in AASHTO's Guide[44]:

PHD = ADT*DH*PF*P*UV*(3.5 gallons/user)

Where:

PHD = Peak hourly demand

ADT = One-way design year ADT

DH = Design hourly factor – Per AASHTO specifications:

AADT < 12,500	→	**DH = 0.15**
12,500 < AADT < 30,000	→	**DH = 0.10**
AADT > 30,000	→	**DH = 0.075**

PF = Peak Hour Factor (use 1.8)

P = Capture rate, determined by $\left(\frac{\text{Rest Area Ramp ADT}}{\text{Mainline Direction ADT}}\right)$

UV = Restroom users per vehicle [(2 users/car) * (percentage of cars) + (1 user/truck) * (percentage of trucks)]

Table 6-3 summarizes the water usage forecast for the 5-, 10-, and 20-year planning horizon at each of the rest areas included in the study.

[44] Figure 13 from A Guide for the Development of Rest Areas on Major Arterials and Freeways, 2001

Table 6-3. Rest Area Water Usage Forecasts

Map No.[a]	Rest Area	Route	Traffic Direction Served	Mainline AADT				Calculated Water Usage: Peak Hourly Demand[b] (gallons/hour)			
				2022	2027	2032	2042	2022	2027	2032	2042
1	Mohawk	I-8	EB	5,700	6,400	7,100	8,900	615	691	766	961
1	Mohawk	I-8	WB	5,700	6,300	7,100	8,800	846	935	1,054	1,306
2	Sentinel	I-8	EB	5,400	6,100	6,800	8,700	886	1,001	1,116	1,428
2	Sentinel	I-8	WB	5,900	6,700	7,500	9,600	427	485	542	694
3	Ehrenberg	I-10	EB	14,800	16,800	19,100	24,800	1,897	2,153	2,448	3,178
3	Ehrenberg	I-10	WB	14,700	16,700	19,000	24,600	1,133	1,287	1,464	1,896
4	Bouse Wash	I-10	EB	14,900	17,000	19,300	25,100	1,675	1,912	2,170	2,822
4	Bouse Wash	I-10	WB	13,600	15,500	17,700	23,000	1,439	1,640	1,873	2,434
5	Burnt Well	I-10	EB	12,200	13,800	15,700	20,300	2,693	3,046	3,466	4,481
5	Burnt Well	I-10	WB	13,900	15,800	18,000	23,300	2,225	2,530	2,882	3,730
6	Sacaton	I-10	EB	33,800	37,600	41,800	51,900	2,014	2,240	2,490	3,092
6	Sacaton	I-10	WB	33,000	36,800	40,900	50,700	2,019	2,252	2,503	3,103
7	Texas Canyon	I-10	EB	8,400	9,500	10,800	13,900	1,392	1,574	1,790	2,303
7	Texas Canyon	I-10	WB	10,700	12,200	13,800	17,800	1,359	1,549	1,753	2,261
8	San Simon	I-10	EB	7,800	8,900	10,100	13,000	988	1,128	1,280	1,647
8	San Simon	I-10	WB	7,500	8,500	9,700	12,500	925	1,049	1,197	1,542
11	Haviland	I-40	EB	9,900	11,400	13,000	17,100	645	743	848	1,115
11	Haviland	I-40	WB	9,200	10,600	12,100	15,900	624	719	820	1,078
17	Parks[c]	I-40	EB	11,600	12,900	14,300	17,500	-	-	-	-
17	Parks[c]	I-40	WB	10,000	11,100	12,300	15,100	-	-	-	-

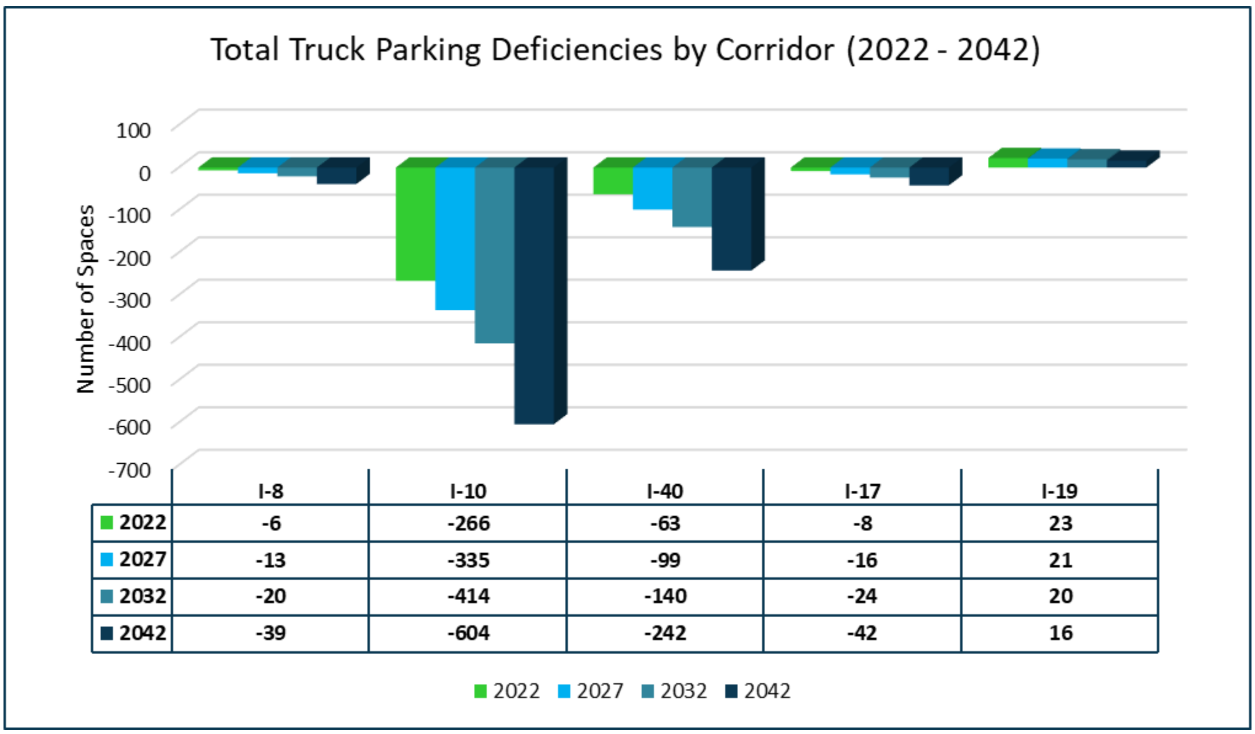
Map No.[a]	Rest Area	Route	Traffic Direction Served	Mainline AADT				Calculated Water Usage: Peak Hourly Demand[b] (gallons/hour)			
				2022	2027	2032	2042	2022	2027	2032	2042
18	Meteor Crater	I-40	EB	10,600	12,100	13,900	18,300	1,252	1,429	1,642	2,162
18	Meteor Crater	I-40	WB	11,000	12,600	14,400	19,000	1,253	1,435	1,640	2,164
12	Painted Cliffs	I-40	Both	25,300	29,300	34,000	45,600	1,178	1,365	1,584	2,124
16	McGuireville	I-17	NB	14,400	15,700	17,000	20,100	1,123	1,224	1,325	1,567
16	McGuireville	I-17	SB	13,100	14,200	15,400	18,200	1,320	1,431	1,552	1,834
9	Sunset Point[d]	I-17	Both	40,100	44,900	50,100	62,600	2,256	2,526	2,818	3,521
19	Christensen[c]	I-17	NB	13,100	14,200	15,400	18,100	-	-	-	-
19	Christensen[c]	I-17	SB	11,300	12,200	13,200	15,500	-	-	-	-
10	Canoa Ranch	I-19	NB	9,100	10,000	11,000	13,300	857	942	1,036	1,253
10	Canoa Ranch	I-19	SB	9,200	10,100	11,100	13,400	751	825	906	1,094
13	Hassayampa	US 60	Both	19,400	20,800	22,300	25,800	-	-	-	-
14	Salt River Canyon	US 60	Both	3,000	3,400	3,900	5,000	-	-	-	-
15	Mazatzal[e]	SR 87	Both	13,900	15,000	16,200	18,800	-	-	-	-

[a] RA Map No. = Rest area number corresponding to Figure 2-1.
*[b] Water demand calculated by: ADT * DH * (Peak Hour Factor) * (capture rate) * (restroom users/vehicle) * (3.5 gallons/user).*
Peak Hour Factor assumed to be 1.8.
*Restroom users/vehicle = (2 users/car) * (percentage of cars) + (1 user/truck) * (percentage of trucks).*
[c] Rest area permanently closed, but temporarily open to truck parking.
[d] Rest area under construction, but temporarily open to truck parking.
[e] Rest area permanently closed.

6.4. Forecasts and Deficiencies

6.4.1. Parking Forecasts and Deficiencies

Based on the forecast data in **Table 6-1**, existing car parking at rest areas generally is adequate. However, the eastbound Burnt Well and eastbound Ehrenberg Rest Areas do show existing (2022) deficiencies (30 spaces and 9 spaces, respectively). Truck parking at ADOT rest areas is much more deficient as compared to car parking. In fact, all rest areas along I-10 were found to be deficient and range from needing 5 spaces to 51 spaces. In addition, all rest areas forecasted along I-40 also were deficient in truck parking, although not as severely so as I-10. The total parking deficiencies per corridor were calculated and provided below in **Figure 6-1**. As shown, I-10 and I-40 have the largest deficits in existing year 2022 and in future year 2042. I-19 is the only corridor to not be in deficit by the year 2042.



	I-8	I-10	I-40	I-17	I-19
2022	-6	-266	-63	-8	23
2027	-13	-335	-99	-16	21
2032	-20	-414	-140	-24	20
2042	-39	-604	-242	-42	16

Figure 6-1. Truck Parking Deficiencies by Corridor

The average deficit per rest area along each corridor also was calculated and is provided on **Figure 6-2**. On an average, the rest areas along I-10 will need an additional 50 truck parking spaces per rest area to provide for the expected growth by 2042. Similarly, rest areas along I-40 will need an average of 48 more truck parking spaces per rest area. Truck parking deficiencies are discussed in more detail in Section 7.3.

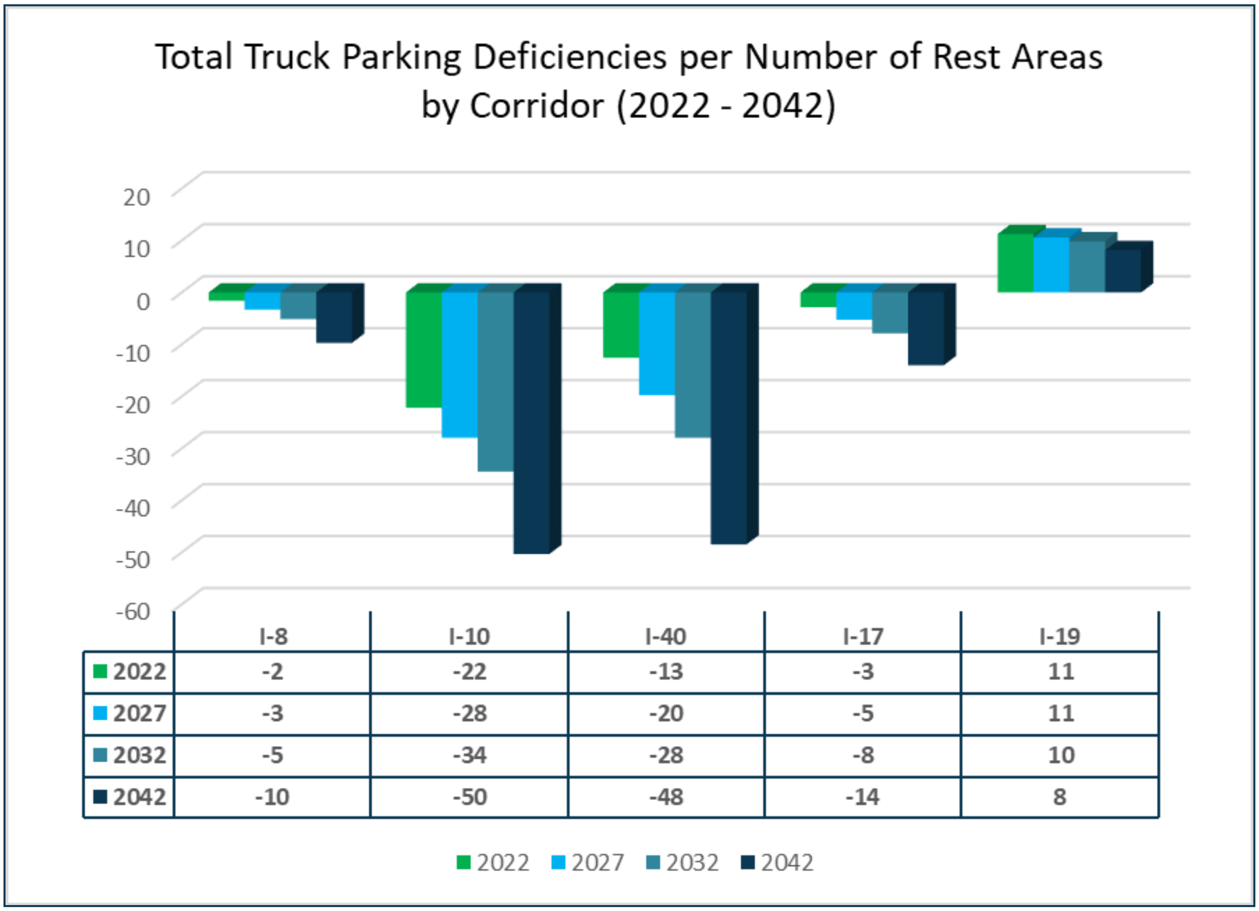


Figure 6-2. Average Truck Parking Deficiencies per Corridor

Since the Parks Rest Area is only temporarily open to trucks during the pandemic, ramp data were not collected for these rest areas. Instead, eastbound and westbound ramp data were collected for Exit 185 (Hughes Avenue), near the Bellemont community in the unincorporated portion of Coconino County, approximately 4 miles east of the Parks Rest Areas. These data were used to provide a better indication of traveler tendencies in the region. The Hughes Avenue exit is the only access to the community of Bellemont from I-40. North of the interchange is a Pilot Travel Center and Truck Stop; otherwise, the surrounding area is populated with residential and commercial properties and may not provide an accurate representation of travelers stopping to rest in the region.

Although the collected data cannot give direct insight into the potential usage of the Parks Rest Area, it portrays a general overview of the area. Exit 185 at Hughes Avenue serves an almost even split of cars and trucks for both the eastbound and westbound exit ramps. In the westbound direction, collected ADT data show 57% car and 43% truck usage. However, in the eastbound direction, there is a higher volume of trucks (53%) served than cars (47%). Refer to **Figure 6-3** for the details at Parks Rest Area and Bellemont exit traffic data.

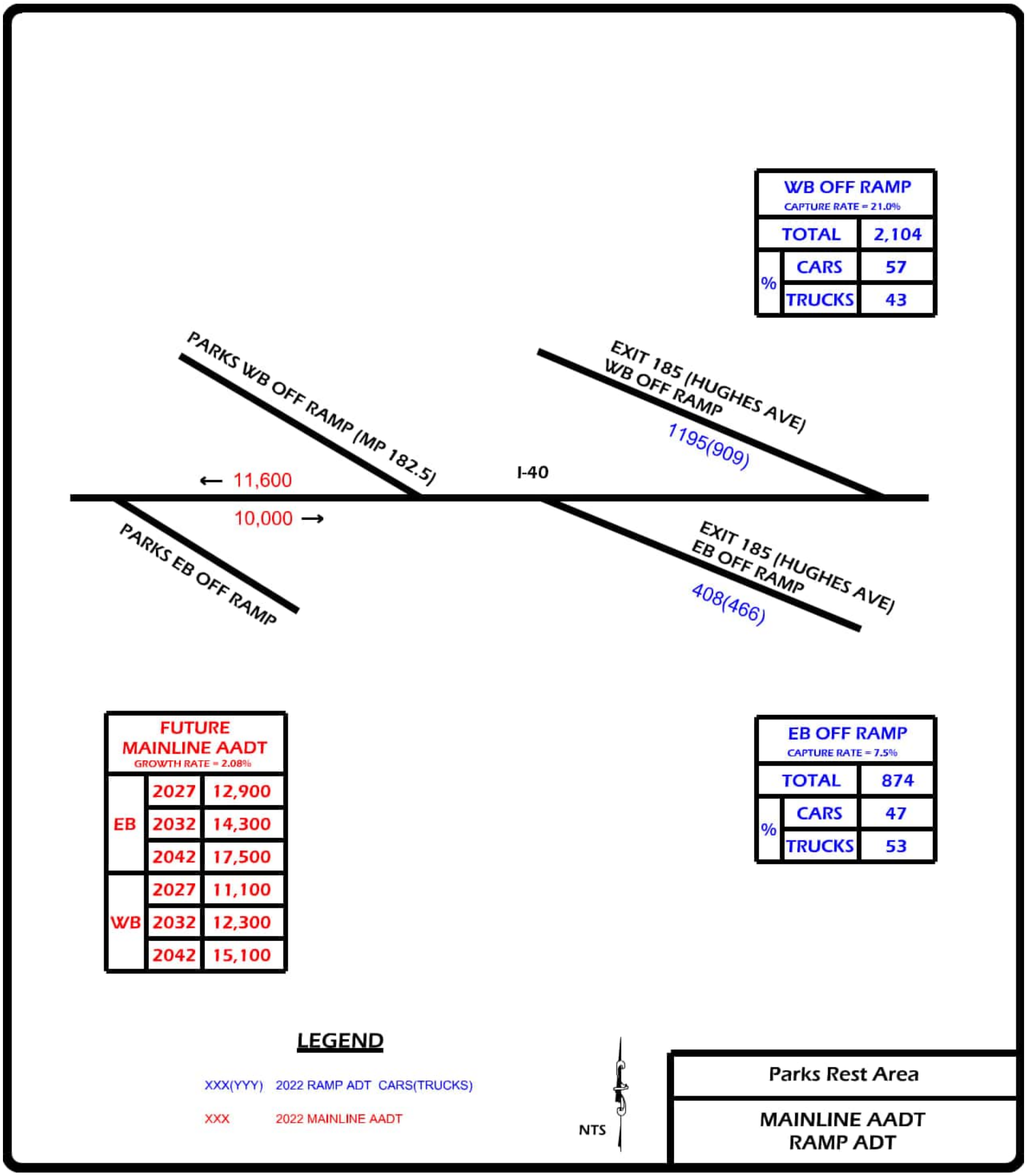
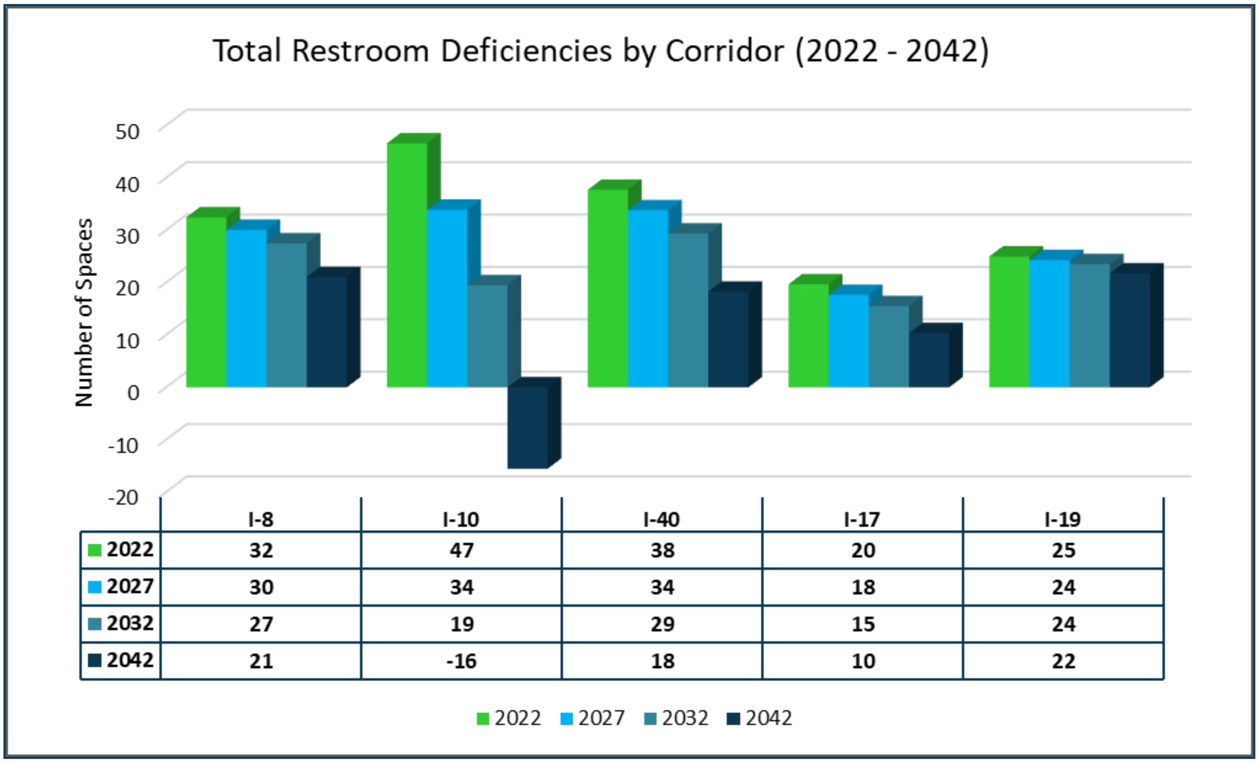


Figure 6-3. Parks Rest Area

6.4.2. Restroom Forecasts and Deficiencies

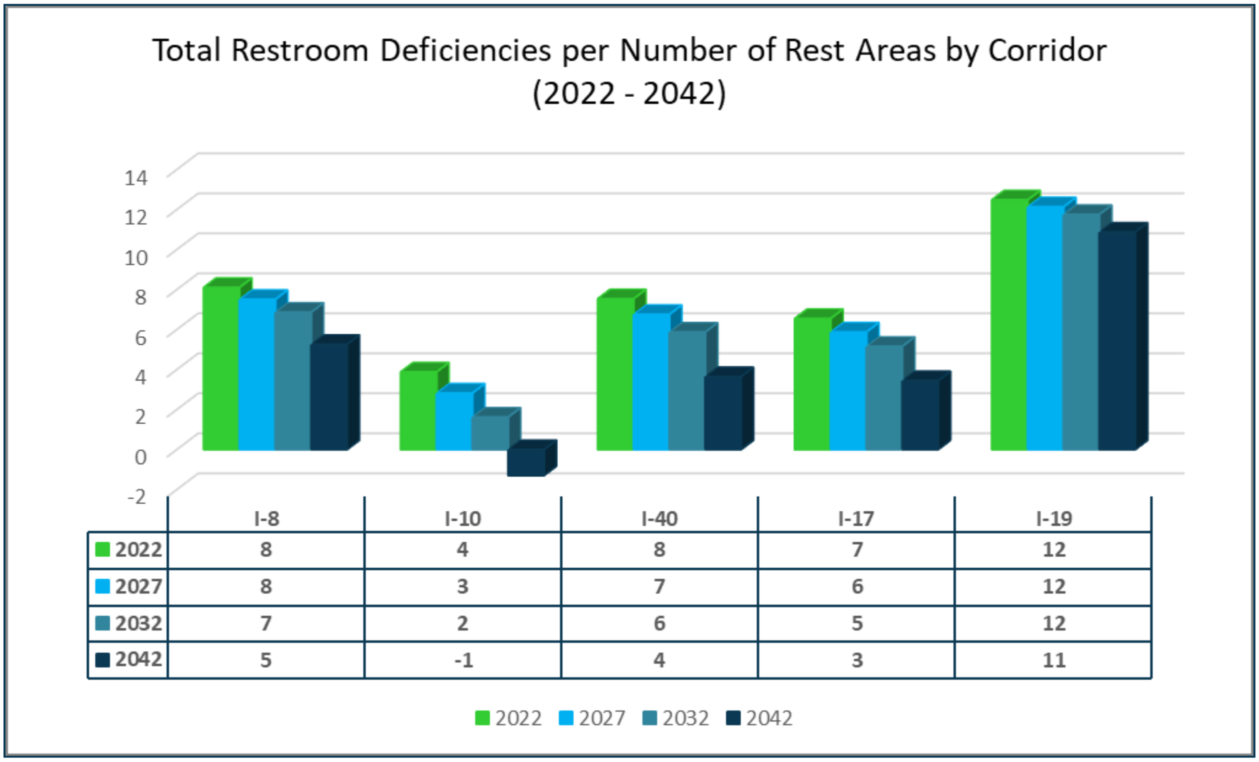
The total restroom deficiencies per corridor were calculated and are presented on **Figure 6-4**. As shown, I-10 is the only rest area corridor with deficiencies in future year 2042.



	I-8	I-10	I-40	I-17	I-19
2022	32	47	38	20	25
2027	30	34	34	18	24
2032	27	19	29	15	24
2042	21	-16	18	10	22

Figure 6-4. Restroom Deficiencies by Corridor

The average restroom demand per the number of rest areas along each corridor also was calculated and is provided on **Figure 6-5**. On an average, the rest areas along I-10 may require one additional restroom stall by 2042.

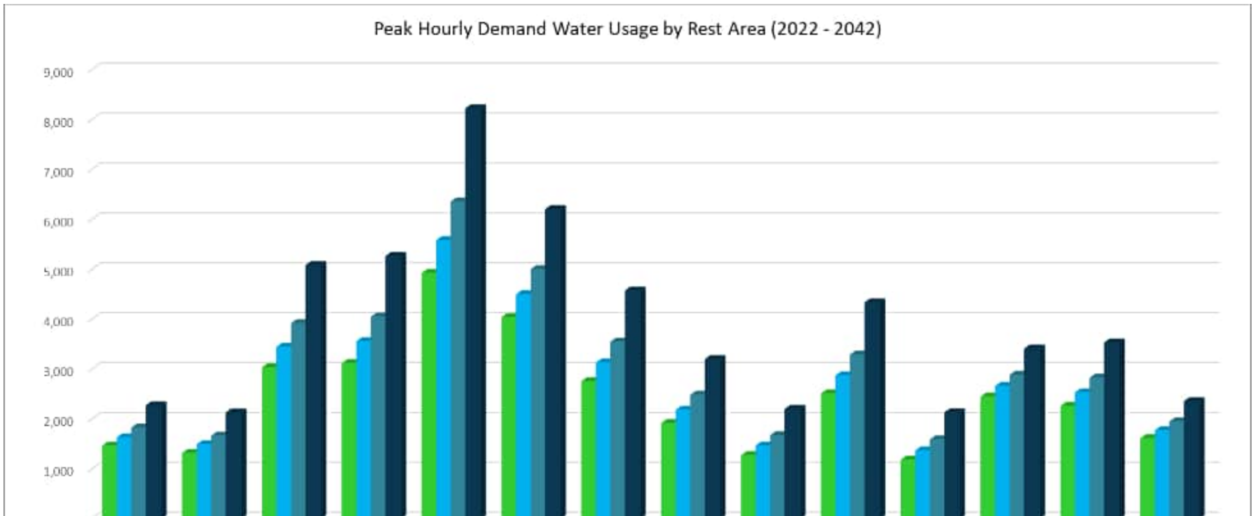


	I-8	I-10	I-40	I-17	I-19
2022	8	4	8	7	12
2027	8	3	7	6	12
2032	7	2	6	5	12
2042	5	-1	4	3	11

Figure 6-5. Average Restroom Deficiencies per Corridor

6.4.3. Water Usage Forecasts and Deficiencies

The water usage for each rest area is shown in **Figure 6-6**. Burnt Well and Sacaton Rest Areas are the leading rest areas with the highest projected peak hourly water demand over the next 20 years.



	Mohawk	Sentinel	Ehrenberg	Bouse Wash	Burnt Well	Sacaton	Texas Canyon	San Simon	Haviland	Meteor Crater	Painted Cliffs	McGuireville	Sunset Point	Canoa Ranch
2022	1,461	1,313	3,030	3,115	4,919	4,033	2,751	1,914	1,269	2,505	1,178	2,443	2,256	1,608
2027	1,626	1,486	3,440	3,552	5,576	4,492	3,124	2,176	1,462	2,865	1,365	2,655	2,526	1,767
2032	1,820	1,659	3,912	4,043	6,348	4,993	3,542	2,476	1,668	3,282	1,584	2,877	2,818	1,943
2042	2,266	2,122	5,074	5,256	8,212	6,195	4,564	3,189	2,193	4,326	2,124	3,401	3,521	2,347

Figure 6-6. Water Usage by Rest Area

7. Corridor Needs Criteria

The following criteria were used to identify and analyze locations where new rest areas might be needed on highways in Arizona. New rest area types considered include full amenity rest areas and safe parking only locations with limited amenities. These criteria also are used to identify potential expansions or preservation of existing ADOT rest areas.

7.1. Spacing Between Rest Areas

Spacing between ADOT rest areas is a key consideration when identifying locations for new rest areas or rest area expansions. Since the previous 2011 Study, the spacing recommendations of 60 miles or 1-hour drivetime, provided by AASHTO and FHWA, has not changed. Similarly, the existing spacing between ADOT rest areas has not changed. In general, spacing between rest areas on the same route ranges from a maximum of 175 miles (between the Hassayampa and Salt River Canyon Rest Areas on US 60), to a minimum of 28 miles (between the Mohawk and Sentinel Rest Areas on I-8).

Although some rest areas are spaced beyond the recommended distance or drivetime, regions between these rest areas often have urban areas or communities that provide ASOs for travelers. A map of ASOs is presented in the following section.

7.2. Availability of ASOs and Site Remoteness

The availability and number of ASOs between rest areas spaced beyond the AASHTO and FHWA recommended spacing also were considered when identifying locations where new or expanded rest area services may be warranted. ASOs provide travelers with an opportunity to stop and refresh themselves, often in locations where there are no rest areas. ASOs also were evaluated for their ability to provide services considered important for a rest area, such as being open 24 hours a day, 7 days a week. Highway segments where there are few ASOs, or the distance between ASOs and existing rest areas is beyond the AASHTO and FHWA recommended spacing, represent regions where rest area services may be needed.

The number and location of existing ASOs was updated from the previous study using a desktop review of Google Maps and GIS data. **Figure 7-1** presents the existing ASOs along ADOT's highway system. Additional information about specific ASOs is provided in **Appendix E**.

The distance between urban areas and ASOs or existing rest areas also was considered when evaluating gaps in rest area services. For this study, the census-designated urban areas were used to measure the distance from rest areas. Urban areas generally have higher concentrations of ASOs compared to less densely populated regions. Furthermore, highway segments in more remote areas also typically have lower traffic volumes. **Table 7-1** summarizes the distance between existing rest areas, ASOs, and urban areas.

Table 7-1. Spacing of Existing Rest Areas, ASOs, and Urban Areas

Map No.[a]	Rest Area	Route	Traffic Direction Served	Milepost	Distance to Nearest Rest Area (mi)		Distance to Nearest ASO[b] (mi)		Distance to Nearest Urban Area[c] (mi)	
					N or E	S or W	N or E	S or W	N or E	S or W
1	Mohawk	I-8	EB	55.8	28	None	11	15	130	41
1	Mohawk	I-8	WB	56.5	28	None	11	15	130	41
2	Sentinel	I-8	EB	83.6	None	28	32	14	103	70
2	Sentinel	I-8	WB	84.9	None	28	32	14	103	70
3	Ehrenberg	I-10	EB	4.4	48	None	<1	4	12	5
3	Ehrenberg	I-10	WB	5.3	48	None	<1	4	12	5
4	Bouse Wash	I-10	EB	52.2	34	48	42	7	60	33
4	Bouse Wash	I-10	WB	52.9	34	48	42	7	60	33
5	Burnt Well	I-10	EB	86.0	97	34	8	41	26	67
5	Burnt Well	I-10	WB	86.8	97	34	8	41	26	67
6	Sacaton	I-10	EB	181.7	138	97	16	10	20	13
6	Sacaton	I-10	WB	183.5	138	97	16	10	20	13
7	Texas Canyon	I-10	EB	320.2	68	138	2	13	20	16
7	Texas Canyon	I-10	WB	320.8	68	138	2	13	20	16
8	San Simon	I-10	EB	388.4	None	68	7	10	83	88
8	San Simon	I-10	WB	389.0	None	68	7	10	83	88
11	Haviland	I-40	EB	22.6	159	None	22	13	25	36
11	Haviland	I-40	WB	23.2	159	None	22	13	25	36
17	Parks[e]	I-40	EB	181.6	54	159	3	19	13	19
17	Parks[e]	I-40	WB	182.7	54	159	3	19	13	19

Map No.[a]	Rest Area	Route	Traffic Direction Served	Milepost	Distance to Nearest Rest Area (mi)		Distance to Nearest ASO[b] (mi)		Distance to Nearest Urban Area[c] (mi)	
					N or E	S or W	N or E	S or W	N or E	S or W
18	Meteor Crater	I-40	EB	235.2	123	54	19	35	16	34
18	Meteor Crater	I-40	WB	236.4	123	54	19	35	16	34
12	Painted Cliffs	I-40	Both	359.0	None	123	<1	20	21	70
9	Sunset Point[d]	I-17	Both	253	45	None	11	21	34	26
16	McGuireville	I-17	NB	297	27	45	40	10	42	8
16	McGuireville	I-17	SB	297	27	45	40	10	42	8
19	Christensen[e]	I-17	NB	324	None	27	13	37	15	35
19	Christensen[e]	I-17	SB	324	None	27	13	37	15	35
10	Canoa Ranch	I-19	NB	32.7	None	None	30	20	30	29
10	Canoa Ranch	I-19	SB	33.7	None	None	30	20	30	29
13	Hassayampa	US 60	Both	116.1	175	None	4	14	5	22
14	Salt River Canyon	US 60	Both	292.9	None	175	47	38	47	39
15	Mazatzal[f]	SR 87	Both	235.7	None	None	15	47	15	47

[a] Map No. = Rest area number corresponding to Figure 2-1.
[b] Alternative stopping opportunities.
[c] Urban Clusters and Urbanized Areas as designated by U.S. Census Bureau (2010).
[d] Rest area under construction, but temporarily open to truck parking.
[e] Rest area permanently closed, but temporarily open to truck parking.
[f] Rest area permanently closed.

Highway segments in remote areas with greater spacing between rest areas, few existing ASOs, limited urban areas, or where no rest areas currently exist represent regions where new rest area services may be warranted. Despite several rest areas being spaced beyond the recommended 60 miles or 1-hour drivetime, none of the rest areas are without an available ASO or urban area beyond the recommended distance.

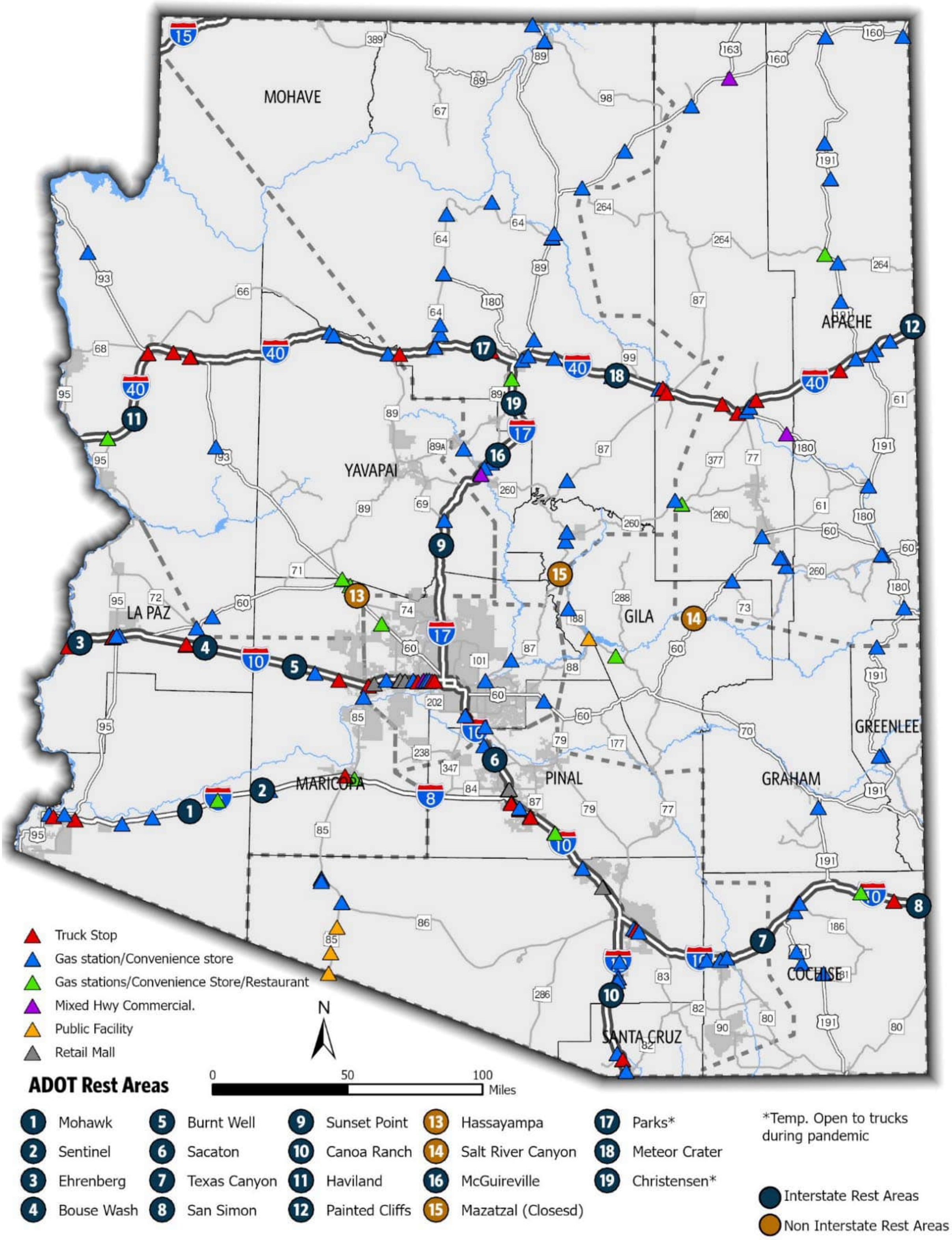
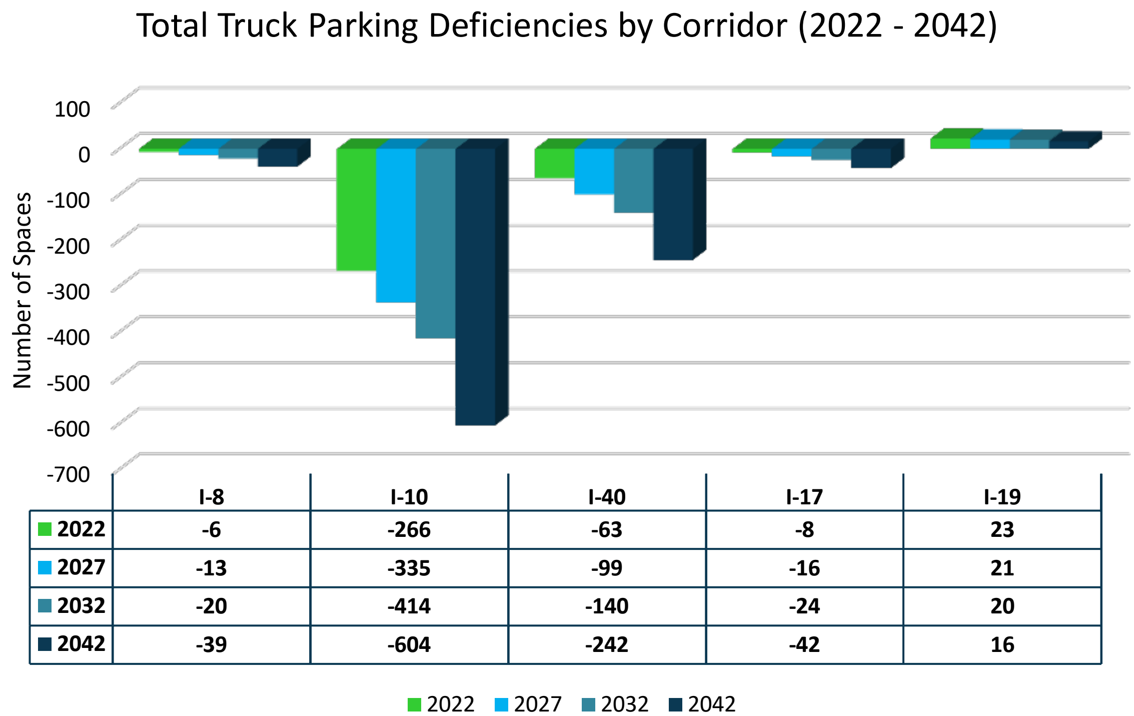


Figure 7-1. Statewide Alternative Stopping Opportunities

7.3. Truck Parking Deficiencies

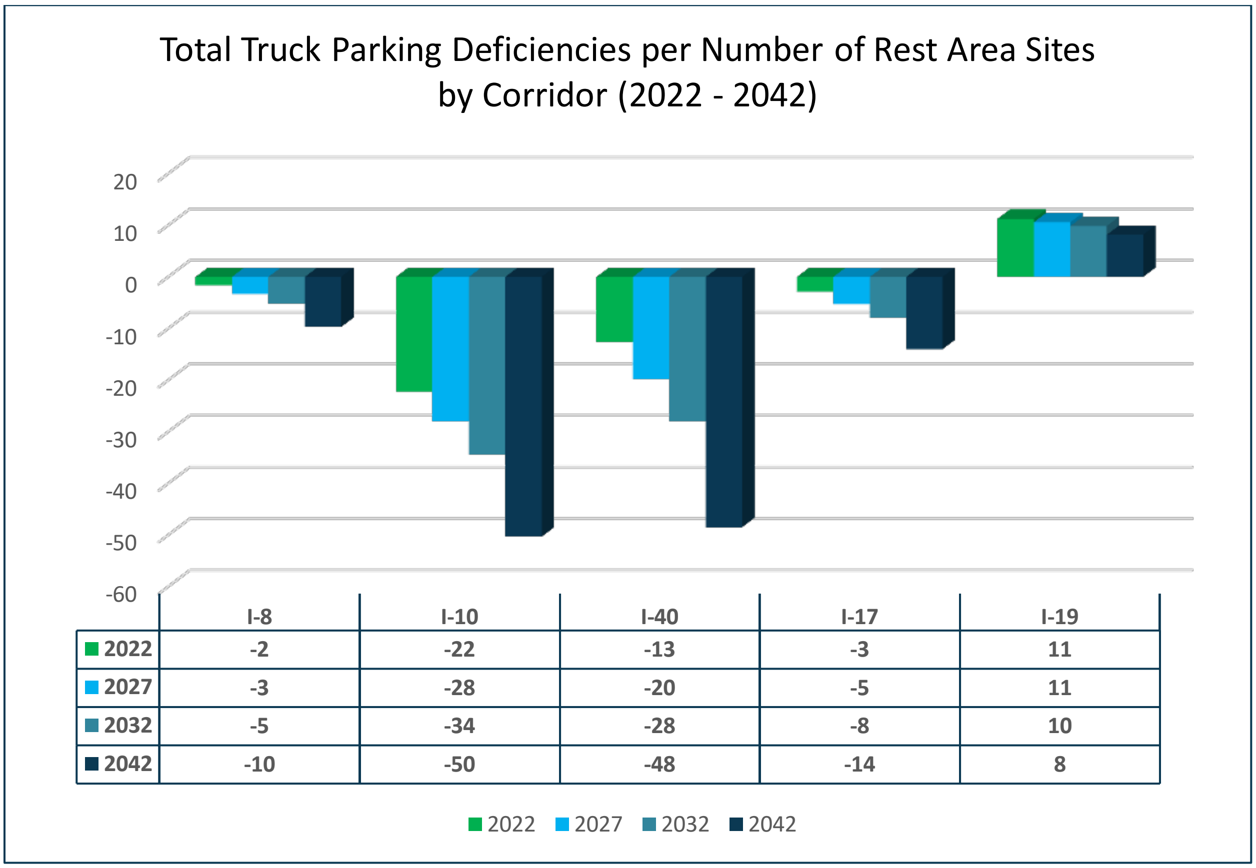
Based on the truck parking forecast model through year 2042, I-10 has the most deficient amount of truck parking among all corridors with rest areas, as presented in **Figure 7-2**. According to the data presented, I-10 is expected to require an additional 604 truck parking spaces by 2042. Furthermore, I-40 and I-8 also will require additional truck parking spaces by 2042 (242 and 39, respectively).



	I-8	I-10	I-40	I-17	I-19
2022	-6	-266	-63	-8	23
2027	-13	-335	-99	-16	21
2032	-20	-414	-140	-24	20
2042	-39	-604	-242	-42	16

Figure 7-2. Truck Parking Deficiencies by Corridor (2022 to 2042)

As part of the analysis, the number of rest area sites also was considered. Since I-10 also has the greatest number of rest area sites as compared to other corridors, a comparison of truck parking deficiencies per number of rest area sites was also evaluated. Although I-10 has the greatest number of truck parking spaces needed, when compared to the number of sites, I-40 has a similar deficiency per site by 2042 (50 and 48, respectively). **Figure 7-3** presents the total truck parking deficiencies per number of rest area sites through 2042. However, it is important to note that although both corridors have similar truck parking deficiencies when comparing the number of rest area sites considered, public truck parking spaces along I-10 comprise approximately 41% of the total truck parking spaces along the corridor. In comparison, public truck parking spaces along I-40 contribute only 21% of the total truck parking spaces along I-40.[45]



	I-8	I-10	I-40	I-17	I-19
2022	-2	-22	-13	-3	11
2027	-3	-28	-20	-5	11
2032	-5	-34	-28	-8	10
2042	-10	-50	-48	-14	8

Figure 7-3. Total Truck Parking Deficiencies per Number of Rest Area Sites by Corridor (2022 - 2042)

This study acknowledges that although the truck parking forecast model projects several rest areas to have deficient truck parking, the model does not account for existing private truck parking. Therefore, this study also considered the existing amount, density, and location of private truck parking and its potential to offset the need for expanded truck parking at rest areas.

[45] https://azdot.gov/sites/default/files/2019/08/wp3-truck-parking-supply-demand-and-gaps.pdf

According to the *2019 Arizona Truck Parking Study*, private truck parking along I-10 equals a total of 3,846 spaces, with high densities occurring between the Ehrenberg and Bouse Wash Rest Areas, as well as east of the Burnt Well Rest Areas and south of the Sacaton Rest Areas. Along I-40, private truck parking equals a total of 1,723 spaces, with a high density of locations occurring around the Haviland Rest Area near the City of Kingman. Several large private truck parking facilities are located east of the Meteor Crater Rest Area near the cities of Winslow and Holbrook.

7.3.1. Undesignated Truck Parking

The *2019 Arizona Truck Parking Study* found that five ADOT rest areas were among the top 15 locations where undesignated truck parking occurs. The five rest areas referenced in the study include the Haviland, Sunset Point, Texas Canyon, Ehrenberg, and Meteor Crater Rest Areas. It also noted that the exits near the Bouse Wash Rest Area were among the top 15 locations for undesignated truck parking. In addition, the *2019 Arizona Truck Parking Study* found that even though the Parks and Christensen Rest Areas were closed at the time of the study, over the 8-week global positioning system sample, 30 trucks parked at the on-/off-ramp at the Christensen rest area, while 106 trucks parked along the on-/off-ramps at the Parks rest area. More than 70% of the trucks parked at the Parks Rest Area were along the eastbound portion of I-40 and were limited to less than two hours in duration. This suggests that those trucks were stopping for their mandatory 30-minute HOS break and were likely staging for deliveries in Flagstaff. [46]

According to the undesignated truck parking being tracked by ADOT's Facilities Management, the Haviland (eastbound/westbound) and Sunset Point Rest Areas experienced the highest total of undesignated truck parking (1,985/974 and 881, respectively), as well as the highest average number of trucks parked in undesignated locations per day (10.8/5.3 and 4.8, respectively). Although the Painted Cliffs Rest Area experienced an average of 4.3 trucks per day parked in undesignated locations, this may be partially because of a vertical clearance constraint for large trucks exiting from the eastbound direction.

7.3.2. Benefits of Designated Truck Parking

There are several benefits associated with providing expanded truck parking at rest areas to meet growing demand. The FHWA recently published its *Truck Parking Development Handbook*[47] in September 2022, which highlights the major quantitative benefits associated with truck parking projects. In general, those benefits include:

- Safety for truck drivers
- Safety for other motorists
- Enhanced security for truck drivers

[46] https://azdot.gov/sites/default/files/2019/08/wp3-truck-parking-supply-demand-and-gaps.pdf

[47] https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/docs/Truck_Parking_Development_Handbook.pdf

- Reduced emissions of pollutants
- Reduced trucking costs

The benefits outlined by FHWA are a result of improving truck parking availability and can be attributed to decreased undesignated parking and avoided detours to find parking, as well as enhanced trucking efficiency, productivity, and reliability. Specific quantitative benefits of expanding truck parking at ADOT rest areas will be documented as part of the *2019 Arizona Truck Parking Study* update, which is expected to occur following this study's completion.

7.3.3. Future Changes in Truck Parking Demand

Since the previous study, several advancements and changes have occurred regarding commercial trucks and their use. One of those changes has been in the advancement of Automated Driving Systems. In fact, the U.S. Department of Transportation's *Automated Vehicles Comprehensive Plan* (updated January 11, 2021) noted that several trucking companies have already begun developing fully automated commercial vehicles for use on limited access highways, that would operate without a human operator between exits, and then operate with a human in more complex environments, such as urban areas. [48]

As a result of these developments, potential changes to truck parking demand along ADOT highways exists. Currently, commercial drivers must adhere to mandatory breaks and are required to stop and park at locations while their break is completed. As driverless or fully automated commercial vehicles are further adopted and technology improves, that requirement may become less impactful to ADOT rest areas; as more driverless commercial vehicles are adopted, the truck parking demand along ADOT's highways may decrease.

A 2018 report by the University of California, Berkeley Center for Labor Research and Education and Working Partnerships USA documented six potential scenarios for autonomous commercial vehicles. Noted as the most likely in the near future was the use of exit-to-exit autonomous trucks. This scenario involves commercial vehicles using rest areas or Autonomous Trucking Ports, where commercial vehicle drivers would transfer their trailer to a driverless vehicle for interstate portions of the freight's trip. Conversely, when the vehicle approaches its destination, the trailer then could be transferred back to a human-operated vehicle to navigate to its final delivery (**Figure 7-4**). [49]

[48] https://www.transportation.gov/sites/dot.gov/files/2021-01/USDOT_AVCP.pdf

[49] http://driverlessreport.org/files/driverless.pdf

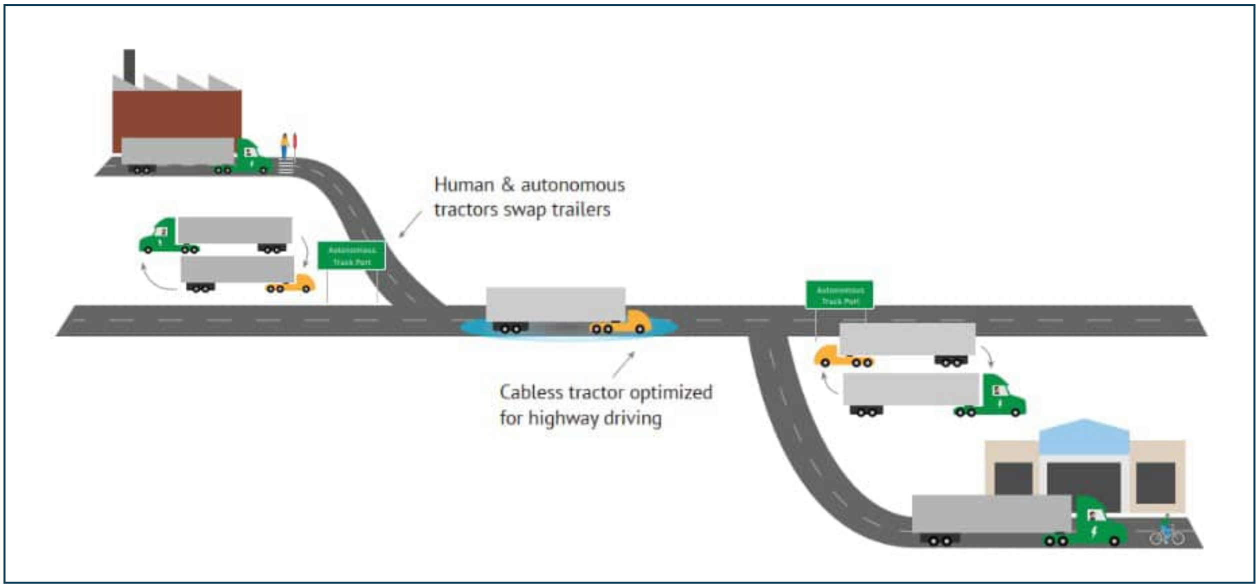


Figure 7-4. Exit-to-Exit Autonomous Trucks
Source: DRIVERLESS? Autonomous Trucks and the Future of the American Trucker

7.4. Routes with High AADT

As documented in Section 4.4, 2019's AADT was used to better represent traffic conditions prior to the pandemic. Future AADT adjacent to rest areas then was projected for each planning period using site-specific growth rates derived from ADOT's traffic monitoring data. **Table 7-2** summarizes the forecasted AADT adjacent to ADOT rest areas for each planning period, through 2042.

Table 7-2. Mainline AADT Adjacent to Rest Areas (2022-2042)

Map No.[a]	Rest Area	Route	Traffic Direction Served	ADOT District	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT at ADOT Rest Areas				Percentage Change in AADT (2022-2042)
							2022	2027	2032	2042	
1	Mohawk	I-8	EB	Southwest	5,333	2.26%	5,700	6,400	7,100	8,900	56.1%
1	Mohawk	I-8	WB	Southwest	5,287	2.26%	5,700	6,300	7,100	8,800	54.4%
2	Sentinel	I-8	EB	Southwest	5,000	2.44%	5,400	6,100	6,800	8,700	61.1%
2	Sentinel	I-8	WB	Southwest	5,500	2.44%	5,900	6,700	7,500	9,600	62.7%
3	Ehrenberg	I-10	EB	Southwest	13,695	2.61%	14,800	16,800	19,100	24,800	67.6%
3	Ehrenberg	I-10	WB	Southwest	13,591	2.61%	14,700	16,700	19,000	24,600	67.3%
4	Bouse Wash	I-10	EB	Southwest	13,741	2.66%	14,900	17,000	19,300	25,100	68.5%
4	Bouse Wash	I-10	WB	Southwest	12,598	2.66%	13,600	15,500	17,700	23,000	69.1%
5	Burnt Well	I-10	EB	Southwest	11,249	2.61%	12,200	13,800	15,700	20,300	66.4%
5	Burnt Well	I-10	WB	Southwest	12,875	2.61%	13,900	15,800	18,000	23,300	67.6%
6	Sacaton	I-10	EB	Southcentral	31,655	2.17%	33,800	37,600	41,800	51,900	53.6%
6	Sacaton	I-10	WB	Southcentral	30,974	2.17%	33,000	36,800	40,900	50,700	53.6%
7	Texas Canyon	I-10	EB	Southcentral	7,748	2.58%	8,400	9,500	10,800	13,900	65.5%
7	Texas Canyon	I-10	WB	Southcentral	9,934	2.58%	10,700	12,200	13,800	17,800	66.4%
8	San Simon	I-10	EB	Southeast	7,211	2.61%	7,800	8,900	10,100	13,000	66.7%
8	San Simon	I-10	WB	Southeast	6,907	2.61%	7,500	8,500	9,700	12,500	66.7%
9	Sunset Point[c]	I-17	Both	Northwest	37,549	2.25%	40,100	44,900	50,100	62,600	56.1%
10	Canoa Ranch	I-19	NB	Southcentral	8,618	1.91%	9,100	10,000	11,000	13,300	46.2%
10	Canoa Ranch	I-19	SB	Southcentral	8,696	1.91%	9,200	10,100	11,100	13,400	45.7%
11	Haviland	I-40	EB	Northwest	9,149	2.76%	9,900	11,400	13,000	17,100	72.7%
11	Haviland	I-40	WB	Northwest	8,519	2.76%	9,200	10,600	12,100	15,900	72.8%
12	Painted Cliffs	I-40	Both	Northeast	23,129	3.00%	25,300	29,300	34,000	45,600	80.2%

Map No.[a]	Rest Area	Route	Traffic Direction Served	ADOT District	2019 Mainline Traffic Volume (ADOT AADT)	Growth Rate[b]	Mainline AADT at ADOT Rest Areas				Percentage Change in AADT (2022-2042)
							2022	2027	2032	2042	
13	Hassayampa	US 60	Both	Southwest	18,556	1.44%	19,400	20,800	22,300	25,800	33.0%
14	Salt River Canyon	US 60	Both	Southwest	2,788	2.60%	3,000	3,400	3,900	5,000	66.7%
15	Mazatzal[d]	SR 87	Both	Southwest	13,269	1.53%	13,900	15,000	16,200	18,800	35.3%
16	McGuireville	I-17	NB	Northcentral	13,700	1.68%	14,400	15,700	17,000	20,100	39.6%
16	McGuireville	I-17	SB	Northcentral	12,423	1.68%	13,100	14,200	15,400	18,200	38.9%
17	Parks[e]	I-40	EB	Northcentral	10,925	2.08%	11,600	12,900	14,300	17,500	50.9%
17	Parks[e]	I-40	WB	Northcentral	9,391	2.08%	10,000	11,100	12,300	15,100	51.0%
18	Meteor Crater	I-40	EB	Northcentral	9,736	2.79%	10,600	12,100	13,900	18,300	72.6%
18	Meteor Crater	I-40	WB	Northcentral	10,084	2.79%	11,000	12,600	14,400	19,000	72.7%
19	Christensen[e]	I-17	NB	Northcentral	12,508	1.61%	13,100	14,200	15,400	18,100	38.2%
19	Christensen[e]	I-17	SB	Northcentral	10,729	1.61%	11,300	12,200	13,200	15,500	37.2%

[a] Map No. = Rest area number corresponding to Figure 2-1.
[b] Growth rate provided by ADOT/MPD.
[c] Rest area under construction, but temporarily open to truck parking.
[d] Rest area permanently closed.
[e] Rest area permanently closed, but temporarily open to truck parking.

8. Corridor Needs

This section summarizes the results of a preliminary review of corridor needs using the proposed draft criteria discussed in the previous section, which include potential safe parking locations, new rest area locations, and rest areas that are candidates for expansion.

8.1. New Rest Area Locations

Based on the criteria discussed in the previous section, no new full-service rest area locations may be needed. As summarized in **Table 7-1**, the existing spacing between some rest areas exceeds the AASHTO and FHWA recommended 60 miles or 1-hour drivetime. However, all the rest areas have ASOs within 60 miles, indicating that travelers have stopping opportunities between those rest areas that are spaced beyond 60 miles or 1-hour drivetime. In fact, some rest areas have multiple ASOs within 20 miles. In addition, most rest areas are within 60 miles of a census-designated urban area, which offers further stopping opportunities, such as restaurants and parks.

Although the remote areas along I-40 between Williams (urban cluster) and Kingman (urban cluster) have no existing rest areas, the existing ASOs are spaced within 60 miles or 1-hour drivetime. ADOT Facilities Management also noted that, in the winter, commercial drivers will take routes along more southern portions of Arizona to avoid hazardous weather conditions.

In addition, many of the ADOT highways and routes without existing rest areas, are either less than 60 miles in length or have existing ASOs and urban areas along their respective routes that are spaced close to or within the recommended 60 miles.

However, based on the forecasts and deficiencies described in Section 6, some rest areas may require rehabilitation or expansion. There is also potential to provide safe parking locations at interchanges or off-system locations that can supplement the truck parking deficiencies summarized in **Table 6-1** and to reduce undesignated parking along corridors.

8.2. Rest Area Expansions

This section summarizes the potential need for rest area expansions based on findings from the corridor needs criteria and the forecasts and deficiencies summarized in previous sections. Because rest areas had only minimal deficiencies for car parking through 2042, the subsequent sections focus on expansions based on restroom and truck parking deficiencies.

8.2.1. Based on Restroom Deficiencies

According to the restroom forecast model used for projecting restroom needs over the next 20 years, none of the rest areas should be considered for additional restrooms in the next 5 years. In fact, only the Burnt Well and Bouse Wash Rest Areas showed a deficiency in the near term, but the number of restroom stalls required is not significant enough to require rehabilitation. However, the potential exists for these rest areas to require restroom expansions by 2042. These forecasts should be reevaluated in the next 10 years before prioritizing additional restroom stalls at the Burnt Well and Bouse Wash Rest Areas.

8.2.2. Based on Truck Parking Deficiencies

Based on data from the corridor needs criteria in Section 7, as well as information obtained from the *2019 Arizona Truck Parking Study*, several rest areas may require expansion for supplemental truck parking. When analyzing the need for truck parking expansion at rest areas, the following elements were considered:

- Forecasted truck parking deficiencies
- Large amount of undesignated truck parking near or at the rest area
- Density of private truck parking near rest areas
- Distance to large, urbanized areas

When considering the criteria listed, only rest areas that are permanently open, had associated forecast data, or have designated truck parking were evaluated. The truck parking deficiencies were rated based on a statistical analysis using the mean number of truck parking spaces required and a standard deviation (SD) for the deficient truck parking for the existing year (2022). The following criteria used to rate truck parking deficiencies at rest areas is summarized in **Table 8-1**.

Table 8-1. Truck Parking Deficiency Rating Criteria

Range		Rating
Min	Max	
-44	-59	Very High
-28	-43	High
-12	-27	Moderate
-1	-11	Low
18	0	None

When identifying undesignated truck parking near rest areas, this study relied on the *2019 Arizona Truck Parking Study* by evaluating if a rest area was listed as being near one of the top 15 areas with undesignated truck parking. The *2019 Arizona Truck Parking Study* and this study's evaluation of existing ASOs were used to identify areas with existing high densities of private truck parking. Lastly, because commercial drivers often stage and park near large, urbanized areas for deliveries, rest areas within 60 miles of a census-designated urbanized area (population greater than 50,000) were considered as particularly important for truck parking. **Table 8-2** provides an overview of the comparative analysis using the listed criteria.

Table 8-2. Comparative Analysis of Truck Parking Needs at Rest Areas

Rest Area	Route	Traffic Direction Served	Truck Parking Deficiency	Nearby Undesignated Truck Parking	High Density of Private Truck Parking	Within 60 Miles of Urbanized Area
Mohawk	I-8	EB	Low	No	No	No
Mohawk	I-8	WB	Low	No	No	No
Sentinel	I-8	EB	Low	No	No	No
Sentinel	I-8	WB	None	No	No	No
Ehrenberg	I-10	EB	Moderate	Yes	Yes	No
Ehrenberg	I-10	WB	Low	Yes	Yes	No
Bouse Wash	I-10	EB	Moderate	Yes	Yes	No
Bouse Wash	I-10	WB	Low	Yes	Yes	No
Burnt Well	I-10	EB	High	No	Yes	Yes
Burnt Well	I-10	WB	Low	No	Yes	Yes
Sacaton	I-10	EB	Low	Yes	Yes	Yes
Sacaton	I-10	WB	Low	Yes	Yes	Yes
Texas Canyon	I-10	EB	Very High	Yes	No	Yes
Texas Canyon	I-10	WB	Very High	Yes	No	Yes
San Simon	I-10	EB	Moderate	No	No	No
San Simon	I-10	WB	High	No	No	No
Haviland	I-40	EB	Moderate	Yes	Yes	No
Haviland	I-40	WB	Moderate	Yes	Yes	No
Meteor Crater	I-40	EB	Low	Yes	Yes	Yes
Meteor Crater	I-40	WB	Low	Yes	Yes	Yes
Painted Cliffs	I-40	Both	Low	No	No	No
McGuireville	I-17	NB	Low	No	No	No
McGuireville	I-17	SB	Low	No	No	No
Sunset Point[a]	I-17	Both	None	Yes	No	Yes
Canoa Ranch	I-19	NB	None	No	Yes	Yes
Canoa Ranch	I-19	SB	None	No	Yes	Yes

[a] Rest area under construction, but temporarily open to truck parking.

Based on the comparative analysis, Texas Canyon Rest Areas have the largest amount of truck parking need, as these rest areas have a "very high" parking deficiency, have documented undesignated parking nearby, lack a high density of private truck parking, and are within 60 miles of Tucson. In addition, Haviland Rest Areas have moderate truck parking deficiency, and were documented in the *2019 Arizona Truck Parking Study* as the number one location with undesignated truck parking.

Although the eastbound Burnt Well Rest Area has a "high" parking deficiency, the rest area is situated in an area with a high density of private truck parking and was not documented as having a large amount of undesignated parking nearby. Although the forecast did not identify any existing truck parking deficiency at the Sunset Point Rest Area, the *2019 Arizona Truck Parking Study* found this rest area to be among the top 10 locations with high amounts of undesignated parking. The high amount of undesignated parking at Sunset Point might be a result of trucks being parked for extended periods of time.

Since the *2019 Arizona Truck Parking Study*, truck parking at the Meteor Crater and Haviland Rest Areas was expanded and the concentration of undesignated truck parking in those areas may have changed. The following rest areas were initially ranked by priority for either truck parking expansion or locations where ADOT should consider providing nearby supplemental parking:

- Texas Canyon (Eastbound and Westbound) Rest Areas
- Haviland (Eastbound and Westbound) Rest Areas
- San Simon (Eastbound and Westbound) Rest Areas
- Bouse Wash (Eastbound) Rest Area
- Sunset Point Rest Area

These rest areas also will be evaluated for their potential to provide informal overflow truck parking lots adjacent to the rest areas, thereby reducing the need to reconstruct the existing parking lots. Existing rest areas with ROW or geographic constraints that limit expanding truck parking should be further evaluated for safe parking only locations with limited amenities, or for potential P3 opportunities, as discussed in the following sections. The feasibility of expanding truck parking at the rest area locations listed is documented in more detail in Section 13.

8.3. Safe Truck Parking Only Locations

Although no full-service rest area locations were identified as a need, there is potential to implement safe parking only locations to offset the demand at rest areas. Some rest areas with existing and future truck parking deficiencies are constrained by either ROW or geography and expanding truck parking at these locations may not be feasible. Therefore, implementing safe parking only locations nearby within ADOT's existing ROW could help offset capacity limitations at these deficient rest areas. Safe parking only locations can be constructed within existing interchange footprints with limited to no amenities. These locations could be constructed similarly to the example used in the *2019 Arizona Truck Parking Study*, which highlighted Nebraska's low-cost solution to supplement parking needs. [50] These locations can be constructed using a gravel lot and minimal amenities, such as lighting and trash receptacles, thereby reducing capital investment and operational and maintenance costs. Refer to **Figure 8-1** for more about Nebraska's solution.

[50] https://azdot.gov/sites/default/files/2019/08/wp3-truck-parking-supply-demand-and-gaps.pdf

Low or No Amenity Truck Parking

Other states such as Nebraska have embraced the development of low amenity truck parking spaces by developing truck parking where it had previously not existed or was not in service. Figure 2-12 displays a gravel lot occupying unused right of way (ROW) at the interchange of I-80 and US 138 in Nebraska. The gravel lot has no amenities beyond a couple of overhead lights. Additionally, the entrance to the location is located on the US 138, which has lower posted speed than I-80, requiring less entering and exiting infrastructure.

Figure 2-12: Low Cost Truck Parking Solution in Nebraska

Source: Imagery ©2018 Google, Map data ©2018 Google

Figure 8-1. Low-Cost Truck Parking Solution in Nebraska
Source: 2019 Arizona Truck Parking Study

These locations are particularly important for regions or corridors with high AADT, deficient truck parking nearby, high amounts of documented undesignated truck parking, or limited ASOs. Corridors or regions that meet these criteria include:

- I-17 between the Sunset Point Rest Area and Phoenix
- I-40 between Kingman and Ash Fork
- I-10 between the Texas Canyon and San Simon Rest Areas

9. Emerging Rest Area Needs

This study's goals include the evaluation and identification of future conditions, which includes identifying emerging trends and needs. Emerging needs and trends in the transportation landscape were identified through peer state reviews, review of recent long-range planning initiatives, and coordination with ADOT staff and stakeholders. This section summarizes the results of those efforts and highlights key considerations for ADOT's rest areas over the next 20 years.

9.1. Facilities Management and Stakeholder Identified Needs

Throughout this study, coordination with stakeholders such as Tribes and ADOT staff was held to help identify growing issues, trends, and needs at ADOT rest areas. The following section summarizes the input provided resulting from those coordination efforts.

9.1.1. Tribal Consultation

Since three of the existing ADOT rest areas (Sacaton, Salt River Canyon, and Painted Cliffs) are located on Tribal Land, consultation with each Tribe was requested to identify issues and needs at those rest areas. Through coordination with ADOT's Tribal Liaison office, letters were sent to the Tribes in June 2022. Of the four Tribes contacted, only one Tribe (San Carlos Apache) responded. A coordination meeting was held with the Tribe representatives to discuss needs and issues related to the Salt River Canyon Rest Area. The San Carlos Apache Tribe noted the following issues and needs:

- Expanded solar panels
- Safety Improvements (e.g., security cameras, lighting, and hazard signing)
- Installation of digital cultural displays
- Flash flood warning signs for Salt River
- Wireless internet
- Information displays for nearby recreational activities and services

Salt River Canyon is located along U.S. Highway 60 in a remote region of Arizona and has limited access to power, water, and cellular coverage. Because of these limits, security cameras, wireless internet, and digital displays are not currently feasible. However, the potential to implement these features may become feasible in future years as the energy generated from solar panels becomes more efficient. As an alternative to digital displays, static displays at the Salt River Canyon Rest Area to highlight cultural resources, recreational activities, and services related to the San Carlos Apache Tribe and the region are feasible.

9.1.2. Facilities Management and TSMO Input

ADOT Transportation Systems Management and Operations (TSMO) is responsible for managing the operation and maintenance of ADOT rest areas, while Facilities Management staff is responsible for managing the maintenance and operations of water and wastewater facilities at rest areas. Therefore, they are included as part of this study's PMT. Their knowledge and experience of ADOT rest areas was relied upon to garner information related to rest area needs or issues. The following items were noted as needs or considerations when planning for future improvements at ADOT rest areas:

- High-mast lighting
- Solar panels
- Conceptual EV charging spaces
- Telephone call boxes
- Overflow truck parking lots (where needed)

9.2. Truck Parking Availability System

As documented previously, TPAS is being implemented along the I-10 corridor as part of a joint effort among DOTs for California, Arizona, New Mexico, and Texas. TPAS will be deployed at four ADOT rest areas (eight sites) along the I-10 corridor in Arizona, which include the Ehrenberg, Bouse Wash, Texas Canyon, and San Simon Rest Areas. The system is being designed to detect truck parking availability at rest areas and to disseminate this information in real-time to commercial drivers through DMSs and ADOT's Arizona 511. The result of this project is expected to provide benefits such as improved mobility and safety, reduction of infrastructure damage and emissions, and reducing lost earnings for commercial drivers through increased efficiency and productivity. [51]

9.2.1. Infrastructure Requirements

According to ADOT TSMO, the TPAS project is being implemented using fixed radar technology and onsite power that detects which truck parking spaces at the rest areas are occupied. Radar units can detect approximately 10 truck parking spaces per unit and were selected because they are easier to maintain and avoid ground disturbance. Radar units also were found to be more accurate and cheaper than alternative technologies. Occupancy data are transmitted through cellular data to nearby modems, which then share the data to DMSs located prior to each rest area. Occupancy accuracy will be verified by staff using imagery from closed-circuit television (CCTV) cameras.

Although ADOT's TPAS data will initially rely on cellular coverage to transmit data, the potential exists to convert as broadband technology is extended along ADOT's highways. Additional items associated with implementing TPAS at rest areas include new pull boxes, 55-inch CCTV poles, radar sensor poles, and electric improvements. The initial estimate to implement TPAS at the four ADOT rest areas (eight sites) is approximately $3 million.

9.3. Alternatives to TPAS

The limitations to implementing a statewide system of collecting truck parking availability data at rest areas includes an initial capital investment, loss or lack of cellular coverage, and the additional staff required to monitor, verify, and maintain the system. Therefore, ADOT plans to evaluate the potential for standardizing TPAS at the remaining rest areas following a period of operation and evaluation. However, as part of this study's goal to consider future conditions, TPAS was evaluated for potential

[51] https://i10connects.com/node/4656

limitations for implementing TPAS at all rest areas in Arizona, as well as alternatives for disseminating truck parking availability data.

All but one rest area (Salt River Canyon) have access to power to operate the TPAS infrastructure. However, the potential exists to use solar power to operate radar and CCTV cameras for rest areas with limited power and this option also would reduce long-term operational costs. The Federal Communication Commission (FCC) provides a Mobile Long-Term Evolution (LTE) Coverage Map that shows existing mobile broadband coverage throughout the U.S. [52] Based on the FCC's Mobile LTE Coverage Map, only one rest area does not have mobile broadband cellular coverage (Salt River Canyon).

Based on the infrastructure requirements, TPAS is currently feasible at all but one (Salt River Canyon) of the existing ADOT rest areas. However, the Salt River Canyon Rest Area does not have any existing designated truck parking; therefore, the need to install a TPAS is not necessary. Even without the implementation of DMSs, truck parking availability data could be used by commercial vehicle dispatchers to relay truck parking availability data to commercial drivers.

9.4. Electric Vehicles

ADOT is not considering EV charging stations in rest areas during the development of this study. To learn more about the implementation of EV charging stations in Arizona, refer to the most recent version of the Arizona Electric Vehicle Plan.

9.5. Wireless Internet

As travelers continue to use and rely on mobile devices, wireless connectivity at rest areas provides travelers the ability to access needed information such as weather updates, traffic conditions, and directions. States such as Texas and Florida have made Wi-Fi available at many of their facilities. However, connectivity and service at remote rest area locations are dependent on existing utilities. The Governor's Office, the Arizona Commerce Authority, and ADOT are partnering to bring broadband to much more of Arizona. Within this partnership, the implementation of Wi-Fi access has been considered and may be coming to rest areas throughout Arizona. [53]

9.6. Potential Locations for Emerging Rest Area Services

9.6.1. TPAS

The potential to implement TPAS at the remaining rest areas not included in the I-10 Coalition was analyzed for this study. Based on the infrastructure and resource requirements documented in the previous section, TPAS is currently feasible at all but one (Salt River Canyon) of the existing rest areas. The Salt River Canyon Rest Area does not have reliable cellular or satellite signal, and power is limited to what is produced through solar energy; at the same time, this rest area does not have any existing designated truck parking, so TPAS installation may be a nonissue at this point in time.

[52] https://www.fcc.gov/BroadbandData/MobileMaps/mobile-map

[53] Information provided by ADOT's P3 Office on May 4, 2022.

Each of the remaining rest areas have access to power and cellular coverage, thereby allowing truck parking availability data to be collected and transmitted. Even without the implementation of DMSs, truck parking availability data could be used by dispatchers and third-party applications that relay truck parking availability data to commercial drivers.

Based on input provided by ADOT's TSMO staff, the limitations to implementing a statewide system of collecting truck parking availability data at rest areas includes an initial capital investment, as well as additional staff required to monitor, verify, and maintain the system. Therefore, ADOT plans to evaluate the potential for standardizing TPAS at the remaining rest areas following a period of operation and evaluation.

9.6.2. Wireless Internet

As the broadband network is extended along ADOT's highway system, rest areas should be upgraded to include Wi-Fi access, which provides travelers the ability to access needed information such as weather updates, traffic conditions, and directions when cellular coverage may be limited. Specifically, rest areas with high usage rates, high AADT volumes, close to adjacent state borders, and locations where extreme weather events occur should be considered first. Rest areas that meet this criterion include the following:

- Rest areas along I-10
- Sunset Point Rest Area
- Haviland and Painted Cliffs Rest Areas

10. Public-Private Partnership Opportunities

P3s provide the ability to expand rest area services in needed areas, while potentially reducing capital and operating costs. These partnerships also allow for additional rest area services that may not be permissible within ADOT ROW but are a growing need to the traveling public. The potential for P3s to expand rest area services at a lower cost than developing a traditional state-owned rest area offers a unique approach to mitigating Arizona's continuing budgetary challenges, while continuing to address highway traffic growth in Arizona.

Since the previous study, P3s for the development and adoption of rest areas have remained limited. However, the confluence of special-interest group support, availability of federal approval and implementation guidelines, and the compelling economic advantages make public-private rest area partnerships worthy of consideration. The consideration of P3s to provide rest area services in the near and long term is an important component to any long-range planning strategy to expand needed rest area services while simultaneously reducing the costs to the state for providing these additional services.

The following sections discuss the key aspects of P3 programs and potential partnership models evaluated for improving the rest area system in Arizona.

10.1. Federal Interstate Oasis Program

The federal Interstate Oasis Program was enacted as part of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users in 2005. In 2006, the FHWA published the Interstate Oasis Program and Policy, which presented finalized rules/policies governing the Interstate Oasis Program. Since the 2011 Study, none of the criteria outlined by the FHWA policy document has changed. The following standards and excerpts are from the FHWA policy document. [54]

The FHWA describes the purpose of the Interstate Oasis Program as being:

"…to enhance safety and convenience for Interstate highway users by allowing States, in accordance with this policy, to designate and provide signing to certain facilities off the freeway that will provide increased opportunities for stopping to rest, using restroom facilities, and obtaining basic services."

Under the final program rules, the FHWA went on to define an Interstate Oasis as:

"…a facility near an Interstate highway but not within the Interstate right-of-way, designated by a State after meeting the eligibility criteria of this policy, that provides products and services to the public, 24-hour access to public restrooms, and parking for automobiles and heavy trucks."

[54] The FHWAs Interstate Oasis Program and Policy document can be found online at: https://www.federalregister.gov/documents/2006/10/18/E6-17367/interstate-oasis-program

10.1.1. Criteria

The Interstate Oasis Program allows states to partner with private operators who meet the minimum criteria to provide basic rest area services in exchange for online highway signing and official designation as an Interstate Oasis. Therefore, by designating and signing commercial operations that meet the minimum eligibility criteria for an Interstate Oasis, the state may expand guaranteed free parking and restroom services to augment the services available at existing rest areas without having to construct and maintain expensive new rest area facilities. Importantly, the Interstate Oasis Program has the support of the National Association of Truck Stop Operators (NATSO), the most powerful industry lobbying group that opposes public-private partnerships or any commercialization of existing or new online rest areas. As such, the Interstate Oasis Program provides an alternative type of public-private partnership offline, and which is supported by the very industry lobbying groups that have in the past been so successful in defeating every significant attempt to overturn or bypass the federal prohibition against providing commercial services at rest areas.

The following represent the seven minimum eligibility criteria for an operator to be designated and signed as an Interstate Oasis, according to FHWA standards:

1. **Distance from Interchange.** "Shall be located no more than 3 miles from an interchange with an Interstate highway, except that:
   - A lesser distance may be required when a State's laws specifically restrict truck travel to lesser distances from the Interstate system; and
   - Greater distances, in 3-mile increments up to a maximum of 15 miles, may be considered by States for interchanges in very sparsely developed rural areas where eligible facilities are not available within the 3-mile limit;"
2. **Access from Route.** "Shall be accessible via a route that an engineering study determines can safely and conveniently accommodate vehicles of the types, sizes, and weights that would be traveling to the facility, entering and leaving the facility, returning to the Interstate highway, and continuing in the original direction of travel."
3. **Physical Geometry of Site Layout.** "Shall have physical geometry of site layout, including parking areas and ingress/egress points, that an engineering study determines can safely and efficiently accommodate movements into and out of the site, onsite circulation, and parking by all vehicles, including heavy trucks of the types, sizes, and weights anticipated to use the facility."
4. **Restrooms.** "Shall always have restrooms available to the public (24 hours per day, 365 days per year). Restrooms should be modern and sanitary and should have drinking water. The restrooms and drinking water should be available at no charge or obligation;"
5. **Parking.** "Shall have parking spaces available to the public for automobiles and heavy trucks. The parking spaces should be well lit and should be available at no charge or obligation for parking durations of up to 10 hours or more, in sufficient numbers for the various vehicle types, including heavy trucks, to meet anticipated demands based on volumes, the percentage of heavy vehicles in the Interstate highway traffic, and other pertinent factors as described in formulas contained in AASHTO's Guide."

6. **Products and Services to be Provided.** "Shall provide products and services to the public. These products and services should include:
   - Public telephone;
   - Food (vending, snacks, fast food, and/or full service); and
   - Fuel, oil, and water for automobiles, trucks, and other motor vehicles;"
7. **Security and Staffing.** "Should be staffed by at least one person on duty at all times (24 hours per day, 365 days per year)."

These criteria include the basic services that are available at most rest areas in Arizona, including free parking for cars and trucks for extended periods and in sufficient numbers to meet demand, free access to sanitary restrooms, water, and access to public telephones. Additionally, the Interstate Oasis Program provides commercial services and onsite security available 24-hours per day.

In exchange for providing these services, the operator is eligible to be designated and signed as an Interstate Oasis.

10.1.2. Signing Guidelines

The FHWA's 2009 MUTCD provides specific guidance on signing for Interstate Oases. The following summarizes the FHWA's proposed guidelines relating to Interstate Oasis signing under Section 2I.04. [55]

The 2009 MUTCD revisions indicate that states providing Interstate Oasis signing should implement the following signing practices on the freeway for any given exit to identify the Interstate Oasis:

Online Highway Sign: Option 1. "If adequate sign spacing allows, a separate Interstate Oasis (D5-12) sign should be installed in an effective location with spacing of at least 800 feet from other adjacent guide signs, including any Specific Service signs. This Interstate Oasis sign should be located upstream from the Advance Guide sign or between the Advance Guide sign and the Exit Direction sign for the exit leading to the Interstate Oasis. The Interstate Oasis sign should have a white legend with a letter height of at least 10 inches and a white border on a blue background and should contain the words INTERSTATE OASIS and the exit number or, for an unnumbered interchange, an action message such as NEXT RIGHT. The names or logos of the businesses designated as Interstate Oases should not be included on this sign."

The 2009 MUCTD indicates that the "Interstate Oasis sign panel shall only be used on the separate Interstate Oasis sign where it is accompanied by the words INTERSTATE OASIS and shall not be used independently without the words."

Online Highway Sign: Option 2. "If the spacing of the other guide signs precludes the use of a separate sign as described in Item A [Option 1], an INTERSTATE OASIS (D5- 12P) supplemental plaque with a letter height of at least 10 inches and with a white legend and border on a blue background should be appended above or below an existing D9-18 series General Service sign for the interchange."

[55] https://mutcd.fhwa.dot.gov/pdfs/2009r1r2r3/mutcd2009r1r2r3edition.pdf

Ramp/Interchange Signing: Option 1. "If Specific Service signing is provided at the interchange, a business designated as an Interstate Oasis and having a business logo sign panel on the Food and/or Gas Specific Service signs may use the bottom portion of the business logo sign panel to display the word OASIS."

Ramp/Interchange Signing: Option 2. "If Specific Services signs containing the OASIS legend as a part of the business logo(s) are not used on the ramp and if the Interstate Oasis is not clearly visible and identifiable from the exit ramp, a sign with a white INTERSTATE OASIS legend with a letter height of at least 6 inches and a white border on a blue background shall be provided on the exit ramp to indicate the direction and distance to the Interstate Oasis."

Guide Signs. "If needed, additional trailblazer guide signs shall be used along the crossroad to guide road users to an Interstate Oasis."

These signing requirements indicate that two Interstate Oasis signs will be provided along the interstate ROW in each direction of travel—or a total of four highway signs per Oasis—with one sign being on the mainline of the highway in advance of the exit where the Interstate Oasis is located, and the second sign be located at the off-ramp leading to the Oasis. In addition, guide signs may be used on cross streets/frontage roads where needed to direct travelers from the highway off-ramp to the Oasis.

Given that highway signing represents the primary incentive for private partners to participate in the Interstate Oasis Program, these regulations will have important implications for potential partners' interest in participating in the program. For example, the requirement that the partners' business name or logo cannot be used on the mainline sign would somewhat diminish the attractiveness of the opportunity. However, since travelers will be guided directly to the facility by exit/trailblazing signs and given that the partner presumably has the authority to provide additional signing onsite, advertising itself as an Interstate Oasis, this is not considered to be a major impediment to attracting partners.

The following figure (**Figure 10-1**) presents examples of Interstate Oasis signs as provided under the 2009 MUTCD.

Figure 10-1. Examples of Permissible Interstate Oasis Signs and Plaques

Other important Interstate Oasis requirements specified by the FHWA include the following:

Routes where Oases are Permitted. As the name suggests, Interstate Oases can only be established on interstate highways. Therefore, at present, Interstate Oases could not be developed on U.S. or State highways in Arizona under this program.

Multiple Operators. The Interstate Oasis Program standards indicate that, in the case where no one business at an interchange satisfies all the Oasis eligibility criteria, states can allow two or more businesses that are located at an interchange, are immediately adjacent to each other, and are mutually accessible by foot to combine to satisfy the Oasis requirements. Clearly, this will allow a greater degree of flexibility in creating Oasis partnerships. For example, an adjacent gas station and a restaurant at an interchange could collaborate to satisfy the minimum Oasis eligibility requirements.

Non-Exclusion. The Interstate Oasis Program standards insist that if a state provides or permits Interstate Oasis signing, then any facility/operator meeting the minimum criteria will be eligible for designation as an Interstate Oasis. Given that the state cannot require additional criteria for designating an operator as an Interstate Oasis, states would not be able to deny operators from being designated and signed as an Oasis, while permitting others, if all meet the Oasis requirements. However, if the Oasis Program proved popular, the provision might enable a significant number of Oases, and therefore traveler stopping opportunities, while also multiplying the state's signing obligation.

Additional State Criteria. A state cannot impose additional criteria beyond the criteria specified by the FHWA to qualify for designation as an Interstate Oasis. However, a business designated as an Interstate Oasis would be permitted to provide additional products, services, or amenities. This requirement effectively blocks the state from imposing any additional criteria/standards on Oasis partners not specified in the act, while allowing the operator to offer them. For example, a state could not require the operator to provide a landscaped lawn and picnic area as a requirement to be designated as an Interstate Oasis, because this is not one of the eligibility criteria specified under the Interstate Oasis Program. However, the Oasis partner might provide such amenities voluntarily.

Use of the Term "Interstate Oasis." The FHWA recommends that the state policies, program, and procedures developed to govern the Interstate Oasis Program should include legislation or rules to limit the use of the phrase ''Interstate Oasis'' on business premises and advertising media to only those businesses approved by the state as an Interstate Oasis. Doing so would provide a branding advantage to only those businesses designated as an Oasis, and who could use the designation in their marketing efforts. If use of the term were not limited to only those businesses designated as an Interstate Oasis, it would reduce the attractiveness of the designation both from the perspective of the traveling public's confidence in the program and private partners' ability to benefit from meeting the program's standards. Therefore, failure to restrict the term's use would reduce partner's participation in, and the public's acceptance of, the program.

Educational/Marketing Campaign. The FHWA recommends that if a state chooses to participate, it should "undertake educational and marketing efforts, in cooperation with trucking and travel industry partners as appropriate, to familiarize travelers and businesses with the program before it is implemented and during the initial period of implementation." Marketing the Oasis concept will be important for attracting both future Oasis partners and travelers to individual Oases. Since the program is new and the traveling public in Arizona is unfamiliar with the term and concept of an Interstate Oasis, the state should attempt to distribute educational information on the locations of Oases, the services provided, and company contact information for the Oasis partner. A low-cost option for doing all three would be for ADOT to develop a dedicated website, accessible by mobile devices, that provided statewide maps of Oases locations, services provided, and links to the Oasis operators' websites.

10.1.3. Program Success

Peer states providing input as part of this study expressed P3 implementation problems stemming from legal restrictions, opposition from special-interest groups, and community opposition to pursue such partnerships. Based on input provided from peer states and additional desktop research, only one state (Idaho) was found to have successfully deployed the use of the Interstate Oasis Program.

According to the Idaho Transportation Department's (ITD) website, the agenda packet for the July 21, 2021, District 5 Tour and Regular Meeting of the Idaho Transportation Board shows five active public-private partnerships along I-84, US 95, and I-15B. [56] The first ITD Oasis partnership was implemented in 2006 with Flying J Corp., where ITD provided $328,000 and signing along I-15B for a new Flying J facility in McCammon. In return, Flying J agreed to provide 24-hour access to restrooms for free that were built and maintained to meet ITD standards.

The ITD's Oasis partnerships were implemented following the initial success observed with UDOT's implementation of four rest area public-private partnerships. However, in the completed questionnaire

[56] https://itd.idaho.gov/wp-content/uploads/2021/07/July2021_BoardPacket.pdf

UDOT provided for this study, it noted that it has since cancelled those P3s and is not currently pursuing any new ones.

In 2018, South Dakota Department of Transportation (SDDOT) requested information regarding the existence of Interstate Oasis signing in other states, as posted on the AASHTO website. The inquiry found that only Idaho has installed Interstate Oasis Signs. [57]

10.2. New Rest Area Partnerships

Another goal of this study is to identify new potential funding sources, as well as document potential P3 opportunities that could provide expanded rest area services while reducing annual operational and maintenance costs. This section describes the following three key funding and P3 opportunities identified for this study:

- ASO Public-Private Partnerships (Interstate Oasis)
- Public-Private Partnerships on Publicly Owned Land
- Sponsorships

10.2.1. Potential ASO Partnerships

The latest Infrastructure Investment and Jobs Act (Public Law 117-58), approved November 15, 2021, did not alter the existing 1956 restriction on commercial activity within interstate rest areas. [58] Opposition for removing this commercial ban from special-interest groups further reinforces the need to explore P3s outside of ADOT's interstate ROW.

In reviewing the success of other states' rest area P3s, this study found that the success of those partnerships generally stemmed from coordination with private commercial owners and DOTs to identify planned private facilities for construction. Existing private facilities would likely require extensive reconstruction and capital investment to meet the FHWA Interstate Oasis Program requirements, or to meet ADOT's engineering standards. Therefore, this study recommends early coordination with U.S. fuel retailers to identify planned facilities along ADOT highways that may require expanded rest area services.

However, existing ASOs also provide the potential for P3s near existing rest areas that might provide additional rest area services where parking demand at nearby rest areas is forecast to exceed existing capacity in the future. The potential partners identified are within a 20-mile radius from each rest area. **Appendix E** summarizes the potential private partners based primarily on the criteria specified under the federal Interstate Oasis Program.

10.2.2. Partnerships on Publicly Owned Land

This partnership arrangement consists of ADOT owning and controlling the land outside the interstate ROW and a private operator would lease and share responsibility for developing, operating, and

[57] https://traffic.transportation.org/wp-content/uploads/sites/26/2019/10/Interstate-Oasis-Signing-Inquiry.pdf

[58] https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf

maintaining the facility. Since the land would not be located within the interstate ROW, the private partner would be able to operate commercial services onsite, such as food/beverage, retail, fuel, EV charging, and other needed commercial services. ADOT could set the terms and conditions of the lease and review the private entity's facility design and operation standards to align with the Department's standards.

In this P3 model, the benefits to the private partner would include not having to purchase property, avoiding purchasing highway signage, and other financial benefits that the state might provide, such as a property tax exemption or favorable lease terms, low or no lease fees, or a long-term contract. However, the private partner would sacrifice long-term control of the land through ownership and would in most cases need to make some amount of financial contribution to development, operation, and maintenance of the facility. In this partnership model, ADOT would reduce the cost to design and construct a new rest area, reduce annual rest area maintenance costs, and receive income in the form of lease payments from the private operator.

This model also would require ADOT to acquire new land at locations outside the interstate ROW to initiate and develop this type of P3. The acquisition of new lands would be a more costly and complicated partnership arrangement compared to developing Interstate Oasis partnerships where a private partner owns/controls the land. However, this P3 model may provide more incentive and favorable terms to private operators than the traditional Interstate Oasis Program. For this P3 model, it is recommended that ADOT coordinate with U.S. fuel retailers to identify ideal locations for implementing and constructing a new facility.

10.2.3. Sponsorships

Since the current federal restrictions still limit commercial activity within the interstate ROW, this study examined potential sponsorships at existing rest areas that could help to reduce the annual operating and maintenance costs, while also providing expanded services. A P3 model for sponsorship at existing rest areas should follow the existing "Safe Phone Zone" partnership between ADOT and Geico. These sponsorships provide new, non-toll and non-tax revenue to ADOT that can offset the operation and maintenance costs associated with rest areas. Similarly, TxDOT noted that it used a similar model to provide wireless internet to rest areas through a partnership with Geico. This study recommends ADOT explore sponsorship opportunities such as providing sponsorship signing in return for compensation or rest areas services such as wireless internet. Per the FHWA, "the most common ways for highway agencies to recognize the support provided by sponsors is through acknowledgment signs. However, there are a number of other options to recognize sponsors, including acknowledgment on in-vehicle transponders, service patrol vehicles, maintenance vehicles, outreach and educational materials, and Internet Web sites, as well as within telephone messages such as those of 511 systems." [59]

[59] https://www.fhwa.dot.gov/legsregs/directives/orders/51601a.cfm

The sponsorship policies and regulations should adhere to the following principles:

- Sponsorship agreements can allow sponsors to provide products, services, or monetary contributions.
- Sponsorship agreements may be of any duration. However, these agreements should:
  - Be economically viable and provide a net benefit to the public
  - Include provisions for maintenance and removal of physical elements of the sponsorship acknowledgment after the agreement expires or the sponsor withdraws
- Agreements can be applicable to a highway site, a highway corridor, or a specific highway operation. If a sponsor is making a monetary contribution, the recipient agency needs to identify specific highway sites, corridors, or operations supported by the monetary contribution in the sponsorship agreement.
- If federal-aid funds were used within the corridor or facility for which sponsored services are being provided, then monetary contributions received as a part of sponsorship agreements must be spent for highway purposes.
- All sponsorship agreements involving the interstate highway system should be approved by the FHWA Division Administrator.

In addition, FHWA policy states, “For sponsorship of rest areas, one acknowledgment sign for each direction of travel may be installed on the highway mainline. Additional acknowledgment signs may be placed within the rest area, provided that these sign legends are not visible to highway mainline traffic and do not pose safety risks to rest area users. In accordance with the provisions of the MUTCD, the acknowledgment signs must not be appended to any other sign, sign assembly, or other traffic control device. In accordance with Section 2H.08 of the MUTCD, rest area acknowledgment signs on the highway mainline should not be located within 500 feet of other traffic control devices.” Use of a company or brand logo on signs along highway mainlines for new sponsorships will likely be prohibited by FHWA, and companies may find little value in having sponsorship acknowledgments limited to only lettering on these signs.

ADOT also could explore revisiting existing lease agreements with cellular providers that have existing cell towers on ADOT ROW. These leasing fees could be reduced or eliminated in turn for providing wireless internet.

11. Evaluation Criteria

This section discusses the approach, framework, and scoring criteria used to prioritize rest area expansion, rehabilitation assessments, and modernization improvements for each planning horizon (short-, mid-, and long-term) through 2042.

11.1. Methodology

Data collected and forecasts developed as part of this study were analyzed to make prioritized recommendations (both short-, mid-, and long-term). As part of this analysis, evaluation tools were developed to document characteristics associated with rest areas and identify their potential needs using scores and weighted criteria to objectively compare rest areas. Prioritized rest area improvements for preservation, expansion, or modernization were identified based on a set of data categories that include the following:

- Forecasted deficiencies
- Availability of ASOs
- Nearby rest areas
- Proximity to urban areas
- Truck parking characteristics
- Completed and programmed improvements
- Years since previous improvements
- Anticipated water demand
- Peer state and industry best practices

Close coordination with the PMT and stakeholders was conducted to refine the following evaluation criteria and scoring. The following sections describe in further detail the criteria used to rank and prioritize improvements for each improvement category.

11.1.1. Rest Area Preservation/Rehabilitation

Preservation needs were evaluated based on existing rest area conditions, as well as their ability to continue functioning at an acceptable level for the traveling public through year 2042. Since the 2011 Study, all short-term recommended rehabilitation and preservation projects have been completed. **Table 12-1** summarizes all improvements made since 2011.

Facilities Management and TSMO provided the expected life cycle of mechanical, structural, electrical, and water and wastewater elements. In general, facilities located underground (water lines, conduit, and others) are expected to have a life cycle of approximately 30 years, while facilities located above ground (structures, electrical components, and others) are expected to have a life cycle of approximately 15 years. This information was used to project when each site would require a detailed assessment of its facilities for potential rehabilitation, based on the number of years since the previous improvements occurred. Water capacity deficiencies were calculated based on allowable pump capacity, projected water usage, and peak hour capture rates. Lastly, the years since previous improvements at each rest area were evaluated to identify in which year each rest area is expected to require a detailed facility assessment. The results of each input were compared to identify a list of prioritized locations for assessment through year 2042.

11.1.2. Expansion

As part of evaluating future conditions and deficiencies, forecasts for each planning period (5, 10, and 20 years) were developed to identify potential restroom and parking deficiencies at ADOT's managed rest areas. Because many of the rest areas were projected to have some deficiency by 2042, scoring and weighted criteria were developed to prioritize parking or restroom expansions by short-, mid-, and long-term needs.

Some rest areas do not contain any existing truck parking spaces and were not included in the truck parking expansion portion of the analysis. In addition, some of the associated traffic data needed to forecast parking needs (for instance, capture rates) were not available for certain rest areas. Therefore, the following rest areas were not evaluated for parking expansion at this time:

- Parks
- Christensen
- Mazatzal
- Salt River Canyon
- Hassayampa

11.1.2.1. Tier 1 Evaluation – Forecasted Deficiencies

Because this study is expected to be updated every 10 years (next update is anticipated in 2032) and to ensure rest areas maintain flexibility as changes in the transportation landscape occur, forecasted deficiencies through 2032 were used to prioritize expansion needs. Furthermore, truck parking needs will be further evaluated as part of the planned Truck Parking Study in future years. Of those rest areas in which forecasts were developed, all but four sites (Sentinel Westbound, Sunset Point, Canoa Ranch Eastbound, and Canoa Ranch Westbound) had either car or truck parking deficiencies by 2032. A summary of the car and truck parking deficiencies at each rest area in 2032 is summarized in Section 13.1.

11.1.2.2. Tier 2 Evaluation – Rest Area Prioritization

Since most rest areas are expected to require additional parking, scoring criteria were developed to determine which sites should be prioritized first. Data categories included in this evaluation are as follows:

- Forecasted parking deficiencies in 2032
- Locations with documented undesignated truck parking
- Availability of private truck parking nearby
- Proximity to urbanized areas

Using logical assessment of existing conditions and statistical analysis, the following scoring ranges were applied to each category, as summarized in **Table 11-1**.

Table 11-1. Rest Area Prioritized Parking Expansion Scoring and Criteria

Evaluation Category	Description	Scoring Criteria	Weight Applied
Truck Parking Deficiencies (2032)	The number of deficient truck parking spaces at each rest area in 2032	-80 to -61 = 4 -60 to -41 = 3 -41 to- 21 = 2 -20 to -1 = 1 > 0 = 0	1.0
Undesignated Truck Parking at/near Rest Areas	Rest areas within 20 miles of a documented top 15 undesignated truck parking location (*Source: 2019 Arizona Truck Parking Study*)	At Rest Area = 2 Within 20 Miles = 1 No = 0	1.5
Truck Parking at Nearby Private Facilities	The number of available parking spaces at private facilities within 30 miles of each rest area (must be within 2 miles of an interchange)	0 to 51 = 0 51 to 220 = -1 221 to 440 = -2 441 to 660 = -3 661 to 700 = -4	1.25
Distance to Urbanized Areas (in miles)	The distance from the rest area to urbanized areas (population >50,000) *(Source: 2010 U.S. Census Bureau)*	1 to 30 = 2 31 to 60 = 1 61 to 90 = 0	0.5

The weighting applied to each category was developed to counteract the limitations and constraints of AASHTO's forecast model. Specifically, the forecast does not account for overnight parking or nearby private parking locations. Therefore, these categories were weighted higher as compared to the forecasted deficiencies. In addition, the proximity to urbanized areas can affect the demand at rest areas as many commercial drivers will queue at these rest areas prior to morning and evening deliveries within the urban areas. However, the proximity to urbanized areas is only a small contributing factor in comparison to the overall system use.

11.1.2.3. Tier 3 Evaluation – Expansion Feasibility

For rest areas with parking deficiencies in 2032, recommendations were made based on the most reasonable and feasible method to accommodate parking at each site. Specifically, each site was evaluated for the following abilities:

- Expand parking within the existing ROW without interruptions to the existing ramps and facilities
- Expand parking within the existing ROW by using minor ramp realignments as needed
- Expand parking by using overflow parking lots within the existing ROW or on adjacent land where feasible (**Figure 11-1**)
- Expand parking by relocating ramps and ramp gores within the existing ROW
- Expand parking by extending the existing ROW and relocating ramps and gores
- Expand parking by extending the existing ROW and using an overflow parking lots

- Identify nearby safe parking locations within existing nearby interchanges ROW
- Identify nearby ASOs for potential P3s

Figure 11-1. Truck Parking Overflow Lot Example (Meteor Crater – WB)

Since some of these existing sites would require major relocation of the existing ramps and gores to accommodate more truck parking spaces, overflow parking lots like those implemented at Meteor Crater also were evaluated for feasibility. In addition, if the adjacent land use surrounding the rest area was not suitable for expansion and development, then offsite, safe parking only locations were identified. Lastly, if no suitable location was identified within proximity to the rest area for a safe parking only location, then it was recommended ADOT engage with private facility owners for potential P3s. The results and analysis of expansion opportunities is documented in further detail in Section 13.3.

11.1.3. Modernization

Opportunities to modernize or expand services at each rest area to meet existing and future travelers' needs also was evaluated as part of this study. Each rest area was first evaluated based on nearby services (ASOs), distance to urban areas, distance to adjacent rest areas, and their anticipated usage in year 2042. Combined, these categories provide insight into the expected demand for services and amenities at each rest area over the next 20 years. The categories described and their associated scoring and weighting criteria are summarized in **Table 11-2**.

Table 11-2. Rest Area Usage and Nearby Services Scoring and Criteria

Evaluation Category	Subcategory	Description	Scoring Criteria	Weight Applied
Usage	Annual Usage Projection (2042)	Forecasted Total Annual Users in 2042	260K to 640K= 1 641K to 1M = 2 1.1M to 1.4M = 3 1.41M to 1.75M = 4	2.0
Nearby Services	Distance to Urban Areas	Distance to Urban Areas (miles)	1 to 30 = 1 31 to 60 = 2 61 to 90 = 3	0.5
	Distance to ASOs	Distance to Nearest ASO (miles)	1 to 15 = 1 16 to 30 = 2 31 to 60 = 3	1.25
	Distance to Adjacent Rest Areas	Distance to Nearest Rest Area (miles)	1 to 60 = 1 61 to 120 = 2 121 to 180 = 3	1.5

A statistical analysis of the resulting scores from the usage and nearby services evaluation then was used to determine the short-, mid-, and long-term implementation periods for each rest area. These implementation periods are used to represent the planning period in which these expanded services and amenities are recommended for implementation. The results from the rest area demand evaluation are summarized in detail in Section 14.1.

The expanded services and amenities also were evaluated based on (1) their ability to improve safety, (2) their ability to improve sustainability, (3) if they are documented peer state and industry best practices, and (4) their feasibility to be implemented. **Table 11-3** summarizes the evaluation categories and scoring criteria used to prioritize each improvement.

Table 11-3. Expanded Services and Amenities Evaluation Criteria

Evaluation Category	Subcategory	Description	Scoring Criteria	Weight Applied
Safety	Increased Visibility (Buildings and Parking Areas)	Does this improvement improve visibility in and around the rest area?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	2.0
	Potential to Reduce Crashes	Does this improvement help to reduce crashes or incidents at or around rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	
	Increased Access to Emergency Services	Does this improvement provide increased access to emergency services at rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	
	Potential to Deter Criminal Activity	Does this improvement have the potential to deter criminal activity at rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	
	Potential to Reduce Driver Fatigue	Does this improvement have the potential to increase travelers' length of stay, thereby reducing driver fatigue?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	
Sustainability	Potential to Reduce Energy Use	Does this improvement have the potential to reduce energy consumption at rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	1.5
	Potential to Reduce Water Use	Does this improvement have the potential to reduce water use at rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	
	Reduced Environmental Footprint	Does this improvement have the potential to reduce the rest area's environmental footprint?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	

Evaluation Category	Subcategory	Description	Scoring Criteria	Weight Applied
Peer State and Industry Best Practice	Peer State and Industry Best Practice	Was this improvement identified as a common practice among peer states or industry wide?	Yes = 2 Somewhat = 1 No = 0	1.5
Feasibility	Available Supporting Infrastructure	Is the infrastructure required to support this improvement already present at rest areas?	Very Likely = 2 Somewhat Likely = 1 Not Likely = 0	1.75
	Cost Estimate	Is the cost estimate for this improvement considered high, medium, or low compared to other improvements?	High = -1 Medium = 0 Low = 1	
	Impacts to Existing Facilities	Would this improvement result in substantial impact to the existing facilities (buildings, wastewater)?	Very Likely = -1 Somewhat Likely = 0 Not Likely = 1	
	Environmental Impacts	Would this improvement result in significant environmental impacts?	Very Likely = -1 Somewhat Likely = 0 Not Likely = 1	

The data associated with the potential benefits or effects of implementing each improvement were limited. Therefore, a stakeholder survey also was initiated to further define and rank each improvement. The amenities and services comparison survey was distributed to this study's TAC and stakeholders in December 2022. The results of the survey and comparative analysis are summarized in detail in Section 14.2.2.

11.1.4. Planning Period Prioritization

The results from each category evaluation were compiled to identify the overall implementation strategy for each rest area. For instance, if a rest area was prioritized for parking expansion and modernization within the short-term planning period, then this study recommends completing both improvements as part of one project. Conversely, if an improvement was not identified as a short-term need, but another improvement was, then the short-term improvement should be prioritized without any other improvements. A flowchart summarizing the overall framework and evaluation criteria used for this study is presented in **Figure 11-2**.

Figure 11-2. Rest Area Prioritization and Evaluation Framework

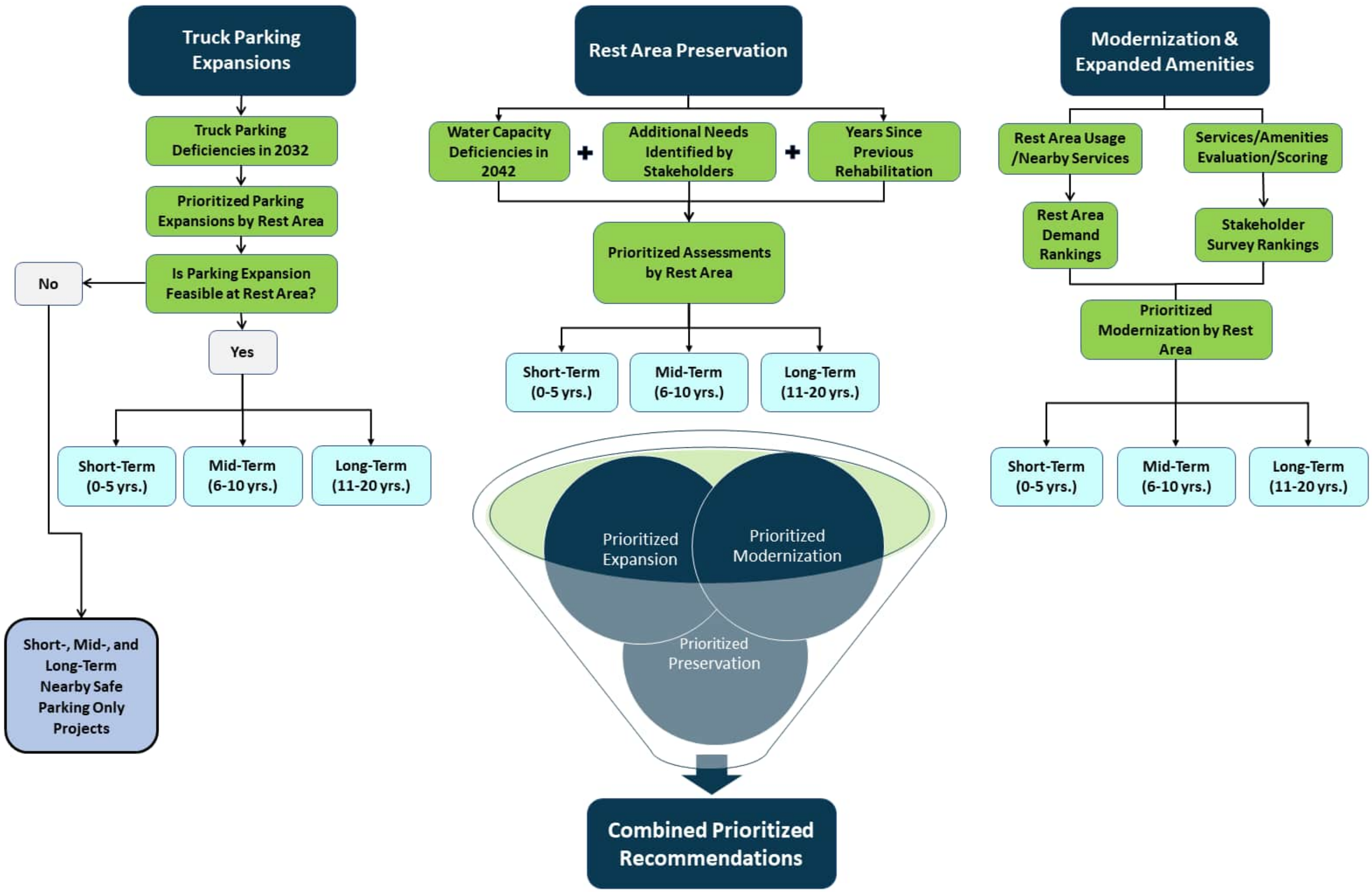


Figure 11-2. Rest Area Prioritization and Evaluation Framework

12. Rest Area Preservation/Rehabilitation

This section describes in detail the results and prioritized rehabilitation assessment needs of each rest area through 2042. As discussed previously, aboveground facilities are expected to have a life cycle of 15 years, while underground facilities are expected to have a life cycle of 30 years. These expected life cycles, combined with the timeframe since improvements were last made, were used to determine the approximate planning period when rest area facilities may require a detailed site assessment. Additionally, water usage forecasts were developed and compared to the existing water capacity to determine if rest areas have existing or future water deficiencies. The results of the preservation/rehabilitation evaluation are summarized in the following sections.

12.1. Water Capacity Deficiencies

Monthly water usage reports and groundwater well pump capacities were used in conjunction with peak hourly water demand calculations to determine if any of the rest areas using groundwater wells would experience water capacity deficiencies through 2042. Based on those calculations, no rest areas were anticipated to have water deficiencies by 2042. A summary of calculations and projected water usage are included as **Appendix F**.

12.2. Previous Improvements

A review of the most recent improvements and record drawings, combined with input from ADOT's Facilities Management and Rest Area Managers were used to determine the approximate year when rest areas may require a detailed site assessment to identify needed rehabilitations. This study began by evaluating the type of improvement made at each rest area since the previous study in 2011.

12.2.1. Completed Rehabilitations

Findings from that review revealed that major rehabilitation of 16 rest areas (or 28 sites) have occurred in the last 10 years. Rehabilitation projects generally included the following:

- Water and wastewater system enhancements
- Structural, mechanical, and electrical rehabilitations
- Pavement rehabilitations
- ADA improvements
- Restroom expansions and renovations
- Truck parking expansions

The description of work and funding for rest area improvements were provided by the ADOT Facilities Management team and are documented in ADOT's previous and current *Five-Year Transportation Facilities Construction Programs*. **Table 12-1** summarizes the improvements made at each rest area since 2011. **Table 12-2** summarizes the programmed improvements over the next 5 years, while **Table** 12-3 summarizes the unfunded planned improvements identified by Facilities Management.

Table 12-1. Completed Rest Area Improvements (2011 to 2022)

Rest Area(s)	Description of Work	Funding Amount	Date Completed
Sunset Point	Drill new well; water system communication; ramada structural rehabilitation	$3,495,000	October 2013
Bouse Wash	Replace water/booster pumps (and related work); replace wastewater pond liners; ADA compliance; site paving; water system communication; structural, mechanical, and electrical rehabilitation	$1,485,000	August 2013
McGuireville **Hassayampa**	McGuireville: Drill new well; replace water/booster pumps (and related work); paint water storage reservoir; sanitary sewer system modifications; ADA compliance; water system communication; structural rehabilitation Hassayampa: Septic tank and leach line cleaning; parking lot rehabilitation	$1,400,000	McGuireville: October 2013 Hassayampa: October 2013
Salt River Canyon	Replace water/booster pumps (and related work); paint water storage reservoir; replace composting toilets; ADA compliance; site paving; structural rehabilitation	$1,290,000	October 2014
Burnt Well **Ehrenberg**	Burnt Well and Ehrenberg: Replace water/booster pumps (and related work); replace septic tanks and leach fields; ADA compliance; site paving; paint water storage reservoir; water system communication; structural, mechanical, and electrical rehabilitation	$3,700,000	Burnt Well: October 2014 Ehrenberg: April 2015
San Simon	Drill new well; replace water/booster pumps (and related work); replace septic tanks and leach field; paint water storage reservoir; site paving; ADA compliance; water system communications; structural, mechanical, and electrical rehabilitation	$3,000,000	May 2016
Texas Canyon	Replace water/booster pumps (and related work); replace wastewater pond liners; replace septic tanks; replace water pipeline; paint water storage reservoir; ADA compliance; site paving; water system communication; structural, mechanical, and electrical rehabilitation	$4,795,000	June 2016

Rest Area(s)	Description of Work	Funding Amount	Date Completed
Mohawk	Replace water/booster pumps (and related work); replace septic tanks; replace water pipeline; rehabilitate water pump building; replace water storage reservoir; ADA compliance; site paving; water system communication; structural, mechanical, and electrical rehabilitation	$4,200,000	July 2017
Sacaton **Canoa Ranch**	Sacaton: Replace water pipeline; replace septic tanks and leach fields; abandon old well; structural, mechanical, and electrical rehabilitation Canoa Ranch: Replace water pumps; install new water line; replace septic tanks and leach fields; replace water pipeline; paint water storage reservoir; water system communications; structural, mechanical, and electrical rehabilitation	$3,520,000	Sacaton: November 2018 Canoa Ranch: May 2019
Haviland	Replace water/booster pumps (and related work); paint water storage reservoir; replace septic tanks; ADA compliance; truck parking expansion and site paving; structural, mechanical, and electrical rehabilitation	Phase1 &2: $4,299,370 Truck Parking Expansion: $4,383,054	Phase 1 (construction): July 2019 Phase 2 (landscape establishment): December 2019 Truck Parking Expansion: June 2020
Painted Cliffs **Meteor Crater**	Painted Cliffs: Replace water pumps, septic tanks, and leach fields; water system communication; site work; structural, mechanical and electrical rehabilitation Meteor Crater: Replace water pumps; evaporation pond liners; paint water storage reservoir; water system communication; site work; truck parking expansion; structural, mechanical, and electrical rehabilitation	$3,775,000	Painted Cliffs: September 2020 Meteor Crater: October 2021
Bouse Wash	Relocate septic tanks (and related work); rehabilitate well for higher water production; paint water storage reservoir; truck parking expansion; ADA compliance; restroom/residence renovation; structural, mechanical, and electrical rehabilitation	$4,375,000	June 2022
Sentinel	Rehabilitate well; new pump house (and related work); replace septic tanks and leach fields; new water storage reservoir; truck parking expansion; ADA compliance; site work; structural, mechanical, and electrical rehabilitation	$7,125,000	December 2022

Table 12-2. Programmed Rest Area Improvements—FY 2023 to 2027

Rest Area (s)	Description of Work	Funding Amount	Expected Completion
Sunset Point	Rehabilitate old restroom building; residence renovation; replace aerators, power, and related controls for the ponds; ADA compliance; demolition of old pump house interior (and related work); truck parking expansion; site work; structural, mechanical, and electrical rehabilitation	$6,400,000	Currently under construction. Expected Completion June 2023
McGuireville	Rehabilitate existing lift station and controls; install power and related controls for the evaporation ponds; residence renovation; ADA compliance; mechanical upgrade for residence and restroom building; site painting and seal buildings; site work; truck parking expansion; structural, mechanical, and electrical rehabilitation	$6,500,000	February 2024

Table 12-3. Unfunded Planned Improvements

Rest Area (s)	Description of Work	Estimated Costs	Anticipated Year of Construction
Hassayampa	Structural, mechanical, and electrical rehabilitation, site paving, and ADA improvements.	$4,500,000	To be determined

The three rest areas with no improvement made since 2011 (Parks, Christensen, and Mazatzal) have been closed since the previous study. Parks and Christensen are located near an urbanized area (Flagstaff) along I-40 and I-17, respectively. These locations have limited ASOs and rest areas nearby and a documented demand for truck parking. Although these sites were opened to truck parking only during the pandemic, the Parks and Christensen Rest Areas are recommended to be converted to permanent truck parking only sites within the short-term planning horizon.

Input from ADOT's TSMO and Facilities Management staff provided cost-effective solutions to convert these sites to permanent truck parking only locations to ensure demand at these sites is met and ADOT maintains the locations for future use. Solutions proposed include the following:

- Removal of existing restroom buildings
- Installation of vaulted toilets (water and wastewater facilities not required)
- Minor rehabilitation of existing ramadas
- Pavement rehabilitation (as needed)
- Installation of high-mast lighting (existing power onsite)
- Formalized signage designations (Truck Parking Only Rest Areas)

The Hassayampa Rest Area was improved in 2013, but only included water system repair and parking lot rehabilitation. Facilities Management also noted that this site requires ADA compliance improvements. Therefore, this location is recommended as a short-term priority for structural, mechanical, and electrical rehabilitation, as well as ADA and site paving improvements.

12.2.2. Projected Year of Needed Site Assessment

Based on input from Facilities Management regarding the life cycle of rest area facilities, an analysis was conducted to determine when each facility type may require a detailed assessment of its facilities for potential rehabilitation. The years since previous improvements were calculated and subtracted from the expected life cycle timeframe. That calculation provided the number of years until each facility type (aboveground and belowground) may require detailed facility assessments. Aboveground facilities were assumed generally to include ramadas, restroom building and fixtures, electrical, well pump houses, caretaker's residences, pavement, and sidewalks. Belowground facilities were assumed generally to include water and wastewater facilities (septic tanks, leech field, pipes). **Table 12-4** summarizes the projected year of needed assessments for aboveground and belowground facilities at each rest area.

Table 12-4. Projected Year of Needed Facility Assessment

Priority Rank	Rest Area	Route	Traffic Direction Served	Forecasted Annual Users in 2042	Above Ground Facilities[a]				Below Ground Facilities[b]			
					Years Since Last Aboveground Facility Improvements	Number of Years Until Needed Assessment (aboveground facilities)	Anticipated Assessment Year	Anticipated Assessment Planning Period	Years Since Last Belowground Facility Improvements	Number of Years Until Needed Assessment (belowground facilities)	Anticipated Assessment Year	Anticipated Assessment Planning Period
1	Hassayampa	US 60	Both	--[c]	9	6	2028	Mid-term	9	21	2043	Long-term
2	Salt River Canyon	US 60	Both	--[c]	8	7	2029	Mid-term	8	22	2044	Long-term
3	Ehrenberg	I-10	EB	1,227,525	7	8	2030	Mid-term	7	23	2045	Long-term
4	Ehrenberg	I-10	WB	732,369	7	8	2030	Mid-term	7	23	2045	Long-term
5	Burnt Well	I-10	EB	1,730,908	6	9	2031	Mid-term	6	24	2046	Long-term
6	Burnt Well	I-10	WB	1,440,870	6	9	2031	Mid-term	6	24	2046	Long-term
7	Texas Canyon	I-10	EB	889,674	6	9	2031	Mid-term	6	24	2046	Long-term
8	Texas Canyon	I-10	WB	873,148	6	9	2031	Mid-term	6	24	2046	Long-term
9	San Simon	I-10	EB	636,317	6	9	2031	Mid-term	6	24	2046	Long-term
10	San Simon	I-10	WB	595,558	6	9	2031	Mid-term	6	24	2046	Long-term
11	Mohawk	I-8	WB	504,340	5	10	2032	Mid-term	5	25	2047	Long-term
12	Mohawk	I-8	EB	371,013	5	10	2032	Mid-term	5	25	2047	Long-term
13	Sacaton	I-10	WB	1,198,371	4	11	2033	Long-term	4	26	2048	Long-term
14	Sacaton	I-10	EB	1,194,337	4	11	2033	Long-term	4	26	2048	Long-term
15	Canoa Ranch	I-19	NB	483,850	3	12	2034	Long-term	3	27	2049	Long-term
16	Canoa Ranch	I-19	SB	422,646	3	12	2034	Long-term	3	27	2049	Long-term
17	Haviland	I-40	EB	430,600	3	12	2034	Long-term	3	27	2049	Long-term
18	Haviland	I-40	WB	416,338	3	12	2034	Long-term	3	27	2049	Long-term
19	Painted Cliffs	I-40	Both	820,358	2	13	2035	Long-term	2	28	2050	Long-term
20	Meteor Crater	I-40	WB	835,983	1	14	2036	Long-term	1	29	2051	Long-term
21	Meteor Crater	I-40	EB	834,938	1	14	2036	Long-term	1	29	2051	Long-term
22	Bouse Wash	I-10	EB	1,090,157	0	15	2037	Long-term	0	30	2052	Long-term
23	Bouse Wash	I-10	WB	940,117	0	15	2037	Long-term	0	30	2052	Long-term
24	Sunset Point[d]	I-17	Both	1,360,114	0	15	2037	Long-term	0	30	2052	Long-term
25	Sentinel	I-8	EB	551,596	0	15	2037	Long-term	0	30	2052	Long-term
26	Sentinel	I-8	WB	268,145	0	15	2037	Long-term	0	30	2052	Long-term
27	McGuireville	I-17	SB	708,418	-1	16	2038	Long-term	-1	31	2053	Long-term
28	McGuireville	I-17	NB	605,261	-1	16	2038	Long-term	-1	31	2053	Long-term

[a] Aboveground facilities are assumed generally to include ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residences, pavement, and sidewalks.
[b] Belowground facilities are assumed generally to include water and wastewater facilities (septic tanks, leech field, pipes).
[c] No data available based on lack of capture rates.
[d] Rest area under construction as of December 2022.

12.3. Prioritized Preservation/Rehabilitation Assessments

The analysis of existing conditions, years since completed improvements, planned improvements, and input from ADOT staff were used to identify a prioritized list of needed assessments for potential rehabilitation at each rest area. **Table 12-5** summarizes this study's prioritized recommendations for assessments and/or improvements through 2042.

Table 12-5. Prioritized Recommendations of Assessments/Improvements

Priority Rank	Rest Area	Route	Travel Direction Served	Recommended Assessment and/or Improvements
Short-Term (0-5 Years) Prioritized Recommendations				
1	Parks	I-40	EB & WB	Conversion to permanent truck parking only facility (includes removal of existing restroom buildings, rehabilitation of ramadas and pavement, installation of vaulted/composting toilets, high-mast lighting, and signage).
2	Christensen	I-17	EB & WB	Conversion to permanent truck parking only facility (includes removal of existing restroom buildings, rehabilitation of ramadas and pavement, installation of vaulted/composting toilets, high-mast lighting, and signage).
3	Hassayampa	US 60	Both	Structural, mechanical, and electrical assessments; site paving; ADA improvements.
Mid-Term (6-10 Years) Prioritized Recommendations				
4	Salt River Canyon	US 60	Both	Structural assessment; replace composting toilets; site paving.
5	Ehrenberg	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
6	Ehrenberg	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
7	Burnt Well	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
8	Burnt Well	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks

Priority Rank	Rest Area	Route	Travel Direction Served	Recommended Assessment and/or Improvements
9	Texas Canyon	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
10	Texas Canyon	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
11	San Simon	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
12	San Simon	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
13	Mohawk	I-8	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
14	Mohawk	I-8	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
Long-Term (11-20 Years) Prioritized Recommendations				
15	Sacaton	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
16	Sacaton	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
17	Canoa Ranch	I-19	NB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
18	Canoa Ranch	I-19	SB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
19	Haviland	I-40	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
20	Haviland	I-40	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks

Priority Rank	Rest Area	Route	Travel Direction Served	Recommended Assessment and/or Improvements
21	Painted Cliffs	I-40	Both	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
22	Meteor Crater	I-40	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
23	Meteor Crater	I-40	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
24	Bouse Wash	I-10	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
25	Bouse Wash	I-10	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
26	Sunset Point	I-17	Both	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
27	Sentinel	I-8	EB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks
28	Sentinel	I-8	WB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
29	McGuireville	I-17	SB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, pavement, and sidewalks
30	McGuireville	I-17	NB	Assessment of ramadas, restroom building and fixtures, electrical, well pump house, caretaker's residence, pavement, and sidewalks

13. Rest Area Expansion

As mentioned previously, all but four rest area sites have been forecasted to have either truck or car parking deficiencies by 2042. Therefore, an evaluation and scoring criteria to help determine the prioritization order of parking expansion projects was developed. In addition, each site recommended for parking expansion was evaluated to determine if parking expansion is at the existing rest area. The following sections summarize the results of the parking expansion evaluation.

13.1. Truck and Car Parking Deficiencies

The forecast model developed by AASHTO was used to project the anticipated number of parking spaces at each rest area through 2042. The complete result of that forecast is documented in Section 6.4.1.

Similar to the changes experienced between the previous study (in 2011) and this study, such as changes in commercial driving hour requirements and advancements in transportation technologies, this study acknowledges the potential for further changes in the transportation industry over the next 20 years. Therefore, to anticipate potential changes and ensure ADOT's rest areas remain agile to changing conditions, this study based any potential parking expansions on forecasts through 2032. Furthermore, this study is anticipated to be updated every 10 years, allowing for any potential changes in traffic patterns, technology advancements, economic development patterns, and commercial driving requirements to be captured as part of that update. Although this study identified deficiencies through 2042, this study recommends re-evaluating any potential deficiencies again in 10 years. **Table 13-1** summarizes the forecasted parking deficiencies at rest areas in 2032.

Table 13-1. Forecasted Parking Deficiencies at Rest Areas in 2032

Rest Area	Route	Traffic Direction Served	Parking: Excess/Deficiencies in 2032	
			Cars[a]	Trucks[b]
Mohawk	I-8	EB	+3	-10
Mohawk	I-8	WB	-6	-6
Sentinel	I-8	EB	-6	-9
Sentinel	I-8	WB	+11	+4
Ehrenberg	I-10	EB	-19	-38
Ehrenberg	I-10	WB	-2	-17
Bouse Wash	I-10	EB	+2	-27
Bouse Wash	I-10	WB	-2	-21
Burnt Well	I-10	EB	-52	-56
Burnt Well	I-10	WB	-12	-18
Sacaton	I-10	EB	+20	-13
Sacaton	I-10	WB	+6	-10

Rest Area	Route	Traffic Direction Served	Parking: Excess/Deficiencies in 2032	
			Cars[a]	Trucks[b]
Texas Canyon	I-10	EB	-8	-62
Texas Canyon	I-10	WB	-4	-72
San Simon	I-10	EB	+0	-38
San Simon	I-10	WB	+14	-42
Haviland	I-40	EB	+13	-31
Haviland	I-40	WB	+9	-27
Parks[d]	I-40	EB	--[e]	--[e]
Parks[d]	I-40	WB	--[e]	--[e]
Meteor Crater	I-40	EB	-6	-31
Meteor Crater	I-40	WB	-3	-33
Painted Cliffs	I-40	Both	+3	-18
McGuireville	I-17	NB	+20	-6
McGuireville	I-17	SB	+17	-16
Sunset Point[c]	I-17	Both	+13	-2
Christensen[d]	I-17	NB	--[e]	--[e]
Christensen[d]	I-17	SB	--[e]	--[e]
Canoa Ranch	I-19	NB	+9	+9
Canoa Ranch	I-19	SB	+23	+10

[a] FHWA vehicles C1-C3 and C5-C7 (includes motorcycles, passenger cars, two axle vehicles, and single-unit vehicles)
[b] FHWA vehicles C4 and C8-C-13 (includes buses, four or more axle vehicles, and single and multi-trailer vehicles)
[c] Rest area under construction, but temporarily open to truck parking
[d] Rest area permanently closed, but temporarily open to truck parking
[e] No data available
Notes:
+ = Number of excess parking spaces
- = Number of deficient parking spaces

13.2. Prioritized Parking Needs

13.2.1. AASHTO's Parking Forecast Constraints

In 2018, the U.S. Department of Transportation Federal Motor Carrier Safety Administration entered into the full compliance phase of the mandated HOS regulations for commercial vehicle operators. AASHTO's parking forecast formula for rest areas was published in 2001 and has not been updated since that time. Therefore, the formula is limited in its ability to account for changes in truck parking demand since it was first published. Specifically, AASHTO's formula does not account for nearby private parking facilities, nor does it account for site-specific parking patterns at each rest area or changes in commercial driver's mandatory rest periods and driving hour restrictions. For instance, the formula anticipates that the commercial drivers would only remain at rest areas for 20 minutes per stop. However, commercial drivers are required to take a 30-minute break when they have driven for

8 consecutive hours. Furthermore, drivers are required to take a 10 consecutive hour off-duty break after 14 consecutive hours of driving, at which a minimum of 8 hours must be in their sleeper berth, if using one.[60] Although, this study did adjust the formula to account for the required 30-minute break, many commercial drivers park overnight at rest areas to sleep or meet early morning deliveries at nearby locations.

13.2.2. Truck Parking Expansion Prioritization

To account for the limitations in AASHTO's formula and to ensure all characteristics related to truck parking demand are captured, scoring and weighting criteria were developed to help identify the recommended planning period for rest area expansion projects. As summarized in Section 11.1.2, the categories included in the scoring criteria were (1) forecasted parking deficiencies in 2032, (2) locations with documented undesignated truck parking, (3) availability of private truck parking nearby, and (4) rest area proximity to urbanized areas. In addition, a heavier weight was applied to undesignated parking locations and nearby private parking to counteract the formula's limitations. **Table 13-2** summarizes the results of the scoring and weighted criteria applied.

[60] https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations#:~:text=Drivers%20must%20take%20a%2030,combination%20of%20these%20taken%20consecutively

Table 13-2. Truck Parking Expansion Prioritization Results

Priority Rank	Weighting Criteria Truck Parking Deficiency At Rest Areas = 1.0 Undesignated Parking At/Near Rest Areas = 1.5 Available Truck Parking At Private Facilities =1.25 Distance From Rest Areas to Urban Areas = 0.5			Truck Parking Deficiencies (2032)			Undesignated Truck Parking at/near Rest Areas			Truck Parking at Nearby Private Facilities			Distance to Urbanized Area (Miles)			Total Raw Score	Total Weighted Score
				Description The Number of Deficient Truck Parking Spaces at Each Rest Area in 2032	Scoring Criteria -80 to -61 =4 -60 to -41 = 3 -41 to- 21 = 2 -20 to -1= 1 > 0 = 0	Weight Applied 100%	Description Documented Top 15 Undesignated Truck Parking Location (At or Within 20 Miles of Rest Area)[a]	Scoring Criteria At Rest Area = 2 Nearby (within 20 miles) = 1 No = 0	Weight Applied 150%	Description The Number of Available Parking Spaces at Private Facilities within 30 Miles of Each Rest Area (Must Be within 2 Miles of an Intersection)	Scoring Criteria 0 to 51 =0 51 to 220 = -1 221 to 440 = -2 441 to 660 = -3 661 to 700 = -4	Weight Applied 125%	Description The Distance from Existing Rest Areas to Urbanized Areas (Population >50,000)[b]	Scoring Criteria 1 to 30 = 2 31 to 60 = 1 61 to 90 = 0	Weight Applied 50%		
	Rest Area	Corridor	Direction Served	Spaces	Raw Score	Weighted Score	Undesignated Truck Parking	Raw Score	Weighted Score	Spaces	Raw Score	Weighted Score	Distance	Raw Score	Weighted Score		
1	Texas Canyon	I-10	WB	-72.4	4	4	Yes	2	3	314	-2	-2.5	16	2	1	6	5.50
2	Texas Canyon	I-10	EB	-62.5	4	4	Yes	2	3	314	-2	-2.5	16	2	1	6	5.50
3	Bouse Wash	I-10	EB	-27.0	2	2	Near	1	1.5	20	0	0	33	1	0.5	4	4.00
4	Bouse Wash	I-10	WB	-20.6	2	2	Near	1	1.5	20	0	0	33	1	0.5	4	4.00
5	Sunset Point	I-17	Both	-2.0	1	1	Yes	2	3	78	-1	-1.25	26	2	1	3	3.75
6	San Simon	I-10	WB	-41.5	3	3	No	0	0	40	0	0	83	0	0	3	3.00
7	Ehrenberg	I-10	EB	-38.1	2	2	Yes	2	3	452	-3	-3.75	5	2	1	3	2.25
8	Haviland	I-40	EB	-30.7	2	2	Yes	2	3	465	-3	-3.75	25	2	1	3	2.25
10	Haviland	I-40	WB	-27.1	2	2	Yes	2	3	465	-3	-3.75	25	2	1	3	2.25
11	San Simon	I-10	EB	-37.9	2	2	No	0	0	40	0	0	83	0	0	2	2.00
12	McGuireville	I-17	NB	-15.7	1	1	No	0	0	0	0	0	8	2	1	3	2.00
13	McGuireville	I-17	SB	-1.8	1	1	No	0	0	0	0	0	8	2	1	3	2.00
14	Meteor Crater	I-40	EB	-30.6	2	2	Near	1	1.5	230	-2	-2.5	16	2	1	3	2.00
15	Meteor Crater	I-40	WB	-32.8	2	2	Near	1	1.5	230	-2	-2.5	16	2	1	3	2.00
16	Ehrenberg	I-10	WB	-16.8	1	1	Yes	2	3	452	-3	-3.75	5	2	1	2	1.25
17	Sentinel	I-8	EB	-8.8	1	1	No	0	0	0	0	0	70	0	0	1	1.00
18	Painted Cliffs	I-40	Both	-18.5	1	1	No	0	0	208	-1	-1.25	21	2	1	2	0.75
19	Mohawk	I-8	EB	-9.7	1	1	No	0	0	120	-1	-1.25	41	1	0.5	1	0.25
20	Mohawk	I-8	WB	-6.0	1	1	No	0	0	120	-1	-1.25	41	1	0.5	1	0.25
21	Burnt Well	I-10	EB	-55.8	3	3	No	0	0	532	-3	-3.75	26	2	1	2	0.25
22	Sentinel	I-8	WB	3.9	0	0	No	0	0	0	0	0	70	0	0	0	0.00
23	Canao Ranch	I-19	NB	9.4	0	0	No	0	0	90	-1	-1.25	29	2	1	1	-0.25
24	Canao Ranch	I-19	SB	10.3	0	0	No	0	0	90	-1	-1.25	29	2	1	1	-0.25
25	Sacaton	I-10	EB	-13.1	1	1	Near	1	1.5	679	-4	-5	13	2	1	0	-1.50
26	Sacaton	I-10	WB	-10.2	1	1	Near	1	1.5	679	-4	-5	13	2	1	0	-1.50
27	Burnt Well	I-10	WB	-17.7	1	1	No	0	0	532	-3	-3.75	26	2	1	0	-1.75

[a] *Source: 2019 Arizona Truck Parking Study*
[b] *Source: 2010 U.S. Census Bureau*

13.2.3. Prioritization Results and Considerations

The results of the truck parking expansion scores show that 14 of the 26 sites evaluated scored above the mean score of 1.54. To assign a prioritized planning period to each rest area, a statistical analysis of the scores was completed. The five rest area sites scoring one SD above the mean (or above 3.47) include Texas Canyon (eastbound and westbound), Bouse Wash (eastbound and westbound) and Sunset Point.

Although, the eastbound Burnt Well Rest Area is among those rest areas with one of the highest forecasted deficiencies in 2032, it has a large quantity of private parking spaces nearby and was not located at or near a top undesignated parking location. However, based on existing capture rates and anticipated traffic growth, this eastbound site may require car parking expansion by 2032, as it is forecasted to be deficient 52 spaces.

Certain rest areas that scored above the mean but not above one SD of the mean should still be evaluated for potential short-term improvements. For instance, despite having a large quantity of private parking nearby, the Haviland Rest Areas and the Ehrenberg Rest Areas experience large amounts of undesignated truck parking at the rest areas or nearby.

In fact, Haviland was the number one location with undesignated truck parking in the state, with the second location occurring just 13 miles south of the rest area along I-40. Similarly, the Ehrenberg Rest Areas were among the top locations with undesignated parking, with two other locations just east of the rest area. Meteor Crater was also one of the top locations with undesignated parking occurring.[61] However, both the Haviland and Meteor Crater Rest Areas were expanded since 2018 to include an additional 38 and 58 truck parking spaces, respectively (**Figure 13-1**). Therefore, the presence of undesignated truck parking at these locations may have changed.

Figure 13-1. Truck Parking Expansion at Eastbound Meteor Crater Rest Area
Source: ADOT

13.3. Feasibility Analysis

Each rest area site that was forecasted to have truck parking deficiencies by 2032 was evaluated to determine if and where additional truck parking spaces could be added. A tiered approach of implementing additional spaces was conducted for each site, beginning with the most cost-effective

[61] https://azdot.gov/sites/default/files/2019/08/wp3-truck-parking-supply-demand-and-gaps.pdf

solution that would result in little to no disruptions to the existing ramps and facilities. The feasibility of expanding truck parking at each site was evaluated in the following order:

- Expand parking within the existing ROW without interruptions to the existing ramps and facilities
- Expand parking within the existing ROW by using minor ramp realignments as needed
- Expand parking by using overflow parking lots within the existing ROW or on adjacent land where feasible
- Expand parking by relocating ramps and ramp gores within the existing ROW
- Expand parking by extending the existing ROW and relocating ramps and gores
- Expand parking by extending the existing ROW and using an overflow parking lots
- Identify nearby safe parking locations within the ROW of existing nearby interchanges
- Identify nearby ASOs for potential P3s

Many of the rest area sites have already implemented additional truck parking since the previous study and are not able to accommodate more spaces without changes to the existing ramps or ROW. Only three sites (Eastbound Meteor Crater, Eastbound Texas Canyon, and Westbound Texas Canyon) were able to accommodate additional spaces without any ramp realignments. In addition, some of the highest prioritized sites for parking expansion are restricted by adjacent topography (Texas Canyon).

Six of the rest area sites (Eastbound Bouse Wash, Westbound Bouse Wash, Eastbound Burnt Well, Westbound Meteor Crater, Eastbound San Simon, and Westbound San Simon) were not able to accommodate the required truck parking spaces within the existing ROW limits. Therefore, ROW acquisitions may be required at these locations. The approximate amount of ROW acres needed, as well as the adjacent land ownership for each of these locations, is summarized as follows:

- Eastbound Bouse Wash – 7.5 acres – Bureau of Land Management
- Westbound Bouse Wash – 9.5 acres – Bureau of Land Management
- Eastbound Burnt Well – 11.5 acres – State Trust Land
- Westbound Meteor Crater – 1.8 acres–- Private Land/State Trust Land
- Eastbound San Simon – 3.1 acres – Bureau of Land Management
- Westbound San Simon – 4.0 acres – Bureau of Land Management

Table 13-3 summarizes the feasibility analysis conducted for each site and provides the location and number of spaces that can be implemented at each site based on the type of expansion evaluated. To aid ADOT in the potential design and decision making for implementing each parking expansion project, conceptual schematics were developed to further detail the location, number of spaces, and type of expansion feasible at each rest area site. The conceptual schematics for parking expansion are included as **Appendix G**.

Table 13-3. Truck Parking Expansion Feasibility at Rest Areas

Rest Area	Route	Anticipated Number of Deficient Truck Parking Spaces in 2032	No New ROW				Expanded ROW		Notes
			Simple Expansion No/Minor Approach Roadway Work	Minor Roadway Realignment, Retain Existing Ramp Gores	Provide Overflow Parking Area Within Existing Rest Area	Major Ramp Relocation along Freeway with New Ramp Gore or Gores	Expand Rest Area ROW, Major Ramp Relocation along Freeway with New Ramp Gore or Gores	Expand Rest Area ROW, Provide Overflow Parking Area	
			Number of Truck Parking Spaces Gained						
Mohawk EB	I-8	-10	3 (interior)	10 (interior + east)	20	20+ (east)	--[a]	--[a]	Overflow Area in SW corner
Mohawk WB	I-8	-6	3 (interior)	12 (interior + west)	N/A	12 (east)	--[a]	--[a]	
Sentinel EB	I-8	-9	0	0	20	0	TBD	--[a]	Overflow Area in SW corner
Sentinel WB	I-8	4	0	0	N/A	0	--[a]	--[a]	
Ehrenberg EB	I-10	-38	0	8 (east)	N/A	38	--[a]	--[a]	
Ehrenberg WB	I-10	-17	0	7 (west)	10	10 (east)	--[a]	--[a]	Overflow Area in NE corner
Bouse Wash EB	I-10	-27	0	0	N/A	7 (east)	TBD (To East)	TBD (To West)	Overflow Area in NW corner
Bouse Wash WB	I-10	-21	0	0	N/A	6 (east)	TBD (To East)	TBD (To East)	Overflow Area in SE corner
Burnt Well EB	I-10	-56	0	4	N/A	20 (east + west)	TBD	TBD (To East)	Overflow Area in SE corner
Burnt Well WB	I-10	-18	0	4	20	30 (east + west)	--[a]	--[a]	Overflow Area in NW corner
Sacaton EB	I-10	-13	0	6 (west) +7 (east)	N/A	>13 (west)	--[a]	--[a]	
Sacaton WB	I-10	-10	0	8 (east)	N/A	12 (east)	--[a]	--[a]	
Texas Canyon EB	I-10	-62	3	10 (west)	N/A	0	13 (east)	--[a]	Adjacent rock outcropping restricts expansion
Texas Canyon WB	I-10	-72	2	7 (east)	N/A	0	0 - Terrain Restrictions	--[a]	Adjacent rock outcropping restricts expansion
San Simon EB	I-10	-38	0	0	15	14 (west)	TBD (To West)	--[a]	Overflow Area in SW corner
San Simon WB	I-10	-42	0	0	10	8 (west): 10 (east)	TBD (To East)	--[a]	Overflow Area in NE corner
Haviland EB	I-40	-31	0	9 (west)	30 (TBD)	0	--[a]	--[a]	Overflow Area in SE corner
Haviland WB	I-40	-27	0	10 (east)	20 (TBD)	0	--[a]	--[a]	Overflow Area in SW corner
Meteor Crater EB	I-40	-31	0	0	25 (TBD)	0	--[a]	--[a]	Overflow Area in SW corner
Meteor Crater WB	I-40	-33	0	0	N/A	0	TBD (To East)	--[a]	
Painted Cliffs	I-40	-18	0	0	N/A	0	TBD	--[a]	Adjacent terrain restricts all expansion
McGuireville NB	I-17	-2	0	0	N/A	0	--[a]	--[a]	Overflow Area in east end
McGuireville SB	I-17	-16	0	4 (west)	15 (TBD)	0	--[a]	--[a]	Overflow Area between ponds and restroom building
Sunset Point	I-17	-2	0	20 (south)	TBD	0	--[a]	--[a]	Overflow area north of existing ponds
Canoa Ranch NB	I-19	9	0	0	N/A	0	--[a]	--[a]	
Canoa Ranch SB	I-19	10	0	0	N/A	0	--[a]	--[a]	

[a] Not needed by 2032 if other options used.
Notes:
East = Spaces to be added to the east end of the existing truck parking spaces
Interior = Spaces to be added within the interior of the existing truck parking spaces
TBD = Number of exact spaces to be determined during design
West = Spaces to be added to the west end of the existing truck parking spaces

In addition to determining the feasibility of expanding truck parking at each rest area, cost estimates for different truck parking surface treatments also were put together to assist ADOT in the design and development of parking expansion projects. The three surface treatment types identified include the following:

- PCCP (Portland Cement Concrete Pavement)
- Gravel (or Aggregate Base)
- AC (Asphaltic Concrete)

The cost per square yard (SY) for each surface treatment type was developed using costs from recently completed ADOT projects. The approximate cost per square yard for each surface treatment type is as follows:

- PCCP = $192/SY
- Gravel (or Aggregate Base) = $26/SY
- AC = $70/SY

Because the truck parking surface type varies among different rest area sites, estimates for new parking spaces are customized for each rest area site. These values then were used to determine the anticipated costs per space at each rest area.

The actual number of truck parking spaces that could be added at rest areas requiring additional ROW would be determined during final design. However, for the purposes of developing cost estimates, a preliminary number of truck spaces that could be achieved were estimated. Further details on the development of parking expansion cost estimates can be found in **Appendix H**. **Table 13-4** summarizes the average cost per truck parking space at each rest area.

Table 13-4. Average Cost per Truck Parking Space by Rest Area

Rest Area	Route	Traffic Direction Served	Existing Number of Truck Parking Spaces	Maximum Number of Truck Parking Spaces That Can be Added	Additional Right-of-Way Required (Acres)	Average Cost Per Space		
						Gravel (Aggregate Base)	Asphalt (AC)	Concrete (PCCP)
Texas Canyon	I-10	EB	21	10		$41,224	$53,224	$86,224
Texas Canyon	I-10	WB	22	7				
Safe Truck Parking Only	I-10	Both	0	140[a]		$10,197	$25,500	$69,009
Bouse Wash	I-10	EB	20	100[a]	8	$5,407	$8,793	$23,256
Bouse Wash	I-10	WB	20	126[a]	10			
Sunset Point	I-17	Both	27	20		$20,900	$43,000	$108,050
San Simon	I-10	EB	18	38[a]	3	$19,688	$31,688	$64,688
San Simon	I-10	WB	18	42[a]	4			
Ehrenberg	I-10	EB	15	38		$27,727	$38,828	$83,087
Ehrenberg	I-10	WB	15	17				
Haviland	I-40	EB	29	30		$14,500	$31,428	$82,892
Haviland	I-40	WB	23	20				
McGuireville	I-17	NB	20	0		$23,133	$39,301	$104,252
McGuireville	I-17	SB	20	15				
Meteor Crater	I-40	EB	57	25		$10,367	$22,923	$60,134
Meteor Crater	I-40	WB	64	5[a]	2			
Safe Truck Parking Only	I-40	Both		140[a]		$10,197	$25,500	$69,009
Sentinel	I-8	EB	14	20		$10,305	$23,585	$63,425
Sentinel	I-8	WB	15	N/A				
Mohawk	I-8	EB	10	10		$5,091	$13,818	$37,818
Mohawk	I-8	WB	10	12				

Rest Area	Route	Traffic Direction Served	Existing Number of Truck Parking Spaces	Maximum Number of Truck Parking Spaces That Can be Added	Additional Right-of-Way Required (Acres)	Average Cost Per Space		
						Gravel (Aggregate Base)	Asphalt (AC)	Concrete (PCCP)
Sacaton	I-10	EB	21	13		$28,667	$41,238	$98,438
Sacaton	I-10	WB	18	8				
Burnt Well	I-10	EB	30	150[a]	12	$8,993	$17,358	$45,611
Burnt Well	I-10	WB	30	20				
		Total Truck Parking Spaces	**537**	**1,006[a]**	**Average Cost per Space**	**$16,885**	**$29,727**	**$71,135**

[a] *The actual number of parking spaces that can be added for new locations or rest areas requiring ROW will be determined during final design.*

13.4. Prioritized Parking Expansion Recommendations

The results of the parking expansion feasibility and the prioritized ranking analysis were relied on to determine the recommended planning horizon and the type of improvement for each site. **Table 13-5** summarizes this study's prioritized recommendations for parking expansions at rest areas through 2042.

Table 13-5. Prioritized Parking Expansion Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Parking Expansion	Number of Anticipated Truck Spaces Gained
Short-Term (0-5 Years) Prioritized Recommendations					
1	Texas Canyon	I-10	EB	Expand truck parking within the existing ROW using minor ramp realignment.	10
2	Texas Canyon	I-10	WB	Expand truck parking within the existing ROW using minor ramp realignment.	7
3	New Safe Truck Parking Only Location	I-10	Both	Construct a safe truck parking only location along I-10 between Texas Canyon and San Simon Rest Areas within an existing interchange or adjacent to the interstate as a pulloff (site to include high-mast lighting, vaulted toilets, and trash receptacles).	TBD
4	Bouse Wash	I-10	EB	Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in NW corner of existing rest area.	TBD
5	Bouse Wash	I-10	WB	Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area.	TBD
6	Sunset Point	I-17	Both	Provide overflow gravel parking area north of existing ponds.	20
7	San Simon	I-10	WB	Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s).	TBD
8	Ehrenberg	I-10	EB	Expand car and truck parking within the existing ROW by relocating ramp along freeway with new ramp gore(s).	38

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Parking Expansion	Number of Anticipated Truck Spaces Gained
9	Haviland	I-40	EB	Provide overflow gravel parking area in SE corner of existing rest area.	30
10	Haviland	I-40	WB	Provide overflow gravel parking area in SW corner of existing rest area.	20
11	San Simon	I-10	EB	Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s).	TBD
Mid-Term (6-10 Years) Prioritized Recommendations					
12	Ehrenberg	I-10	WB	Expand truck parking within the existing ROW using minor ramp realignments and provide overflow gravel parking area in NE corner.	17
13	McGuireville	I-17	SB	Provide overflow gravel parking between the ponds and restroom building.	15
14	Meteor Crater	I-40	EB	Provide overflow gravel parking area in the SW corner of the existing rest area.	25
15	Meteor Crater	I-40	WB	Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s).	TBD
16	Ehrenberg	I-10	WB	Expand truck parking within the existing ROW using minor ramp realignments and provide overflow parking in the NE corner.	17
17	New Safe Truck Parking Only Location	I-40	Both	2023 Truck Parking Study to evaluate and identify potential locations along I-40 between Meteor Crater and Painted Cliffs within an existing interchange or adjacent to the interstate as a pull-off (site to include gravel lot, high-mast lighting, and trash receptacles).	TBD
18	Sentinel	I-8	EB	Provide overflow gravel parking area in SW corner of existing rest area.	20
19	Mohawk	I-8	EB	Expand truck parking within the existing ROW using minor ramp realignment.	10
20	Mohawk	I8	WB	Expand truck parking within the existing ROW using minor ramp realignment.	12
21	Burnt Well	I-10	EB	Expand car and truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area.	TBD

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Parking Expansion	Number of Anticipated Truck Spaces Gained
Long-Term (11-20 Years) Prioritized Recommendations					
22	Sacaton	I-10	EB	Expand parking within the existing ROW by relocating ramp along freeway with new ramp gore(s).	13+
23	Sacaton	I-10	WB	Expand parking within the existing ROW by relocating ramp along freeway with new ramp gore(s).	8
24	Burnt Well	I-10	WB	Provide overflow gravel parking area in NW corner of existing rest area.	20
Notes: *TBD = Number of exact spaces to be determined during design.*					

14. Modernization

Potential modernization improvements were identified through reviews of peer state and industry best practices, as well as through coordination with ADOT staff and stakeholders. The improvements are intended to improve safety and sustainability and to provide expanded services to meet existing and future travelers' needs. This section summarizes the rest area improvements considered and the results of the prioritization criteria.

14.1. Rest Area Usage and Nearby Services

As documented in Section 11.1.3, each site was evaluated for the existence of nearby services (ASOs), its distance to urban areas, its distance to adjacent rest areas, and its anticipated annual usage in year 2042. These categories were chosen because they best reflect the anticipated traveler demand at each rest area. For instance, the annual usage in year 2042 was used to help identify rest areas that are anticipated to be used more heavily than other rest areas. Similarly, rest areas with limited nearby ASOs are rest areas that are expected to have a higher demand or need for the traveling public. By prioritizing the more heavily used rest areas, or those most needed by travelers, this study seeks to maximize the benefit to the public by expanding or modernizing those rest areas first.

The results of the scoring and weighted criteria represent each rest area's anticipated demand for modernization and expanded amenities. A statistical analysis then was conducted based on the resulting weighted scores to determine under which planning horizon each site should be improved. Rest areas that are permanently closed or those that are only open to truck parking were not included as part of this analysis. **Table 14-1** summarizes the results of this evaluation.

Table 14-1. Rest Area Usage and Nearby Services Evaluation

User Demand Rank	Rest Area	Route	Direction Served	Usage			Nearby Services									Total Weighted Score	Implementation Period
				Annual Usage Projection (2042)			Distance to Urban Areas			Distance to ASOs			Distance to Adjacent Rest Areas				
				Description Forecasted Annual Users in 2042	Criteria 260K to 640K= 1 641K to 1M = 2 1.1M to 1.4M = 3 1.41M to 1.75M = 4	Weight Applied 2	Description Distance to Urban Areas (mi)	Criteria 1 to 30 = 1 31 to 60 = 2 61 to 90 = 3	Weight Applied 0.75	Description Distance to Nearest ASO (mi)	Criteria 1 to 15 = 1 16 to 30 = 2 31 to 60 = 3	Weight Applied 1.25	Description Distance to Nearest Rest Area	Criteria 1 to 60 = 1 61 to 120 = 2 121 to 180 = 3	Weight Applied 1.5		
				Usage	Score	Weighted Score	Distance	Score	Weighted Score	Distance	Score	Weighted Score	Distance	Score	Weighted Score		
1	Burnt Well	I-10	EB	1,730,908	4	8	26	1	0.8	8	1	1.3	34	1	1.5	11.50	Short-term
2	Burnt Well	I-10	WB	1,440,870	4	8	26	1	0.8	8	1	1.3	34	1	1.5	11.50	Short-term
3	Sacaton	I-10	EB	1,194,337	3	6	13	1	0.8	10	1	1.3	97	2	3.0	11.00	Short-term
4	Sacaton	I-10	WB	1,198,371	3	6	13	1	0.8	10	1	1.3	97	2	3.0	11.00	Short-term
5	Painted Cliffs	I-40	Both	820,358	2	4	21	1	0.8	1	1	1.3	123	3	4.5	10.50	Short-term
6	Bouse Wash	I-10	EB	1,090,157	3	6	33	2	1.5	7	1	1.3	34	1	1.5	10.25	Short-term
7	Salt River Canyon	US 60	Both	--[a]	--[a]	0	39	2	1.5	38	3	3.8	175	3	4.5	9.75	Mid-term
8	Canoa Ranch	I-19	NB	483,850	1	2	29	1	0.8	20	2	2.5	None	3	4.5	9.75	Mid-term
9	Canoa Ranch	I-19	SB	422,646	1	2	29	1	0.8	20	2	2.5	None	3	4.5	9.75	Mid-term
10	Ehrenberg	I-10	EB	1,227,525	3	6	5	1	0.8	1	1	1.3	48	1	1.5	9.50	Mid-term
11	Sunset Point	I-17	Both	1,360,114	3	6	8	1	0.8	10	1	1.3	27	1	1.5	9.50	Mid-term
12	Texas Canyon	I-10	EB	889,674	2	4	16	1	0.8	2	1	1.3	68	2	3.0	9.00	Mid-term
13	Texas Canyon	I-10	WB	873,148	2	4	16	1	0.8	2	1	1.3	68	2	3.0	9.00	Mid-term
14	Meteor Crater	I-40	EB	834,938	2	4	16	1	0.8	19	2	2.5	54	1	1.5	8.75	Mid-term
15	Meteor Crater	I-40	WB	835,983	2	4	16	1	0.8	19	2	2.5	54	1	1.5	8.75	Mid-term
16	Haviland	I-40	EB	430,600	1	2	25	1	0.8	13	1	1.3	159	3	4.5	8.50	Mid-term
17	Haviland	I-40	WB	416,338	1	2	25	1	0.8	13	1	1.3	159	3	4.5	8.50	Mid-term
18	San Simon	I-10	EB	636,317	1	2	83	3	2.3	7	1	1.3	68	2	3.0	8.50	Mid-term
19	San Simon	I-10	WB	595,558	1	2	83	3	2.3	7	1	1.3	68	2	3.0	8.50	Mid-term
20	Bouse Wash	I-10	WB	940,117	2	4	33	2	1.5	7	1	1.3	34	1	1.5	8.25	Mid-term
21	Ehrenberg	I-10	WB	732,369	2	4	5	1	0.8	1	1	1.3	48	1	1.5	7.50	Mid-term
22	McGuireville	I-17	SB	708,418	2	4	8	1	0.8	10	1	1.3	27	1	1.5	7.50	Mid-term

User Demand Rank	Rest Area	Route	Direction Served	Usage			Nearby Services									Total Weighted Score	Implementation Period
				Annual Usage Projection (2042)			Distance to Urban Areas			Distance to ASOs			Distance to Adjacent Rest Areas				
				Description Forecasted Annual Users in 2042	Criteria 260K to 640K= 1 641K to 1M = 2 1.1M to 1.4M = 3 1.41M to 1.75M = 4	Weight Applied 2	Description Distance to Urban Areas (mi)	Criteria 1 to 30 = 1 31 to 60 = 2 61 to 90 = 3	Weight Applied 0.75	Description Distance to Nearest ASO (mi)	Criteria 1 to 15 = 1 16 to 30 = 2 31 to 60 = 3	Weight Applied 1.25	Description Distance to Nearest Rest Area	Criteria 1 to 60 = 1 61 to 120 = 2 121 to 180 = 3	Weight Applied 1.5		
				Usage	Score	Weighted Score	Distance	Score	Weighted Score	Distance	Score	Weighted Score	Distance	Score	Weighted Score		
23	Sentinel	I-8	EB	551,596	1	2	70	3	2.3	14	1	1.3	28	1	1.5	7.00	Mid-term
24	Sentinel	I-8	WB	268,145	1	2	70	3	2.3	14	1	1.3	28	1	1.5	7.00	Mid-term
25	Hassayampa	US 60	Both	--[a]	--[a]	0	5	1	0.8	4	1	1.3	175	3	4.5	6.50	Long-term
26	Mohawk	I-8	EB	371,013	1	2	41	2	1.5	11	1	1.3	28	1	1.5	6.25	Long-term
27	Mohawk	I-8	WB	504,340	1	2	41	2	1.5	11	1	1.3	28	1	1.5	6.25	Long-term
28	McGuireville	I-17	NB	605,261	1	2	26	1	0.8	11	1	1.3	45	1	1.5	5.50	Long-term

[a] No Data Available

14.1.1. Usage and Nearby Services Ranking

Rest areas that had a score higher than one SD above the mean score (9.78) were designated as short-term needs, while those within one SD above or below the mean (6.84 to 9.79) were designated as mid-term needs. Only four sites were designated as long-term needs (lower than one SD of the mean). The rest areas that were designated as short-term needs include:

- Burnt Well (EB)
- Burnt Well (WB)
- Sacaton (EB)
- Sacaton (WB)
- Painted Cliffs
- Bouse Wash (EB)

Although the eastbound Ehrenberg and Sunset Point Rest Areas were designated as mid-term modernization needs, these sites should be considered in the short-term planning horizon based on their forecasted usage, popularity, and truck parking demand.

14.2. Modernization and Expanded Amenities Evaluation

The improvements being considered also were evaluated to determine which improvements are needed and most likely to provide benefits to the traveling public. A qualitative scoring criterion was developed to rank and prioritize each improvement based on (1) its ability to improve safety and increase sustainability, (2) if it is among the peer state and industry best practices, and (3) the feasibility of being implemented. The results are shown in **Table 14-2**.

Table 14-2. Modernization and Amenities Evaluation Results

Evaluation Category	Safety					Weight Applied = 2.0	Sustainability			Weight Applied = 1.5	Peer State and Industry Best Practice	Weight Applied = 1.5	Feasibility				Weight Applied = 1.75	Totals	
Proposed Improvement	**Increased Visibility (Buildings, Parking Areas)**	**Potential to Reduce Crashes**	**Increased Access to Emergency Services**	**Potential Criminal Activity Deterrent**	**Potential to Reduce Driver Fatigue**	**Weighted Total**	**Energy Use Reduction**	**Water Use Reduction**	**Reduced Environmental Footprint**	**Weighted Total**	**Peer State Best Practice**	**Weighted Total**	**Supporting Infrastructure**	**Estimated Cost**	**Impacts to Existing Facilities**	**Environmental Impacts**	**Weighted Total**	**Total Raw Score**	**Total Weighted Score**
LED Lighting	1	1	0	1	0	6	2	0	2	6.0	2	3	2	1	1	1	8.75	16	23.8
High-Mast Lighting	2	1	0	2	0	10	1	0	1	3.0	2	3	2	0	0	0	3.5	13	19.5
Security Cameras	2	0	0	2	0	8	0	0	0	0.0	2	3	1	1	1	1	7	11	18.0
Wireless Internet	0	1	2	0	1	8	0	0	0	0.0	1	1.5	1	1	1	1	7	9	16.5
Telephone Call Boxes	0	0	2	1	0	6	0	0	0	0.0	2	3	1	1	1	1	7	10	16.0
Digital Displays	0	1	0	0	1	4	0	0	0	0.0	1	1.5	1	1	1	1	7	7	12.5
Low-Flow Plumbing	0	0	0	0	0	0	0	2	2	6.0	2	3	1	0	-1	1	1.75	8	10.8
Solar Panels	0	0	0	0	0	0	2	0	2	6.0	1	1.5	0	-1	-1	0	-3.5	3	4.0
Family Restrooms	0	0	0	0	1	2	0	0	0	0.0	2	3	0	-1	-1	0	-3.5	0	1.5

14.2.1. Evaluation Ranking

The expanded services and amenities scoring evaluation resulted in LED lighting and high-mast lighting being among those improvements with weighted scores higher that one SD above the mean score. In addition, family restrooms are the only improvement that scored lower than one SD below the mean. All other improvements were designated as being in the mid-term needs, as they scored within one SD of the mean score. The result of the qualitative analysis shows the prioritization for modernizing rest areas (**Figure 14-1**).

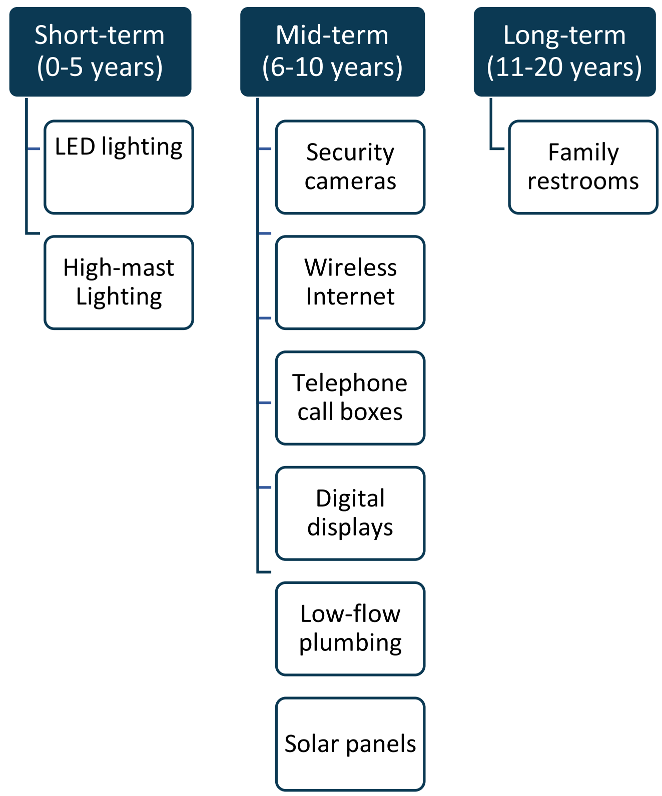


Figure 14-1. Modernization and Expanded Amenities Scoring Results

14.2.2. Stakeholder Survey Results

As stated previously, this study's TAC and stakeholders were engaged in a survey to further evaluate and rank the potential modernization and expanded amenities. The survey was developed to have four categories of improvements to rank. The first category was for all potential improvements considered, while the remaining categories were delineated between safety improvements, sustainability improvements, and expanded amenities. The stakeholder survey was distributed in December 2022 and received a total of 12 responses. Of those that responded, 66% ranked LED lighting as a top 3 improvement, while security cameras were ranked 58% of the time in the top 3. Conversely, digital displays were only ranked 16% of the time as a top 3 improvement. **Figure 14-2** presents the ranking results of all improvements included for consideration.

Rank	Improvement
1	LED Lighting
2	Security Cameras
3	Family Restrooms
4	Wireless Internet
5	High-Mast Lighting
6	Low-Flow Plumbing
7	Solar Panels
8	Telephone Call Boxes
9	Digital Displays

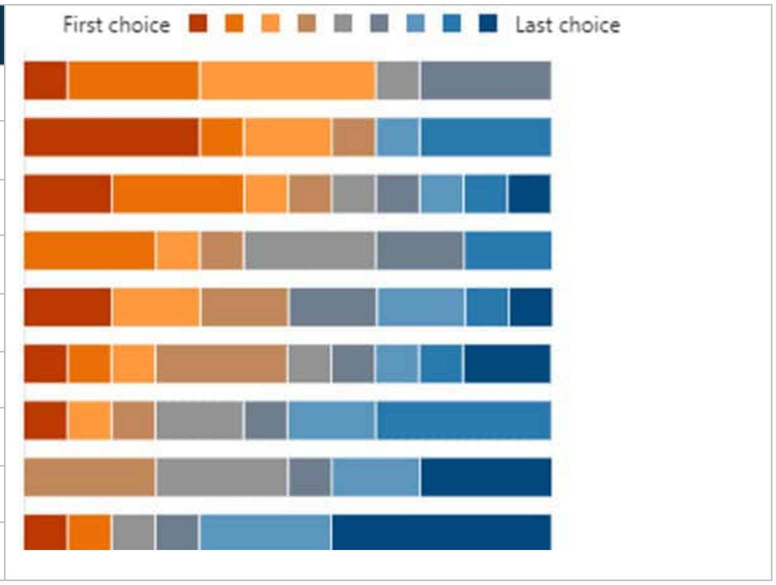


Figure 14-2. Stakeholder Survey Rankings (All Improvements)

To further define each improvement's potential need, the improvements were subcategorized to rank them among each other within their respective improvement type. Among the safety improvements considered, high-mast lighting was ranked first 44% of the time, while 33% of respondents ranked security cameras first. Among the sustainability improvements, solar panels were ranked first by all respondents. For the expanded amenities category, wireless internet was selected as a top 2 choice by 75% of respondents, while family restrooms were ranked in the top 2 by 50% of respondents. **Figure 14-3**, **Figure 14-4**, and **Figure 14-5** present the results of each subcategory's ranking.

Rank	Safety Improvement
1	High-Mast Lighting
2	Security Cameras
3	LED Lighting

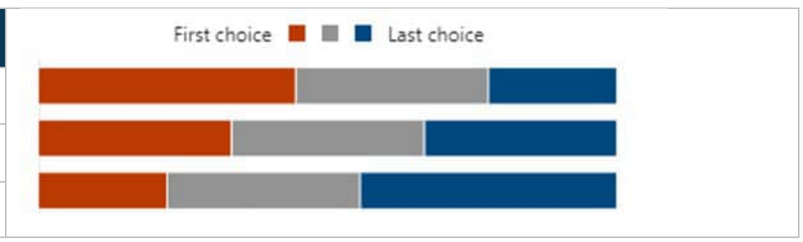


Figure 14-3. Safety Improvements Stakeholder Survey Rankings

Rank	Sustainability Improvement
1	Solar Panels
2	Low-Flow Plumbing

Figure 14-4. Sustainability Improvements Stakeholder Survey Rankings

Rank	Amenity Improvement
1	Wireless Internet
2	Family Restrooms
3	Digital Displays
4	Telephone Call Boxes

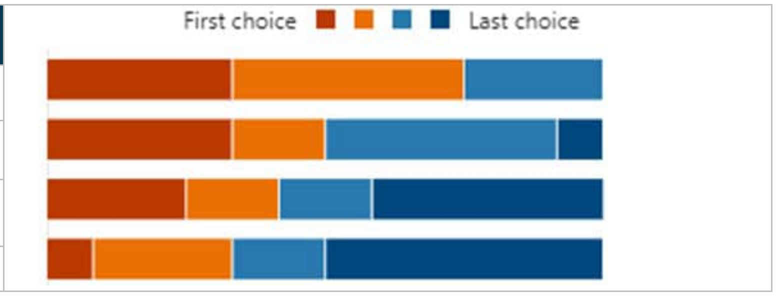


Figure 14-5. Amenities Stakeholder Survey Rankings

14.3. Prioritized Modernization and Expanded Amenities

Based on the results from the usage and nearby services evaluation, as well as the modernization and expanded amenities scoring and ranking, the following modernization improvements and expanded amenities are recommended for implementation at high-demand rest areas.

- High-mast lighting
- LED lighting
- Security cameras

Any short-term improvements identified by this study as either a preservation/rehabilitation project or parking expansion project should include high-mast lighting, LED lighting, and security cameras as part of the improvements. This study also recommends that as the broadband network gets extended throughout Arizona, wireless internet should be incorporated at rest areas with high usage or demand, or as part of other planned improvements. Wireless internet has the potential to be implemented at certain locations using rest area sponsorships or P3s. **Table 14-3** shows prioritized modernization recommendations.

Despite not having annual usage data for the Salt River Canyon Rest Area, this site was ranked 7th among those evaluated for traveler demand (**Table 13-2**). Through coordination with the San Carlos Apache Tribe, additional improvements (not all evaluated here) were proposed for the Salt River Canyon Rest Area. Improvements proposed by the Tribe include:

- Expanded solar panels
- Safety improvements (security cameras, lighting, and hazard signing)
- Installation of digital cultural displays
- Flash flood warning signs for Salt River
- Wireless internet
- Information displays for nearby recreational activities and services

Since power and water access is limited at this site, security cameras, wireless internet, expanded lighting, and digital displays are not currently feasible at the rest area. However, this study recommends flash flood warning signs for Salt River be installed, as well as static displays to highlight cultural information, recreational activities, and services related to the San Carlos Apache Tribe.

Table 14-3. Prioritized Modernization Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Modernization Improvements
Short-Term (0-5 Years) Prioritized Recommendations				
1	Various Locations	N/A	N/A	Install high-mast lighting, upgrade interior lighting with LED lights where applicable, and install security cameras as part of other short-term prioritized rehabilitation and expansion improvements (Texas Canyon, Bouse Wash, Sunset Point, Ehrenberg EB, Haviland, San Simon EB, Parks, and Christensen).
2	Salt River Canyon	US 60	Both	Install flash flood warning signs, static context-sensitive displays, high-mast lighting, LED lighting, and security cameras.
3	Burnt Well	I-10	EB	Install high-mast lighting and install security cameras.
4	Burnt Well	I-10	WB	Install high-mast lighting and install security cameras.
5	Sacaton	I-10	EB	Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.
6	Sacaton	I-10	WB	Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.
7	Painted Cliffs	I-40	Both	Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.
Mid- and Long-Term (6-20 Years) Prioritized Recommendations				
8	Various Locations	N/A	N/A	Implement wireless internet at rest areas with high utilization/demand or at locations near the state border (potential to use rest area sponsorships or P3s).
9	Various Locations	N/A	N/A	Install solar panels at rest areas with high utilization/ demand to offset energy use and long-term operations cost (Burnt Well, Sacaton, Painted Cliffs, Bouse Wash, Ehrenberg, and Sunset Point).
10	Various Locations	N/A	N/A	Construct family restrooms (within or separate from existing restrooms) and replace existing plumbing with low-flow plumbing as part of other planned rehabilitation improvements.

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Modernization Improvements
11	Various Locations	N/A	N//A	Install telephone call boxes at rest area locations more than 30 miles from an urban area (Bouse Wash, San Simon, Sentinel, and Mohawk).
12	Various Locations	N/A	N/A	Install digital displays to highlight weather and traffic conditions, as well as context-sensitive information related to the surrounding region. Should be installed at rest areas located along Arizona's border and regions with high frequency of severe weather (Ehrenberg, Haviland, San Simon, Painted Cliffs, and Sacaton).

15. Overall Project Prioritization

The evaluation and prioritization process for identifying potential rehabilitation assessments, expansion projects, and modernization projects yields separate prioritized lists. Therefore, this study evaluated the recommendations from each evaluation to identify if any of the improvements could be combined into one project. Doing so may help to create a more efficient process for improvements, while also reducing ADOT's design and construction costs. In addition, Facilities Management noted that projects that occur within the same ADOT district could be bundled and managed by the same district to reduce administrative costs.

Although the ranking for each project type differs, if rest areas were identified as having a short-term need in more than one category, then those projects should be combined. Furthermore, if a rest area project was ranked just outside the short-term horizon, but a separate project at the same rest area was identified within short-term horizon, then those projects were also combined. Similarly, the same approach was used for mid- and long-term recommended priorities.

Cost estimates were developed for each prioritized recommendation in present dollars (2023). Information provided by ADOT staff, such as the cost of recently completed rest area projects, was used to better determine the existing cost of improvements. Estimates included in **Table 15-1** and **Table 15-2** include design, mobilization, and administrative costs. For the six rest area sites that are expected to require additional ROW (Eastbound Bouse Wash, Westbound Bouse Wash, Eastbound Burnt Well, Westbound Meteor Crater, Eastbound San Simon, and Westbound San Simon) estimates do not include costs for ROW acquisition.

In addition, the total costs of all improvements at each rest are delineated by the surface treatment types available for expanding the number of truck parking spaces. Since this study is expected to be updated in 2032, cost for recommendations beyond the 10-year planning horizon were not developed.

This study's recommendations were reviewed in detail with the PMT and Facilities Management to ensure recommendations accurately reflect rest area needs. The following sections and tables summarize the overall recommended priorities and estimated costs for all ADOT managed rest areas.

15.1. Short-Term (0-5 years) Priorities

Table 15-1 summarizes this study's overall short-term prioritized recommendations through 2027.

Table 15-1. Overall Short-Term Priortized Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
Short-Term (0-5 Years) Prioritized Recommendations								
1	Texas Canyon	I-10	EB & WB	• Expand truck parking within the existing ROW using minor ramp realignment. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$3,361,344	$3,704,064	$4,646,544	
2	New Safe Truck Parking Only Location	I-10	Both	• Construct a safe truck parking only location along I-10 between Texas Canyon and San Simon within an existing interchange or adjacent to the interstate as a pulloff (site to include gravel lot, high-mast lighting, and trash receptacles).	$4,091,808	$7,462,140	$16,643,952	
3	Bouse Wash	I-10	EB & WB	• EB: Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in NW corner of existing rest area. • WB: Expand truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$4,161,300	$5,423,880	$10,817,070	
4	Parks	I-40	EB & WB	• Convert to permanent truck parking only facility. • Remove existing restroom buildings. • Rehabilitate ramadas and pavement, install vaulted/composting toilets, high-mast lighting, and signage.				$5,260,200
5	Christensen	I-17	EB & WB	• Convert to permanent truck parking only facility. • Remove existing restroom buildings. • Rehabilitate ramadas and pavement, install vaulted/composting toilets, site-lighting, and signage.				$6,336,000
6	Salt River Canyon	US 60	Both	• Install flash flood warning signs, static context-sensitive displays. • Perform structural rehabilitation; replace composting toilets; rehabilitate site paving.				$1,645,050
7	Hassayampa	US 60	Both	• Perform structural, mechanical, and electrical rehabilitation, and ADA improvements. • Pave site. • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.				$4,248,750
8	San Simon	I-10	EB & WB	• Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s). • Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras.	$4,830,000	$6,442,800	$10,878,000	
9	Ehrenberg	I-10	EB & WB	• Upgrade high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • EB: Expand car and truck parking within the existing ROW by relocating ramp along freeway with new ramp gore(s). • WB: Expand truck parking within the existing ROW using minor ramp realignments and provide overflow gravel parking area in NE corner.	$4,413,360	$5,439,034	$9,245,001	

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
10	Haviland	I-40	EB & WB	• Upgrade high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • EB: Provide overflow gravel parking area in SE corner of existing rest area. • WB: Provide overflow gravel parking area in SW corner of existing rest area.	$2,796,750	$4,193,310	$8,183,360	
11	Sunset Point	I-17	Both	• Provide overflow gravel parking area north of existing ponds.	$1,267,200	$1,996,500	$4,143,150	
[a] Final surface material and treatment type will be selected during final design.								

15.2. Mid-Term (6-10 years) Priorities

Table 15-2 summarizes this study's overall mid-term prioritized recommendations between years 2028 and 2032.

Table 15-2. Overall Mid-Term Prioritized Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
Mid-Term (6-10 Years) Prioritized Recommendations								
12	Burnt Well	I-10	EB & WB	• Install high-mast lighting and security cameras. • EB: Expand car and truck parking by expanding rest area ROW and provide overflow gravel parking area in SE corner of existing rest area. • WB: Provide overflow gravel parking area in NW corner of existing rest area.	$6,392,100	$8,738,400	$16,663,350	
13	Mohawk	I-8	EB & WB	• Upgrade interior lighting with LED lights and install security cameras. • Expand truck parking within the existing ROW using minor ramp realignment.	$1,174,800	$1,491,600	$2,362,800	
14	McGuireville	I-17	NB & SB	• Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • SB: Provide overflow gravel parking between the ponds and restroom building.	$3,212,550	$3,612,708	$5,220,237	
15	Meteor Crater	I-40	EB & WB	• Install security cameras. • EB: Provide overflow gravel parking area in the SW corner existing rest area. • WB: Expand truck parking by expanding rest area ROW and relocating ramp along freeway with new ramp gore(s).	$858,480	$1,491,302	$3,366,754	
16	New Safe Truck Parking Only Location	I-40	Both	• 2023 Truck Parking Study to evaluate and identify potential locations along I-40 between Meteor Crater and Painted Cliffs within an existing interchange or adjacent to the interstate as a pull-off (site to include gravel lot, high-mast lighting, and trash receptacles).	N/A	N/A	N/A	

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements	Total Estimated Costs of All Recommended Improvements by Parking Expansion Surface Treatment Type (in 2023 dollars)[a]			
					Gravel (Aggregate Base)	Asphalt	Concrete	No Parking Expansion Included
17	Sentinel	I-8	EB	• Install high-mast lighting, upgrade interior lighting with LED lights, and install security cameras. • Provide overflow gravel parking area in SW corner of existing rest area.	$2,550,405	$2,988,645	$4,303,365	
18	Various Locations	N/A	N/A	• Implement wireless internet at rest areas with high utilization/demand or at locations near the state border (potential to use rest area sponsorships or P3s).				N/A
19	Various Locations	N/A	N/A	• Install solar panels at rest areas with high utilization/demand to offset energy use and long-term operations cost (Burnt Well, Sacaton, Painted Cliffs, Bouse Wash, Ehrenberg, and Sunset Point).				N/A

[a] Final surface material and treatment type will be selected during final design.

15.3. Long-Term (11-20) years) Priorities

Table 15-3 summarizes this study's overall long-term prioritized recommendations between years 2033 and 2042.

Table 15-3. Overall Long-Term Prioritized Recommendations

Priority Rank	Rest Area	Route	Travel Direction Served	Type of Improvements
Long-Term (11-20 Years) Prioritized Recommendations				
19	Sacaton	I-10	EB & WB	• Install high-mast lighting, security cameras, wireless internet, family restrooms, solar panels, and upgrade interior lighting with LED lights. • Expand parking within the existing ROW by relocating ramp along freeway with new ramp gore(s).
20	Painted Cliffs	I-40	Both	• Install high-mast lighting, security cameras, wireless internet, family restrooms, solar panels, and upgrade interior lighting with LED lights.
21	Canoa Ranch	I-19	NB & SB	• Install high-mast lighting, security cameras, wireless internet, family restrooms, solar panels, and upgrade interior lighting with LED lights.
22	Haviland	I-40	EB & WB	• Install wireless internet, family restrooms, and solar panels.
23	Meteor Crater	I-40	EB & WB	• Install wireless internet, family restrooms, and solar panels.

Appendix A
Rest Area Field Review Checklist

Field Report Checklist

ADOT Contract No: **MPD0015-22**

Highway:		Inspection Date:	
Mile Post:		Inspection By:	
Traffic Direction:			
Nearest Down Stream Exit:			
Name:		Milepost/Distance:	

Travel Way Geometry:

Rest Area Entering Speed	
Post Speed:	
Rest Area Exiting Ramp	
Posted Speed:	
Onsite Condition	
Pavement Type and Condition:	
Additional Comments:	

Parking:

Trucks		**ADA**
Total Stalls:		
Occupied:		
Autos		
Total Stalls:		
Occupied:		
Oversized (Trailers, RV's)		
Total Stalls:		
Occupied:		
Trucks and Autos Separated:		
Unauthorized Overflow		
Locations:		
Potential Hazards:		
Additional Comments:		

Amenities:

Picnic Areas:	
Ramadas:	
Seating Areas:	
Pet Areas:	
Traveler Information:	

Field Report Checklist

ADOT Contract No: **MPD0015-22**

Vending:		
Telephone:		Functional (Y/N):
Other:		
Additional Comments:		

Utilities:

Water:		Water Provider:	
		Well:	
		Storage:	
Pump house/Well house		Geolocated (Y/N):	
Sewer:			
Electric:		Service Size:	
Gas:		Uses:	
Communications:			
Site Lighting			
Parking:			
Use Areas:			
Building Exterior:			
Additional Comments:			

Security Features:

Lighting:	
Cameras:	
Call Boxes:	
DPS Facilities:	
MVD / ACE Facilities:	
Additional Comments:	

Accessibility:

ADA Ramps:	
ADA Parking:	
Van Accessibility:	
Additional Comments:	

Buildings:

Number of Buildings:	
Type of Structure:	
Building Uses:	
Heating or Air Conditioning:	
Running Water:	

Field Report Checklist

ADOT Contract No: **MPD0015-22**

Sewer Type:	
ADA Compliance:	
Building Conditions:	
Additional Comments:	

Additional Comments:

Field Report Checklist

ADOT Contract No: **MPD0015-22**

Observational Checklist for Rest Area Facilities

The following document will guide additional observations for rest areas in their existing condition during the field visits. The evaluator should fill out the below criteria as accurately as possible.

Site Conditions – the following section relates to the conditions surrounding the site and access to the site

Time of visit: ________________________ Duration: ___________________

What were the weather conditions at the time of the site visit? (circle the applicable conditions)

Daytime Nighttime

Sunny Light Rain Heavy Rain Fog

What were the adjacent mainline traffic conditions at the time of the site visit? (Circle one)

Free-Flowing Light Traffic Heavy Traffic Not moving

Is there any standing water (flooding) over impervious surfaces such as sidewalk/roadway at the time of the visit? Y / N If so, provide a brief description.

____

Are there obstacles at the rest area that could prevent all users from entering the site?

Are there any observable gaps in lighting? Y / N

If so, provide a brief description.

____

Parking Conditions – the following section relates to parking availability and utilization as seen during the site visit.

How close is the car parking to the building? Circle One: Very Close Somewhat Close Somewhat Far Very Far

Do you see any RV's parked at the site? Y / N If so, how many? _______________

If so, where are they parked? ____

Are there any trucks parked in unauthorized locations at the site? Y / N

If so, how many? _______________

If so, where are they parked? ____

How many electric/hybrid vehicles appear to be parked at the rest area? ___________________

Field Report Checklist

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How many motorcycles are parked at the rest area? ________________________________

Traveler Demographics – the following section relates to people/travelers using the rest area site itself.

Are there any law enforcement officials at the rest area? Y / N If yes, how many? ________

Is there private security at the rest area? Y / N If yes, how many? ______________________

How many children are at the rest area? (Best approximation) ___________________________

What percentage of those at the rest area appear to be senior citizens (65+)?

Circle One: 0-25 % 26 – 50 % 51 – 75 % 76- 100 %

Amenities/Services Utilization – the following section relates to the activities/amenities being utilized at the rest area.

During the time of your site visit, how many people used the vending machines? _____________

How many people are using the picnic areas? ____________

During the time of your site visit, how many people are viewing the information kiosks? ________

How many people appear to be eating? __________

How many pets are using the pet exercise area? ____________

During the time of your site visit, how many people are utilizing the family restrooms (if available)? ________

During the time of your site visit, how many people are utilizing the site provided telephones? __________

Are there any travelers that appear to be performing some sort of vehicle maintenance or repair such as inflating or changing a tire, and if so what type and how many? Y / N If yes, Type ______________, Amount__________

Are there any persons collecting donations or selling goods? If so, lease describe the activity____
____

Appendix B
Crash Analysis by Rest Area

CRASH ANALYSIS BY REST AREA

1. MOHAWK

The crash analysis statistics at the Mohawk Rest Area include the following:

- Total number of crashes: 36
- Year 2019 and 2020 had the highest occurrence of crashes with 8 each (22%)
- More than half of the crashes occur on the Westbound (WB) Mainline
- Majority are single vehicle crashes
- Motor Vehicle in Transport accounts for majority of collision type
- Predominant violations for the crashes are Speed too Fast for Conditions

Fatal Crash
1 crash: WB Mainline between the on and off-ramps for the WB Rest Area.
Violation: Failed to Keep in Proper Lane

Parking Area Crashes
None

Ramp Crashes
1 crash: Eastbound (EB) Rest Area on-ramp
Violation: Unsafe Lane Change

2. SENTINEL

The crash analysis statistics at the Sentinel Rest Area include the following:

- Total number of crashes: 32
- Year 2020 had the highest occurrence of crashes at 12 (38%)
- More than half of the crashes occur on the EB Mainline
- Majority are single vehicle
- Collision types include Motor Vehicle in Transport (25%) and Overturning (31%)
- Predominant violations for the crashes are Speed Too Fast for Conditions and No Improper Action.

Fatal Crashes
1 crash: EB mainline approximately one mile after the EB Rest Area on ramp
Violation: unknown.

Parking Area Crashes
None

Ramp Crashes
None

3. EHRENBURG

The crash analysis statistics at the Ehrenberg Rest Area include the following:

- Total number of crashes: 41

- Year 2019 had the highest occurrence of crashes at 13 (32%)
- More than half of the crashes occurred on the EB Mainline
- Majority were sideswipe (32%) and single vehicle (39%)
- More than half of the crashes were Motor Vehicle in Transport (51%)
- Predominant violations for the crashes were No Improper Action (41%).

Fatal Crashes
None

Parking Area Crashes
None

Ramp Crashes
1 crash: EB Rest Area on-ramp
Violations: Failed to Yield Right of way

1 crash: WB Rest Area off-ramp
Violation: Unknown

1 crash: WB Rest Area on-ramp
Violation: No improper Action

4. *Bouse Wash*

The crash analysis statistics at the Bouse Wash Rest Area include the following:

- Total number of crashes: 53
- Year 2019 had the highest occurrence of crashes at 12 (27%).
- More than half of the crashes occur on the WB Mainline
- 40% of the crashes were single vehicle
- 25 of the crashes were Motor Vehicle in Transport (56%)
- Predominant violations for the crashes were Speed Too Fast for Conditions (38%) and No Improper Action (31%).

Fatal Crashes
None

Parking Area Crashes
None

Ramp Crashes
1 crash: EB Rest Area off-ramp
Violations: Other

1 crash: WB Rest Area off-ramp
Violation: Speed Too Fast for Conditions

5. *Burnt Well*

The crash analysis statistics at the Burnt Well Rest Area include the following:

- Total number of crashes: 72
- The highest occurrences of crashes occurred in the Year 2021 at 20 (28%) and in Year 2018, when 17 (24%) crashes occurred
- More than half of the crashes occurred on the EB Mainline
- 50% of the crashes were single vehicle
- 30 of the crashes were Motor Vehicle in Transport (42%)
- Predominant violations for the crashes were Speed Too Fast for Conditions (26%) and No Improper Action (32%)

Fatal Crashes
1 crash: WB Mainline approximately half a mile after the WB Rest Area on ramp
Violation: Unknown

1 crash: EB Mainline roughly one mile prior to the EB Rest Area off-ramp
Violation: Unknown

Parking Area Crashes
None

Ramp Crashes
1 crash: EB Rest Area off-ramp
Violation: Failed to Keep in Proper Lane

6. SACATON

The crash analysis statistics at the Sacaton Rest Area include the following:

- Total number of crashes: 282
- The highest occurrences of crashes occurred in Year 2021 at 76 (27%)
- More then half of the crashes occurred on the WB Mainline
- Approximately 56% of the crashes were rear end crashes.
- 202 crashes were classified as Motor Vehicle in Transport (72%)
- Predominant violations for the crashes were Speed Too Fast for Conditions (50%)

Fatal Crashes
1 crash: EB Mainline roughly 0.5 miles east of EB Rest Area off-ramp
Violation: Speed too Fast for Conditions

1 crash: WB Mainline roughly 0.5 miles west of WB Rest Area off-ramp
Violation: Failed to Keep in Proper Lane

1 crash: WB Mainline roughly a mile west of WB Rest Area off-ramp
Violation: Failed to Keep in Proper Lane

1 crash: WB Mainline between the Rest Areas
Violation: Speed too Fast for Conditions

Parking Area Crashes
1 crash: EB Rest Area
Violation: No Improper Action

Ramp Crashes
None

7. Texas Canyon

The crash analysis statistics at the Texas Canyon Rest Area include the following:

- Total number of crashes: 56
- The highest occurrences of crashes occurred in Year 2019 at 17 (30%)
- Roughly 39 (70%) of the total crashes occur on the EB Mainline
- Approximately 70% of the crashes were single vehicle
- About 18% of the crashes were classified as Overturn Rollover and 25% were classified as Motor Vehicle in Transport.
- Predominant violations for the crashes were Speed Too Fast for Conditions (41%) and No Improper Action (43%).

Fatal Crashes
1 crash: WB Mainline roughly a mile west of WB Rest Area on-ramp
Violation: No Improper Action

Parking Area Crashes
None

Ramp Crashes
1 crash: EB Rest Area off-ramp
Violation: Unsafe Lane Change

8. San Simon

The crash analysis statistics at the San Simon Rest Area include the following:

- Total number of crashes: 29
- Years 2020 to 2021 had the highest amount of crashes at 8 each (28%)
- Roughly 18 (62%) of the total crashes occurred on the EB Mainline
- 69% of the crashes were single vehicle
- The collision type for about 24% of the crashes was classified as Motor Vehicle in Transport
- Predominant violations for the crashes were No Improper Action (24%)

Fatal crashes
1 crash: EB Mainline roughly near the EB Rest Area on-ramp

Violation: Other

Parking Area Crashes
None

Ramp Crashes
2 crashes: WB Rest Area on-ramp
Violation: Speed Too Fast for Conditions and Other

9. *Sunset Point*

The crash analysis statistics at the Sunset Point Rest Area include the following:

- Total number of crashes: 96
- Years 2020 to 2021 had the highest amount of crashes at 52 each (23%)
- Half of the total crashes occurred on the Northbound (NB) Mainline (54%)
- 48% of the crashes were single vehicle, however rear end collisions accounted for at least 35% of the crashes
- The collision type for about 47% of the crashes was classified as Motor Vehicle in Transport
- Predominant violations for the crashes were Speed Too Fast for Conditions (41%) and No Improper Action (29%)

Fatal Crashes
1 crash: NB Mainline near the NB off-ramp for the Rest Area
Violation: Exceeded Lawful Speed.

1 crash: NB Mainline near the NB on-ramp for the Rest Area
Violation: Unknown.

1 crash: Southbound (SB) Mainline approximately a mile south of the SB on-ramp for the Rest Area
Violation: Speed too Fast for Conditions.

1 crash: SB Mainline 0.5 mile south of the SB on-ramp for the Rest Area
Violation: Failed to Keep in Proper Lane.

1 crash: SB Mainline near the SB on-ramp for the Rest Area
Violation: Failed to Keep in Proper Lane.

Parking Area Crashes
None

Ramp Crashes
1 crash: NB Rest Area off-ramp
Violations: Speed Too Fast for Conditions

1 crash: SB Rest Area on-ramp
Violation: No Improper Action

10. *Canoa Ranch*

The crash analysis statistics at the Canoa Ranch Rest Area include the following:

- Total number of crashes: 40
- The highest occurrence of crashes was in Year 2019 at 15 (38%)
- More than half of the crashes were on the SB Mainline

- 60% of the crashes were Single Vehicle
- The collision type for 25% of the crashes was classified as Collision with an Animal and another 25% was Motor Vehicle in Transport.
- Predominant violations for the crashes were Speed Too Fast for Conditions (33%) and No Improper Action (43%).

Fatal Crashes
None

Parking Area Crashes
None

Ramp Crashes
None

11. *HAVILAND*

The crash analysis statistics at the Haviland Rest Area include the following:

- Total number of crashes: 18
- The highest occurrence of crashes was in Year 2018 at 7 (39%)
- 83% of the crashes were on the EB Mainline
- Roughly 72% of the crashes were single vehicle
- The collision type for about 22% of the crashes was classified as Overturning and another 28% were classified as Motor Vehicle in Transport.
- The predominant violation for the crashes was No Improper Action (44%).

Fatal Crashes
1 crash: EB Mainline near the EB off-ramp for the Rest Area
Violation: Speed too Fast for Conditions.

Parking Area Crashes
None

Ramp Crashes
None

12. *PAINTED CLIFFS*

The crash analysis statistics at the Painted Cliffs Rest Area include the following:

- Total number of crashes: 14
- The highest occurrence of crashes was in Year 2021 at 7 (50%)
- More than half of the crashes were on the EB Mainline (64%)
- Roughly 64% of the crashes were Single Vehicle
- The collision type for about 29% of the crashes were Motor Vehicle in Transport
- Predominant violations for the crashes were Speed Too Fast for Conditions (29%) and Unknown (36%)

Fatal Crashes
None

Parking Area Crashes
None

Ramp Crashes
2 crashes: EB Rest Area off-ramp
Violation: Unknown and Other

13. Hassayampa

The crash analysis statistics at the Hassayampa Rest Area include the following:

- Total number of crashes: 43
- The highest occurrence of crashes occurred in Year 2009 at 14 (33%)
- 51% of the crashes were on the EB Mainline
- Roughly 75% of the crashes were single vehicle
- The collision type for about 30% of the crashes were Collision with Animals and another 30% as Collision with Fixed Object
- Predominant violations for the crashes are Inattention/Distraction and Failed to Yield Right of Way

Fatal Crashes
1 crash: EB Mainline approximately a quarter of a mile west of the Rest Area entrance
Violation: Speed too Fast for Conditions.

1 crash: WB Mainline approximately 0.1 mile west of the Rest Area entrance
Violation: Speed too Fast for Conditions.

Parking Area Crashes
6 crashes: Rest Area
Violation: Speed Too Fast for Conditions, Failed to Yield Right of Way, and No Improper Action

Intersection Crashes
10 crashes: Rest Area Intersection
Violation: Unsafe Lane Changes, Speed Too Fast for Conditions, Ran Stop Sign, Failed to Keep in Proper Lane, Failed to Yield Right of Way, and No Improper Action

14. Salt River Canyon

The crash analysis statistics at the Salt River Canyon Rest Area include the following:

- Total number of crashes: 16
- The highest occurrence of crashes occurred in Year 2018 at 10 (63%)

- Half of the crashes were on the SB Mainline
- Nearly all of the crashes were single vehicle (88%)
- The collision type for about 31% of the crashes was Overturn Rollover
- The predominant violation for the crashes was Speed Too Fast for Conditions (69%)

Fatal Crashes
None

Parking Area Crashes
None

Ramp Crashes
None

15. *MAZATZAL*

The crash analysis statistics at the Mazatzal Rest Area include the following:

- Total number of crashes: 33
- The highest occurrence of crashes occurred in Year 2020 at 10 (30%)
- Majority (67%) all of the crashes were on the WB Mainline
- Nearly all of the crashes were single vehicle (61%)
- The collision type for about 39% of the crashes was Motor Vehicle in Transit
- Predominant violations for the crashes were No Improper Action (36%) and Speed Too Fast for Conditions (7%)

Fatal Crash
1 crash: WB SR 188 Mainline, at the Rest Area entrance intersection
Violation: Failed to Yield Right of way

Parking Area Crashes
None

Intersection Crashes
7 crashes: Rest Area Intersection
Violation: Speed Too Fast for Conditions, Failed to Yield Right of Way, and No Improper Action

16. *MCGUIREVILLE*

The crash analysis statistics at the McGuireville Rest Area include the following:

- Total number of crashes: 104
- The highest occurrences of crashes occurred in the Year 2019 at 27 (26%) and in Years 2017 and 2021, when 25 (24%) crashes occurred
- More than half of the total crashes occur on the SB Mainline (73%)
- Nearly 73% of the crashes were single vehicle

- The collision type for about 26% of the crashes was classified as Motor Vehicle in Transport and another 23% were classified as Overturn Rollover
- The predominant violation for the crashes was Speed Too Fast for Conditions

Fatal Crashes
1 crash: SB Mainline near SB Rest Area on-ramp
Violation: Crossed Median

Parking Area Crashes
None

Ramp Crashes
1 crash: NB Rest Area on-ramp
Violations: Speed Too Fast for Conditions

2 crashes: SB Rest Area on-ramp
Violation: Disregarded Traffic Signal and No Improper Action

17. PARKS

The crash analysis statistics at the Parks Rest Area include the following:

- Total number of crashes: 54
- The highest occurrence of crashes occurred in Year 2017 at 20 (37%)
- Just about half of all of the crashes were on the WB Mainline
- 67% of the crashes were single vehicle
- The collision type for about 30% of the crashes was Motor Vehicle in Transport
- The predominant violation for the crashes was No Improper Action

Fatal Crash
None

Parking Area Crashes
None

Ramp Crashes
None

18. METEOR CRATER

The crash analysis statistics at the Meteor Crater Rest Area include the following:

- Total number of crashes: 38
- The highest occurrence of crashes occurred in Year 2020 at 12 (32%)
- 71% of the crashes were on the EB Mainline
- 53% of the crashes were single vehicle

- The collision type for about 45% of the crashes was classified as Motor Vehicle in Transport and 24% as Overturn Rollover
- Predominant violations for the crashes were No Improper Action (29%) and Speed Too Fast for Conditions (32%)

Fatal Crashes
1 crash: EB Mainline approximately a quarter mile east of the EB Rest Area on-ramp
Violation: Failed to Keep in Proper Lane

Parking Area Crashes
None

Ramp Crashes
1 crash: WB Rest Area off-ramp
Violation: Speed Too Fast for Conditions
1 crash: EB Rest Area on-ramp
Violation: No Improper Action

19. Christensen

The crash analysis statistics at the Meteor Crater Rest Area include the following:

- Total number of crashes: 69
- The highest occurrence of crashes occurred in Year 2018 at 19 (28%) and in Year 2017 at 16 (23%)
- 59% of the crashes were on the NB Mainline
- 86% of the crashes were single vehicle
- The collision type for about 39% of the crashes was classified as Collision with an Animal and 23% as Overturn Rollover
- Predominant violations for the crashes were No Improper Action (52%) and Speed Too Fast for Conditions (30%)

Fatal Crashes
1 crash: NB Mainline approximately a quarter mile south of the NB Rest Area off-ramp
Violation: Failed to Keep in Proper Lane

Parking Area Crashes
None

Ramp Crashes
None

FIGURE B-1: SEVERITY OF INJURY
(JANUARY 2017-DECEMBER 2021)

RA No	Rest Area	Fatal	Injury				Rest Area Total
			No	Possible	Suspected Minor	Suspected Serious	
1	Mohawk	1	25		7	3	36
2	Sentinel	1	20	2	9		32
3	Ehrenberg		32	5	2	2	41
4	Bouse Wash		31	7	7		45
5	Burnt Well	2	49	3	15	3	72
6	Sacaton	4	203	25	46	4	282
7	Texas Canyon	1	42	4	8	1	56
8	San Simon	1	17	5	5	1	29
9	Sunset Point	5	154	18	39	6	222
10	Canoa Ranch		30	6	4		40
11	Haviland	1	11	1	5		18
12	Painted Cliffs		10	2	1	1	14
13	Hassayampa	2	30	10	11	2	55
14	Salt River Canyon		8	2	4	2	16
15	Mazatzal	1	22	1	5	4	33
16	McGuireville	1	69	9	19	6	104
17	Parks		45	3	5	1	54
18	Meteor Crater	1	23	6	7	1	38
19	Christensen	1	51	2	13	2	69
	Grand Total	22	872	111	212	39	1256

FIGURE B-2: TYPES OF COLLISIONS (JANUARY 2017-DECEMBER 2021)

RA No.	Rest Area	Collision with Animal	Collision with Vehicle	Collision with Pedestrian	Overturning or Jackknife	Collision with Fixed Object	Other	Rest Area Total
1	Mohawk	2	10	0	4	16	4	36
2	Sentinel	1	8	0	10	8	5	32
3	Ehrenberg	0	24	0	3	5	9	41
4	Bouse Wash	0	25	0	4	4	12	45
5	Burnt Well	1	34	1	10	15	11	72
6	Sacaton	3	207	0	25	28	19	282
7	Texas Canyon	2	15	0	10	18	11	56
8	San Simon	4	9	0	0	13	3	29
9	Sunset Point	4	108	0	34	42	34	222
10	Canoa Ranch	10	11	0	5	8	6	40
11	Haviland	2	5	0	4	4	3	18
12	Painted Cliffs	1	5	0	1	7	0	14
13	Hassayampa	9	26	0	6	11	3	55
14	Salt River Canyon	0	2	0	5	4	5	16
15	Mazatzal	8	13	0	5	5	2	33
16	McGuireville	5	27	0	24	31	17	104
17	Parks	16	17	0	8	7	6	54
18	Meteor Crater	0	18	0	10	5	5	38
19	Christensen	27	8	0	16	8	10	69
Grand Total		95	572	1	184	239	165	1256

FIGURE B-3: MANNER OF COLLISION (JANUARY 2017-DECEMBER 2021)

RA No.	Rest Area	Angle (Front To Side) (Other Than Left Turn)	Head On	Left Turn	Rear End	Rear To Side	Sideswipe	Single Vehicle	U Turn	Other/Unknown	Rest Area Total
1	Mohawk		1		4		4	25		2	36
2	Sentinel				2		6	19		5	32
3	Ehrenberg				9		13	16		3	41
4	Bouse Wash				12	1	12	18		2	45
5	Burnt Well				14		19	36		3	72
6	Sacaton				158		43	66		15	282
7	Texas Canyon				7		8	39		2	56
8	San Simon				3		6	20			29
9	Sunset Point		1		77		30	106		8	222
10	Canoa Ranch				6		4	24		6	40
11	Haviland				3		1	13		1	18
12	Painted Cliffs						4	9		1	14
13	Hassayampa	6		7	4		6	26	1	5	55
14	Salt River Canyon						2	14			16
15	Mazatzal	3		2	4		4	20			33
16	McGuireville	1	2		10		11	75	1	4	104
17	Parks		1		2		12	36		3	54
18	Meteor Crater		1		7		9	20		1	38
19	Christensen				6		1	59		3	69
Grand Total		10	6	9	328	1	195	641	2	64	1256

FIGURE B-4: JUNCTION RELATED CRASHES (JANUARY 2017-DECEMBER 2021)

RA No.	Rest Area	No Relationship	Driveway Or Alley	Entrance/ Exit Ramp	Entrance/Exit Ramp Interchange	Intersection	Intersection Related Non Interchange	Intersection Related Non Interchange	Other/ Unknown	Rest Area Total
1	Mohawk	35		1						36
2	Sentinel	32								32
3	Ehrenberg	37		3					1	41
4	Bouse Wash	42		2					1	45
5	Burnt Well	71		1						72
6	Sacaton	281				1				282
7	Texas Canyon	55		1						56
8	San Simon	26		2					1	29
9	Sunset Point	218		1	1				2	222
10	Canoa Ranch	40								40
11	Haviland	18								18
12	Painted Cliffs	12		2						14
13	Hassayampa	38	5			9	1	1	1	55
14	Salt River Canyon	16								16
15	Mazatzal	25				7			1	33
16	McGuireville	101		2	1					104
17	Parks	54								54
18	Meteor Crater	36		2						38
19	Christensen	69								69
Grand Total		1206	5	17	2	17	1	1	7	1256

FIGURE B-5: CRASHES BY LOCATION
(JANUARY 2017-DECEMBER 2021)

RA No	Rest Area	Mainline				Off-Ramp				On-Ramp				Unknown	Rest Area Entrance/ Exit Intersection	Parking Area	Rest Area Total
		EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB				
1	Mohawk	13	21							1				1			36
2	Sentinel	20	11											1			32
3	Ehrenberg	23	15				1			1	1						41
4	Bouse Wash	18	23			1	1							2			45
5	Burnt Well	43	28			1											72
6	Sacaton	118	145	11	5									2		1	282
7	Texas Canyon	38	17			1											56
8	San Simon	18	9								2						29
9	Sunset Point			118	99			1					1	3			222
10	Canoa Ranch			18	21									1			40
11	Haviland	15	2											1			18
12	Painted Cliffs	7	4			2								1			14
13	Hassayampa	21	16											2	10	6	55
14	Salt River Canyon	8	8														16
15	Mazatzal			18	7									1	7		33
16	McGuireville			27	75							1	1				104
17	Parks	25	27											2			54
18	Meteor Crater	26	10				1			1							38
19	Christensen			41	28												69
Grand Total		393	336	233	235	5	3	1	0	3	3	1	2	17	17	7	1256

FIGURE B-6: CRASHES BY YEAR
(JANUARY 2017-DECEMBER 2021)

RA No	Rest Area	Year					Rest Area Total
		2017	2018	2019	2020	2021	
1	Mohawk	6	7	8	8	7	36
2	Sentinel	1	9	7	12	3	32
3	Ehrenberg	8	7	13	4	9	41
4	Bouse Wash	8	8	12	8	9	45
5	Burnt Well	10	17	11	14	20	72
6	Sacaton	51	53	54	48	76	282
7	Texas Canyon	10	10	17	9	10	56
8	San Simon	6	1	6	8	8	29
9	Sunset Point	43	38	37	52	52	222
10	Canoa Ranch		7	7	2	2	18
11	Haviland	6	7	2	3		18
12	Painted Cliffs	2	2	2	1	7	14
13	Hassayampa	11	11	14	9	10	55
14	Salt River Canyon	2	10	1	2	1	16
15	Mazatzal	3	5	6	10	9	33
16	McGuireville	25	14	27	13	25	104
17	Parks	20	9	12	7	6	54
18	Meteor Crater	4	6	6	12	10	38
19	Christensen	16	19	13	8	13	69
Grand Total		232	240	255	230	277	1234

FIGURE B-7: LIGHTING CONDITIONS
(JANUARY 2017-DECEMBER 2021)

RA No.	Rest Area	Dark Lighted	Dark Not Lighted	Dark Unknown Lighting	Dawn	Daylight	Dusk	Unknown	Rest Area Total
1	Mohawk	1	7		1	25	2		36
2	Sentinel		4		1	27			32
3	Ehrenberg	5	10		2	24			41
4	Bouse Wash	3	13		5	24			45
5	Burnt Well	2	24		4	39	3		72
6	Sacaton	13	62		6	192	9		282
7	Texas Canyon	1	15		2	35	3		56
8	San Simon	4	6		2	15	2		29
9	Sunset Point	7	57		6	139	12	1	222
10	Canoa Ranch		13	1	1	22	2	1	40
11	Haviland		9			9			18
12	Painted Cliffs	2	3			7	2		14
13	Hassayampa	2	12		3	37	1		55
14	Salt River Canyon		7			9			16
15	Mazatzal	1	16			15	1		33
16	McGuireville	5	16		1	77	5		104
17	Parks		19		3	32			54
18	Meteor Crater	8	10		3	15	2		38
19	Christensen	1	34		1	33			69
Grand Total		55	337	1	41	776	44	2	1256

FIGURE B-8: WEATHER CONDITIONS
(JANUARY 2017-DECEMBER 2021)

RA No.	Rest Area	Blowing Sand Soil Dirt	Clear	Cloudy	Fog Smog Smoke	Rain	Sleet Hail Freezing Rain Or Drizzle	Snow	Snow Or Blowing Snow	Other/ Unknown	Rest Area Total
1	Mohawk		31	2		3					36
2	Sentinel		28			4					32
3	Ehrenberg	1	30	7		3					41
4	Bouse Wash		39	5		1					45
5	Burnt Well		64	5	1	1				1	72
6	Sacaton	1	259	16		6					282
7	Texas Canyon		27	9		18	1		1		56
8	San Simon		25	3		1					29
9	Sunset Point		188	20		11	1		1	1	222
10	Canoa Ranch		34	6							40
11	Haviland		16	1						1	18
12	Painted Cliffs		10	4							14
13	Hassayampa		43	9		3					55
14	Salt River Canyon		11	4					1		16
15	Mazatzal		22	8		2			1		33
16	McGuireville		45	15		43	1				104
17	Parks		37	11			2		3	1	54
18	Meteor Crater		34	3					1		38
19	Christensen		48	6	1	1	2	3	8		69
Grand Total		2	991	134	2	97	7	3	16	4	1256

Appendix C
Rest Area Hazardous Materials List

Preliminary Hazardous Materials Evaluation Results[a]

Rest Area	Environmental Database Ranking[b]	Aerial Review (Ancillary Buildings and Structures) Ranking[c]
Mohawk Rest Area	**High:** This facility is part of the Groundwater Protection Program (GPP) and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 3 wells in area: 2 registered to the Arizona Department of Transportation (ADOT).	**High:** Buildings. • West Bound (WB): 2 structures, western portion of rest area. • East Bound (EB): Building, eastern portion of rest area. **Unknown:** Disturbed areas. • WB: Disturbed rectangular area, western portion of rest area. • EB: Irregular disturbed area, eastern portion of rest area. Another disturbed area east of previous listed area.
Ehrenberg Rest Area	**High:** This facility is part of the Drinking Water Program (DWP and Refuse Disposal Program, and a wastewater permit (possible septic tanks). Compliance required for regulatory closure. **Low:** other listings. 1 well in area, none registered to ADOT.	**High:** Buildings and ponds. • WB: Water tank and pump house, northeastern portion of rest area. 2 evaporation/settling ponds, northwestern portion of rest area. Cluster of 2 shed/housing buildings and another structure, western portion of rest area. • EB: Nothing identified based on review of aerial photographs.
Bouse Wash Rest Area	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure.	**High:** Buildings and ponds. • WB: water tank and pump house, northwestern portion of rest area. • EB: 2 large rectangular evaporation/settling ponds, southeastern portion of rest area.
Burnt Well Rest Area	**High:** The facility is part of the DWP and has a wastewater permit (possible septic tanks). Compliance required for regulatory closure. **Medium:** 3 wells in area registered to ADOT.	**High:** Buildings. • WB: Storage/housing structure with another possible structure, eastern portion of rest area. • EB: Water tank, pump house, storage shed/housing, southeastern portion of rest area. Another possible structure in same cluster. **Unknown:** Disturbed areas. • WB: Disturbed rectangular area northeastern portion of rest area. • EB: Irregular disturbed area, eastern portion of rest area. Possible septic field, south of the rest area.

Preliminary Hazardous Materials Evaluation Results[a]

Rest Area	Environmental Database Ranking[b]	Aerial Review (Ancillary Buildings and Structures) Ranking[c]
Sacaton Rest Area	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 2 wells registered to ADOT. **Low:** other listings.	**High:** Buildings and ponds. • SB: 2 evaporation/settling ponds, northwestern portion of rest area; 2 structures, southeastern portion of rest area. • NB: 1 evaporation/settling pond, northwestern portion of rest area; storage/housing building to SE. **Unknown:** Disturbed area. • SB: No disturbed areas identified based on review of aerial photographs. • NB: Disturbed square area, eastern portion of rest area.
Texas Canyon Rest Area	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure. **Low:** other listing.	**High:** Buildings and ponds. • WB: 3 evaporation/settling ponds, southwestern portion of rest area; water tank and pump house, northern portion of rest area. • EB: 3 evaporation/settling ponds, southern portion of rest area; storage shed/housing structure, southeastern portion of rest area.
San Simon Rest Area	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 1 well in area registered to ADOT. **Low:** other listings.	**High:** Buildings. • WB: Nothing identified based on review of aerial photographs. • EB: Water tank, pump house, and shed/housing buildings, southeastern portion of rest area. **Unknown:** Disturbed areas • WB: Disturbed area to the west of the rest area, potential septic field; second disturbed area on the western portion of the rest area. • EB: Disturbed area southwest of rest area, potential septic field; second potential septic field between housing buildings and pump house.
Sunset Point Rest Area (only SB)	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 1 well in area registered to ADOT. **Low:** other listings.	**High:** Buildings and ponds. • SB: 2 large evaporation/settling ponds, water tank, pump house, and 2 additional structures near ponds, northern portion of rest area. Solar panel array, southwest of the water tank and pump house. 12 manhole covers, various locations. **Unknown:** Disturbed area. • SB: 1 disturbed square area, northern portion of rest area and south of ponds. Former pond.

Preliminary Hazardous Materials Evaluation Results[a]

Rest Area	Environmental Database Ranking[b]	Aerial Review (Ancillary Buildings and Structures) Ranking[c]
Canoa Ranch Rest Area	**Medium:** 1 well in area registered to ADOT. **Unknown:** ADEQ listing incomplete; possible permit.	**High:** Buildings. • SB: Water tank, pump house and shed/housing building, southwestern portion of rest area. • NB: Nothing identified based on review of aerial photographs. **Unknown:** Storage Area. • SB: A storage area is located on the northern portion of rest area. Vehicles and construction equipment are apparent in aerial photographs. • NB: No disturbed areas identified based on review of aerial photographs.
Painted Cliffs Rest Area (only WB)	**Medium:** This facility is part of the DWP and GPP. Compliance required for regulatory closure. **Low:** other listing.	**High:** Buildings. • WB: Water tank, pump house, and shed/housing, southwestern portion of rest area; other possible structures in cluster.
Hassayampa Rest Area (only SB)	**Medium:** 6 wells in area, 1 registered to ADOT. **Low:** other listings. **Unknown:** Tier 2 listing for a facility (Circle City Co, ERIS ID #1) with no listed address, no evidence that facility exists at mapped location.	**Low:** Buildings. • SB: Nothing identified based on review of aerial photographs.
Salt River Canyon Rest Area (only EB)	**Medium:** 1 well registered to ADOT. **Low:** other listings.	**High:** Buildings. • EB: 1 building to north but resolution is not clear enough to determine more.
Mazatzal Rest Area (only SB)	**High:** This facility is part of the DWP and GPP, and has a wastewater permit. Compliance required for regulatory closure.	**High:** Buildings and ponds. • SB: Water tank and other structures, southeastern portion of rest area. Probable 1 large, 2 smaller evaporation/settling ponds filled in with vegetation adjacent to water tank and structures.

Preliminary Hazardous Materials Evaluation Results[a]

Rest Area	Environmental Database Ranking[b]	Aerial Review (Ancillary Buildings and Structures) Ranking[c]
McGuireville Rest Area	**High:** This facility is part of the DWP and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 4 wells in area, 3 registered to ADOT.	**High:** Buildings and ponds. • SB: 1 large and 1 small evaporation/settling pond. • NB: 2 evaporation/settling ponds filled with vegetation to the southeast; 1 large building with water tank, possible pump house, and an unknown structure, southern portion of rest area.
Parks Rest Area	**Low:** other listings. **Unknown:** ADEQ listing incomplete; possible permit.	**High:** Buildings. • WB: Cluster of structures/buildings, northwestern portion of rest area. • EB: Nothing identified based on review of aerial photographs. **Unknown:** Disturbed areas. • WB: No disturbed areas identified based on review of aerial photographs. • EB: Disturbed rectangular area, southern portion of rest area.
Meteor Crater Rest Area	**High:** WB and EB: This facility is part of the GPP and has a wastewater permit. Compliance required for regulatory closure. EB only: This facility is part of the DWP and Air Programs. Compliance required for regulatory closure. **Medium:** 1 well in area registered to ADOT. **Low:** other listing.	**High:** Buildings and ponds. • WB: 2 evaporation/settling ponds, northeastern portion of rest area. • EB: 2 buildings, southwestern portion of rest area, 2 water tanks and pump house.. Possible house or storage building, with another small structure on the south-central poriton. 2 rectangular evaporation/settling ponds eastern portion of rest area. Overflow parking area, west of evaporation/settling ponds.
Christensen Rest Area	**High:** This facility is part of the DWP. Compliance required for regulatory closure. **Low:** other listing.	**Unknown:** Disturbed areas. • NB: Disturbed area with potential concrete foundations and water tank, western portion. • SB: Rectangular disturbed area on southeast portion.
Haviland Rest Area	**High:** This facility is part of the DWP. Compliance required for regulatory closure. **Medium:** 3 wells registered to ADOT. **Low:** other listings.	**High:** Buildings and septic fields • EB: Building cluster on northern portion, pump house and water tank, potential residence or storage building, septic field northwest of residence/storage building. Septic field east of rest area. • WB: Septic field west of rest area. Potential structure south of rest area.

Preliminary Hazardous Materials Evaluation Results[a]

Rest Area	Environmental Database Ranking[b]	Aerial Review (Ancillary Buildings and Structures) Ranking[c]
Sentinel Rest Area	**High:** This facility is part of the DWP and has a wastewater permit. Compliance required for regulatory closure. **Medium:** 1 well registered to ADOT. **Low:** other listings.	**High:** Buildings and ponds. • EB: Building cluster, east of rest area; evaporation/settling pond filled with vegetation, southwest portion of rest area. • WB: 2 buildings, one on the northeast and one on the west portion of the rest area; evaporation/settling pond filled with vegetation, southwest portion of rest area.

[a] If any of the rest areas have a dump station for recreational vehicles, the contents of the dump station may need to be sampled in the event of a closure.

[b] Environmental Database Rankings. For permits, rankings based on regulatory process required for permit modification for renovation/expansion and permit closure for demolition. Rankings for wells based on well capacity for renovation/expansion and well abandonment for closure. Rankings for other listings, including spills, based on perceived hazardous materials issues regardless of renovation/expansion or closure.

[c] Aerial Review Rankings. Rankings based on perceived hazardous materials issues associated with visible buildings and ancillary structures, including asbestos and/or lead based paint sampling and abatement for structure renovation or demolition. Rankings may coincide with environmental database rankings for permits. Unknown rankings based on indeterminate origin of disturbed areas.

Appendix D

Rest Area Cultural Resources List

Appendix D–Cultural Resources Identified Within 0.25 Miles of Rest Area Locations

Discussion: If the proposed rest area rehabilitations are completed using federal or state funds, they will be subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (54 United States Code [USC] 306108, implementing regulations at 36 Code of Federal Regulations [CFR] Part 800, the Arizona Antiquities Act (Arizona Revised Statutes [ARS] §§ 41-841 through 846) and the State Historic Preservation Act (ARS §§ 41-861 through 41-864). ***Table 1-1***summarizes the results of a desktop review of known cultural resources within an 0.25-mile review area of each rest area. The data contained in the desktop review is derived from AZSITE, Arizona's electronic cultural resources database

Only general locational information is presented in ***Table 1-1*** given the fact that a disturbance footprint for any future planned rehabilitation projects is unknown.

Once these rehabilitation projects are funded and a disturbance footprint is established, future cultural resources compliance would include the following general tasks:

- Establishment of a project area of potential effects (APE), including relevant land ownership, for the analysis of cultural resources data.
- Review of cultural resources site and project data within the APE and review area with the ADOT Historic Preservation Team Portal and relevant land managing agencies to determine if new or additional cultural resources survey is required and to identify the locations and NRHP eligibility status of previously recorded cultural resources sites.
- Determine whether any avoidance or mitigation measure as required for potential historic properties in the APE.
- Review of the construction data of each rest area to establish whether the facilities are of historic age and require evaluation for National Register of Historic Places (NRHP) eligibility.
- Review the project under the provisions of ADOT's *Programmatic Agreement Pursuant to Section 106 of the National Historic Preservation Act Regarding Implementation of Federal-Aid Transportation Projects in the State of Arizona* (2016) and as amended to determine whether the project qualifies as a screened exemption.
- Conduct Section 106 or SHPA consultation with relevant agencies and tribal nations, as applicable.

Table 1-1.Cultural Resources Identified within 0.25 Miles of Rest Area Locations

Site Name/No.	Site Description	NRHP Eligibility (Criterion)[1, 2]
Mohawk		
AZ Y:2:33(ASM)	1870s communications (telegraph) line	Determined eligible (A)
AZ FF:9:17(ASM)	Road-US 80	Determined eligible (D)

Site Name/No.	Site Description	NRHP Eligibility (Criterion)[1, 2]
Sentinel		
AZ FF:9:17(ASM)	Road-US 80	Determined eligible (D)
Ehrenberg		
AZ-050-0763	Desert pavement clearing and trail	Unknown eligibility
Bouse Wash		
None identified		
Burnt Well		
None identified		
Sacaton		
None identified		
Texas Canyon		
None identified		
San Simon		
AZ AA:16:377(ASM)/ Ajo-Tucson Highway	Road-State Route (SR) 86	Determined eligible (D)
AZ CC:16:16(ASM)	Communications (telephone) line	Not considered eligible
Sunset Point		
AZ N:16:142(ASM)	Prehistoric artifact scatter, field house, petroglyph	Considered eligible (D)
Canoa Ranch		
AZ DD:4:53(ASM)	Hohokam artifact scatter, undefined rock alignment and rock pile	Determined eligible (D)
AZ DD:4:54(ASM)	Hohokam artifact scatter	Determined eligible (D)
AZ DD:4:55(ASM)	Hohokam artifact scatter	Determined eligible (D)
AZ DD:4:56(ASM)	Hohokam pithouse	Determined eligible (D)
AZ DD:4:74(ASM)/ Canoa Ranch	Historic ranch	NRHP-listed (No. 04001158) (A, C)
AZ DD:4:234(ASM)	Hohokam rock piles and rock ring	Determined eligible (D)
AZ DD:4:235(ASM)	Archaic/Hohokam lithic scatter	Not considered eligible
AZ DD:4:250(ASM)	Prehistoric hearths, lithic scatter, rock pile, and rock rings	Determined eligible (D)
Haviland		
AZ I:15:156(ASM)/ Historic Route 66	Road – US 66	Determined eligible (A)
Painted Cliffs[3] *(Tribal Land)*		
AZ I:15:156(ASM)/ Historic Route 66	Road – US 66	Determined eligible (A)

Site Name/No.	Site Description	NRHP Eligibility (Criterion)[1, 2]
AZ K:12:3(ASM)/ The Green Bear Site	Prehistoric artifact scatter and pithouse village site	Determined eligible/Contributor (D)
AZ K:12:78(ASM)	Prehistoric pueblo site with up to 150 rooms (up to 3 stories), artifact scatter, and 2 burials	Determined eligible/Individually (D)
AZ K:12:237(ASM)	Prehistoric room block with 40-50 rooms and artifact scatter	Determined eligible/Individually (D)
AZ K:12:238(ASM)	Prehistoric pueblo site, room block with up to 10 rooms, and artifact scatter	Determined eligible/Individually (D)
AZ K:12:239(ASM)	Prehistoric artifact scatter	Determined eligible/Individually (D)
AZ K:12:260(ASM)	Prehistoric artifact scatter	Unevaluated
AZ K:12:261(ASM)	Historic road trails and two clusters of structures	Determined eligible/Individually (D)
AZ K:12:262(ASM)	Prehistoric artifact scatter	Unevaluated
AZ K:12:263(ASM)	Prehistoric bedrock staircase with 23 hand and foot holds	Determined eligible/Individually (C, D)
AZ K:12:264(ASM)	Prehistoric rock art with at least seven elements	Determined eligible/Individually (C, D)
AZ K:12:265(ASM)	Historic house remnants	Determined ineligible/Individually
NA22492	Hearth with basalt cobbles and auto parts	Status unknown
NA22494	Large pithouse village with 12+ depressions, possible kiva, and trash	Status unknown
Hassayampa		
AZ N:3:32(ASM)/Santa Fe, Prescott, and Phoenix Railway Line/Atchison, Topeka & Santa Fe Railway	Railroad line constructed in 1890s	Determined eligible (A)
AZ T:2:143(ASM)/ Wickenburg to Dysart-69kV Transmission Line	Historic transmission Line	Determined eligible individually (A)
Salt River Canyon		
None identified		
Mazatzal		
AZ AA:6:63(ASM)/SR 87/ Beeline Highway/ SR 65/SR 166	Road-SR 87	Considered eligible (D)
AZ O:15:110 (ASM)	Salado habitation	Considered eligible

Site Name/No.	Site Description	NRHP Eligibility (Criterion)[1, 2]
AZ O:15:111 (ASM)	Salado field house	Not considered eligible
AZ O:15:112(ASM)	Salado field house and undefined rock alignment	Not considered eligible
NA17230	Salado/Sinagua artifact scatter, masonry structure, and check dams	Status unknown
NA17231	Salado/Sinagua artifact scatter and habitation	Status unknown
NA17232	Salado/Sinagua rock alignments and lithic scatter	Status unknown
NA17233	Salado/Sinagua artifact scatter and habitation	Status unknown
McGuireville		
AZ O:5:177(ASM)	Historic road trail/two-track road	Not evaluated
Parks		
AZ I:15:156(ASM)/ Historic Route 66	Road – US 66	Determined eligible (A)
Meteor Crater		
AZ I:15:156(ASM)/ Historic Route 66	Road – US 66	Determined eligible (A)
AZ J:13:6(ASM)	Historic room block	Status unknown
Christiansen		
NA21196	Historic logging camp and lithic scatter	Not evaluated

[1] Considered/Recommended=recorder's opinion. Determined=agency determination with State Historic Preservation Office (SHPO) concurrence.
[2]NRHP eligibility derived from AZSITE, Arizona's electronic cultural resources database.
[3] Data returned from AZSITE for the Painted Cliffs Rest Area suggests the presence of a historic district. This could not be confirmed by the desktop review.

Appendix E
Potential ASOs Partnerships

Mohawk Rest Area (I-8, MP 56)

- Minute Mart Travel Center (Pilot Travel Center) – This ASO is located 15 miles west of the Mohawk Rest Area at Exit 42. It is open 24 hours a day, 7 days a week and has 6 fuel lanes and 120 parking spots.

Sentinel Rest Area (I-8, MP 83.8)

- Dateland Travel Center (Texaco Station) - This ASO is located 14 miles west of the Sentinel Rest Area along I-8 at Exit 67. It is open 24 hours a day, 7 days a week. This ASO is also 11 miles east of Mohawk Rest Area.

Ehrenberg Rest Area (I-10, MP 4.7-5.1)

- Shell Gas Station – This ASO is located 1/2 mile east of the Ehrenberg Rest Area, along I-10 at exit 5. It is open 24 hours a day, 7 days a week.
- Flying J Travel Plaza – This ASO is located 4 miles west of the Ehrenberg Rest Area, at I-10 exit 1. It is open 24 hours a day, 7 days a week and has 10 fuel lanes and 271 truck parking spaces.
- 76 Gas Station - This ASO is located 4 miles west of the Ehrenberg Rest Area, along I-10 at exit 1. It is open 24 hours a day, 7 days a week.
- Love's Travel Stop - This ASO is located 13 miles east of the Ehrenberg Rest Area, along I-10 at exit 17. It is open 24 hours a day, 7 days a week and has 81 truck parking spaces.
- Pilot Travel Center - This ASO is located 13 miles east of the Ehrenberg Rest Area, along I-10 exit 17. It is open 24 hours a day, 7 days a week and has 9 fuel lanes and 100 truck parking spots.
- Exxon Gas Station (Previously Mobil Station) -This ASO is located miles 13 east of the Ehrenberg Rest Area along I-10 at exit 17. It is open from 6:00 a.m. to 1:00 a.m. Sunday-Thursday and open 24 hours Friday-Saturday.
- Arco AM/PM - This ASO is located 16 miles east of the Ehrenberg Rest Area, along I-10 at exit 19. It is open 24 hours a day, 7 days a week.
- Chevron Gas Station - This ASO is located 16 miles east of Ehrenberg Rest Area, along I-10 at exit 19. It is open 5:00 am to 10:00 pm every day.

Bouse Wash (I-10, MP 52)

- Pilot Travel Center - This ASO is located 7 miles west of the Bouse Wash Rest Area, along I-10 at exit 45. It is open 24 hours a day, 7 days a week and has 8 fuel lanes and 20 parking spots.
- Pride Travel Center- This ASO is located 7 miles west of the Bouse Wash Rest Area, along I-10 at exit 45. It is open 24 hours a day, 7 days a week and has 7 fuel lanes.

Burnt Well Rest Area (I-10, MP 86.1)

- Exxon Mobil Gas Station - This ASO is located 7.5 miles east of the Burnt Well Rest Area, along I-10 at exit 94. It is open 24 hours a day, 7 days a week.
- Pilot Travel Center - This ASO is located 7.5 miles east of the Burnt Well Rest Area, along I-10 at exit 94. It is open 24 hours a day, 7 days a week and has 6 fuel lanes and 66 parking spots.

Sacaton Rest Area (I-10, MP 181.5-183.5)

- Multiple Commercial Operators – These establishments are located 12 miles south of the Sacaton Rest Area at exit 194. Operators at this location include several gas stations and restaurants. Together these operators might individually or jointly meet the criteria to be considered as an Interstate Oasis. There are vacant lots adjacent to several operators which could potentially be used to provide additional auto/truck parking. There are multiple auto parking spaces yet no truck/bus parking spaces at each of the locations.
- Shell Gas Station - This ASO is located 16 miles north of Sacaton Rest Area, along I-10 at exit 167. It is open 5:00 am to 9:00 pm every day.
- Petro Travel Center - This ASO is located 16 miles south of Sacaton Rest Area, along I-10 at exit 200. It is open 24 hours a day, 7 days a week and has 11 fuel lanes and 175 truck parking spaces.
- Pride Travel Center - This ASO is located 16 miles south of Sacaton Rest Area, along I-10 at exit 200. It is open 24 hours a day, 7 days a week.
- Love's Travel Stop - This ASO is located 16 miles south of Sacaton Rest Area, along I-10 at exit 200. It is open 24 hours a day, 7 days a week and has 8 fuel lanes and 105 truck parking spaces.

Texas Canyon Rest Area (I-10, MP 320.5)

- Bowlin's The THING Travel Center - This ASO is located 2 miles east of Texas Canyon Rest Area, along I-10 at exit 322. It is open 7:00 a.m. to 7:00 p.m., seven days a week.
- Multiple Commercial Operators - These establishments are located 16 miles west of the Texas Canyon Rest Area. Operators at this location include several gas stations and restaurants. Together these operators might individually or jointly meet the criteria to be considered as an Interstate Oasis. There are multiple auto spaces yet no truck/bus parking spaces at each location, however there are vacant lots adjacent to several of the operators which could potentially be used to provide additional auto/truck parking.
- Love's Travel Stop – This ASO is located 18 miles west of the Texas Canyon Rest Area, along I-10 at exit 302. This ASO is open 24 hours a day, seven days a week and has 6 fuel lanes and 85 truck parking spaces.

San Simon Rest Area (I-10, MP 388)

- 76 Gas Station - This ASO is located 10 miles west of San Simon Rest Area, along I-10 at exit 378. It is open 24 hours a day, 7 days a week.
- Shell Gas Station - This ASO is located 10 miles west of San Simon Rest Area, along I-10 at exit 378. It is open 24 hours a day, 7 days a week.
- Shady Grove Truck Stop – This ASO is located 7 miles east of the San Simon Rest Area, along I-10 at exit 5 (New Mexico). It is open 24 hours a day, 7 days a week.

Haviland Rest Area (I-40, MP 22.7)

- Pride (Flying J) Travel Center - This ASO is located 2.5 miles north of Haviland Rest Area, along I-40 at exit 25. It is open 24 hours a day, 7 days a week and has 8 fuel lanes and 86 truck parking spaces.

- Pilot Travel Center - This ASO is located 13 miles south of Haviland Rest Area, along I-40 at exit 9. It is open 24 hours a day, 7 days a week and has 10 fuel lanes and 85 parking spots.
- Chevron Station - This ASO is located 13 miles south of Haviland Rest Area, along I-40 at exit 9. It is open from 4:00 a.m. to 2:00 a.m. every day.
- Love's Travel Stop - This ASO is located 13 miles south of Haviland Rest Area, along I-40 at exit 9. It is open 24 hours a day, 7 days a week and has 8 fuel lanes and 84 truck parking spaces.

Parks Rest Area (I-40, MP 182)

- Pilot Travel Center - This ASO is located 3.6 miles East of Parks Rest Area, at I-40 exit 185. It is open 24 hours a day, 7 days a week.
- Texaco Gas Station - This ASO is located 4 miles West of Parks Rest Area, at I-40 exit 178. It is open from 6:00 am to 7:00 pm every day.
- Loves Travel Center - This ASO is located 19 miles West of Parks Rest Area, at I-40 exit 163. It is open 24 hours a day 7 days a week.
- Shell Gas Station - This ASO is located 19 miles West of Parks Rest Area, at I-40 exit 163. It is open 24 hours a day 7 days a week.
- Exxon Gas Station - This ASO is located 19 miles West of Parks Rest Area, at I-40 exit 163. It is open from 7:00 am to 11:00 pm every day.

Meteor Crater Rest Area (I-40 MP 235.2-236.3)

- Flying J Travel Plaza - This ASO is located 20 miles East of Meteor Crater Rest Area, at I-40 exit 255. It is open 24 hours a day, 7 days a week. It has 12 fuel lanes and 150 parking spots.
- 76 Gas Station - This ASO is located 16.5miles East of Meteor Crater Rest Area, at I-40 exit 252. It is open from 6:00 am to 10:00 pm every day.
- Chevron Gas Station - This ASO is located 18 miles East of Meteor Crater Rest Area, at I-40 exit 253. It is open 24 hours a day, 7 days a week.
- Maverick Gas Station - This ASO is located 18 miles East of Meteor Crater Rest Area, at I-40 exit 253. It is open 24 hours a day, 7 days a week.
- Mobil Station - This ASO is located 2.5 miles West of Meteor Crater Rest Area, at I-40 exit 233. It is open from 7:00 am to 7:00 pm every day.

Painted Cliffs Rest Area (I-40, MP 359.6)

- Speedy's Truck Stop - This ASO is located 1 mile East of Painted Cliff Rest Area, at I-40 exit 359. It is open 24 hours a day, 7 days a week.
- Armco Gas Station/Indian Center Trading Post - This ASO is located 17 miles West of Painted Cliff Rest Area, at I-40 exit 341. It is open from 8:00 am to 5:00 pm every day.

McGuireville Rest Area (I-17, MP 297)

- McGuireville Mini Mart - This ASO is located 4 miles West of McGuireville Rest Area, at I-17 exit 293. It is open 5:00 am to 9:00 pm Monday-Friday, 6:30 am 10:00 pm on Saturday and 7:00 am to 9:00 pm on Sunday.

- Conoco Gas Station - This ASO is located 7 miles West of McGuireville Rest Area, at I-17 exit 293.
- Multiple Commercial Operators (Exit 287)
- Chevron Station - This ASO is located 7 miles West of McGuireville Rest Area, at I-17 exit 289. It is open 24 hours a day, 7 days a week.

Sunset Point Rest Area (I-17, MP 251.9)

- Chevron Station- This ASO is located 7 miles West of McGuireville Rest Area, at I-17 exit 289. It is open from 5:00 am to 10:00 pm every day.
- Pilot Travel Center - This ASO is located 11 miles North of Sunset Point Rest Area, at I-17 exit 262. It is open 24 hours a day, 7 days a week.
- Loves Travel Stop – This ASO is located 11 miles North of Sunset Point Rest Area, at I-17 exit 262. It is open 24 hours a day, 7 days a week.

Canoa Ranch Rest Area (I-19, MP 32.7-32.9)

- Chevron Station - This ASO is located 6 miles North of Canoa Ranch Rest Area, at I-19 exit 63. It is open from 5:00 am to 10:00 pm every day.
- Multiple Commercial Operators (Exit 63)
- Shell Gas Station - This ASO is located 7 miles North of Canoa Ranch Rest Area, at I-19 exit 65.

Hassayampa Rest Area (US 60, MP 116)

- Shell Station - This ASO is located 4 miles West of Hassayampa Rest Area, at US 60. It is open 24 hours a day, 7 days a week.
- Shell Station - This ASO is located 5 miles West of Hassayampa Rest Area, at US 60. It is open 24 hours a day, 7 days a week.
- Circle K Gas Station - This ASO is located 6 miles West of Hassayampa Rest Area, at US 60. It is open 24 hours a day, 7 days a week.

Salt River Canyon Rest Area (US 60, MP 292.9)

- No ASOs within 20 miles.

Mazatzal Rest Area (SR 87, MP 235.7)

- Mobil Station

Christensen Rest Area (I-17, MP 322-324)

- Chevron Gas Station - This ASO is located 1 mile East of Christensen Rest Area, at 1-17 exit 322. It is open from 7:00 am to 8:30 pm every day.
- Shell Gas Station - This ASO is located 1 mile East of Christensen Rest Area, at 1-17 exit 322.
- Shell Gas Station - This ASO is located 10 miles West of Christensen Rest Area, at 1-17 exit 333.

Appendix F
Water Deficiency Calculations

Table F-1. Rest Area Water Pump Deficiency Calculations

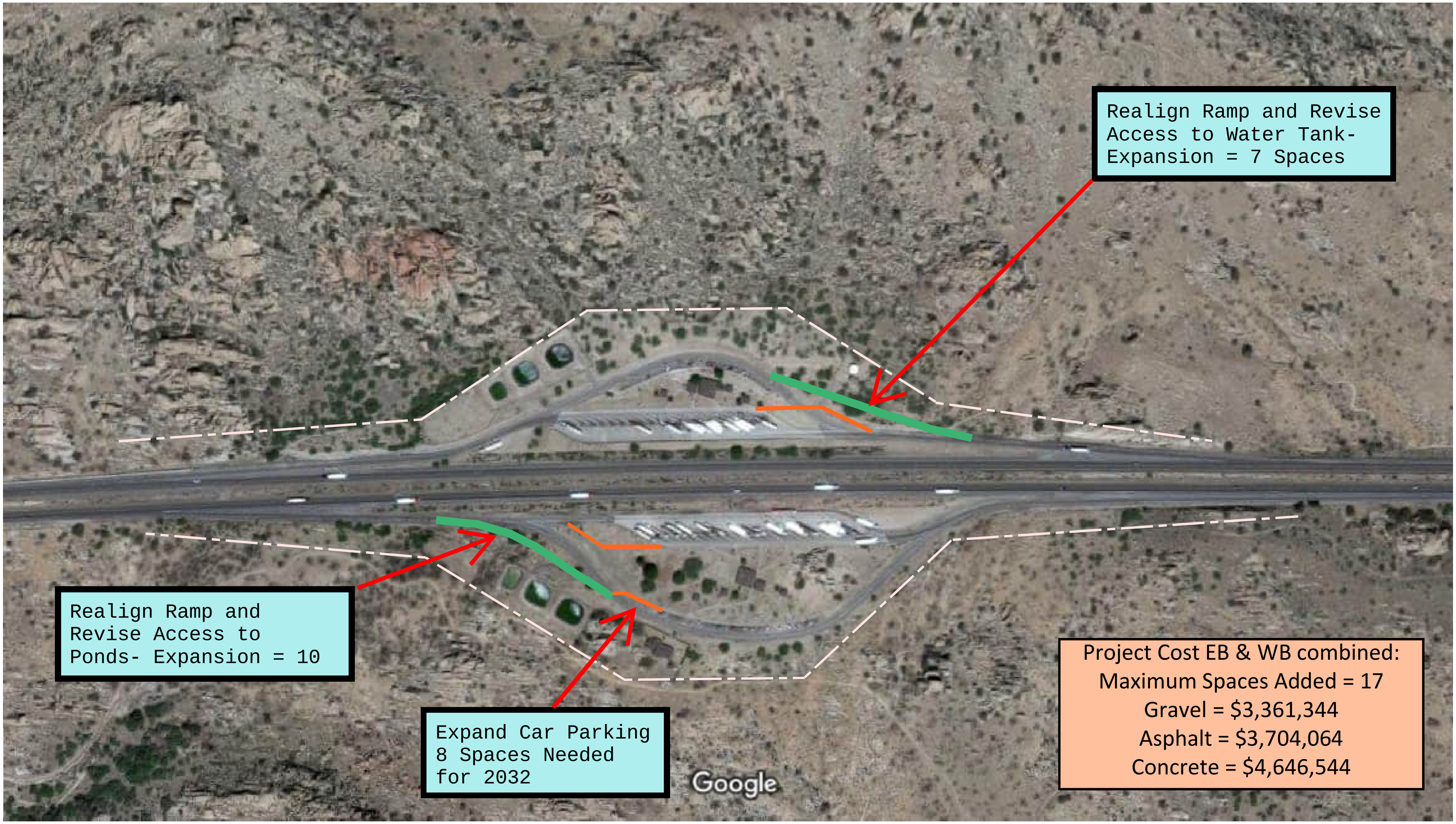
Rest Area	Route	Peak Hour Traffic Percent (K-Factor %)	Average Daily Water Use (gal/day)[a]	2022 Peak Hour Water Use (gal/hour)	2027 Predicted Peak Hour Water Use (gal/hr)	2032 Predicted Peak Hour Water Use (gal/hr)	2042 Predicted Peak Hour Water Use (gal/hr)	Calculated Water Need: Peak Hourly Demand[4] (gallons/hour)				Pump Capacity (gallons/ minute)[b]	Pump Capacity (gallons/hour)	Water Excess (+) / Deficiencies (-) (gallons/hour)			
								2022	2027	2032	2042			2022	2027	2032	2042
Burnt Well	I-10	7%	6,201	434	494	562	727	4,919	5,576	6,348	8,212	20	1,200	766	706	638	473
Sacaton	I-10	9%	4,876	439	489	544	674	4,033	4,492	4,993	6,195	--[c]	--	--	--	--	--
Painted Cliffs	I-40	6%	1,608	96	112	130	174	1,178	1,365	1,584	2,124	20	1,200	1,104	1,088	1,070	1,026
Canoa Ranch	I-19	8%	--	--	--	--	--	--	--	--	--	--[c]	--	--	--	--	--
Salt River Canyon[d]	US 60	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ehrenberg	I-10	12%	3,578	429	488	556	719	3,030	3,440	3,912	5,074	20	1,200	771	712	644	481
Sunset Point	I-17	7%	6,943	486	543	607	758	2,256	2,526	2,818	3,521	20	1,200	714	657	593	442
Texas Canyon	I-10	9%	4,122	371	421	479	617	2,751	3,124	3,542	4,564	20	1,200	829	779	721	583
Meteor Crater	I-40	7%	4,054	284	326	374	492	2,505	2,865	3,282	4,326	20	1,200	916	874	826	708
Haviland	I-40	6%	915	55	63	72	95	1,269	1,462	1,668	2,193	20	1,200	1,145	1,137	1,128	1,105
Mazatzal[e]	SR 87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Simon	I-10	7%	2,454	172	195	222	288	1,914	2,176	2,476	3,189	20	1,200	1,028	1,005	978	912
Bouse Wash	I-10	11%	5,776	635	724	826	1,074	3,115	3,552	4,043	5,256	20	1,200	565	476	374	126
McGuireville	I-17	11%	4,652	512	556	604	714	2,443	2,655	2,877	3,401	20	1,200	688	644	596	486
Hassayampa	US 60	7%	1,018	71	77	82	95	--	--	--	--	20	1,200	1,129	1,123	1,118	1,105
Sentinel	I-8	8%	3,296	264	297	336	427	1,313	1,486	1,659	2,122	20	1,200	936	903	864	773
Mohawk	I-8	7%	2,826	198	221	247	309	1,461	1,626	1,820	2,266	20	1,200	1,002	979	953	891
Parks[f]	I-40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Christensen[f]	I-17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] *Calculated average daily use based on daily totals from November 2022*
[b] *Maximum allowable gallons per minute per ADOT*
[c] *Pump capacity not available because rest area uses city water*
[d] *Rest area does not use potable water*
[e] *Rest area currently closed*
[f] *Rest area closed but open to truck parking*
Notes:
-- = No data available

Appendix G
Conceptual Schematics of Rest Area Parking Expansion

TEXAS CANYON REST AREAS PARKING EXPANSION

Google Maps



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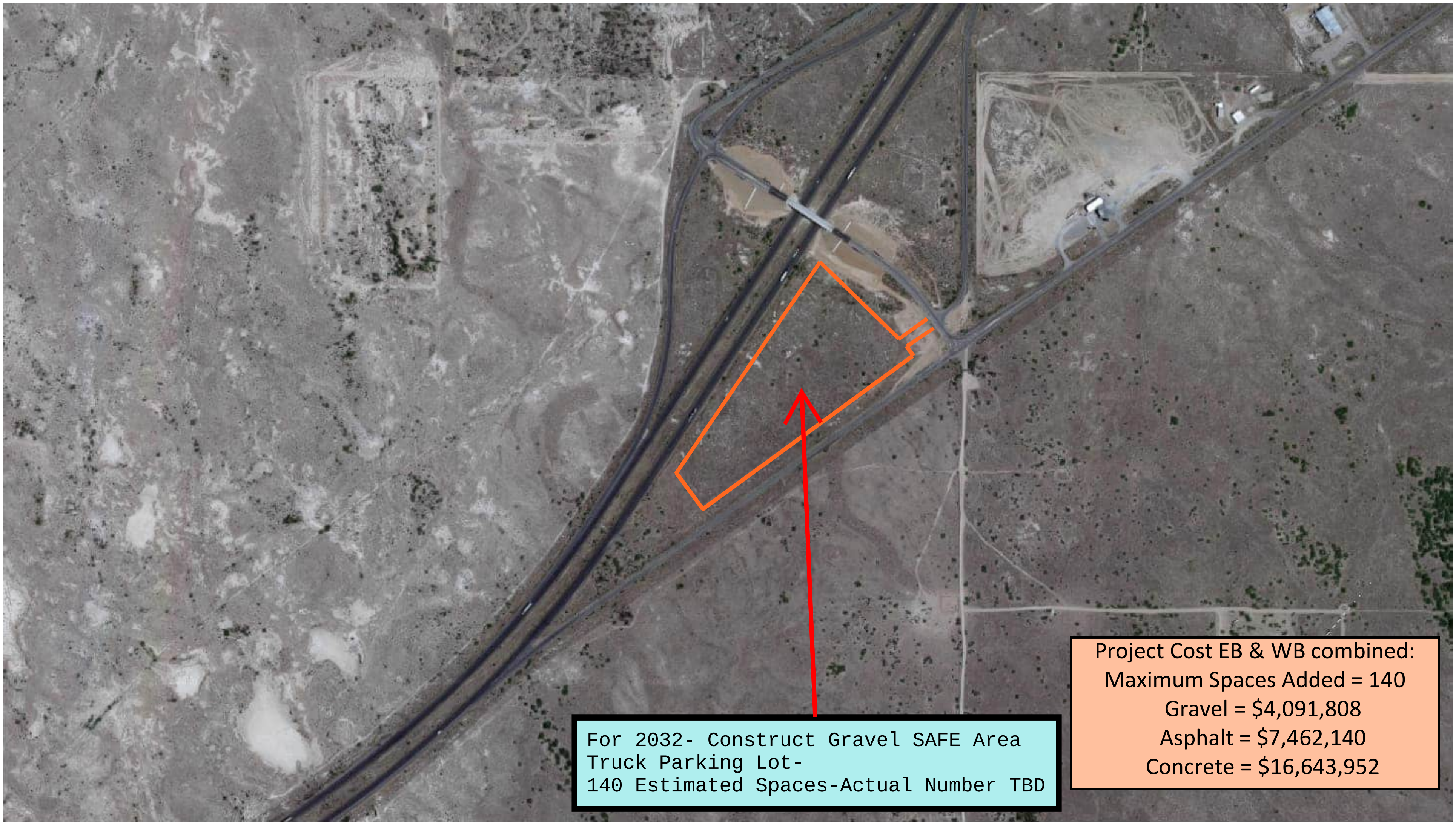
NEW I-10 SAFE TRUCK PARKING ONLY LOCATION (EXIT 336)



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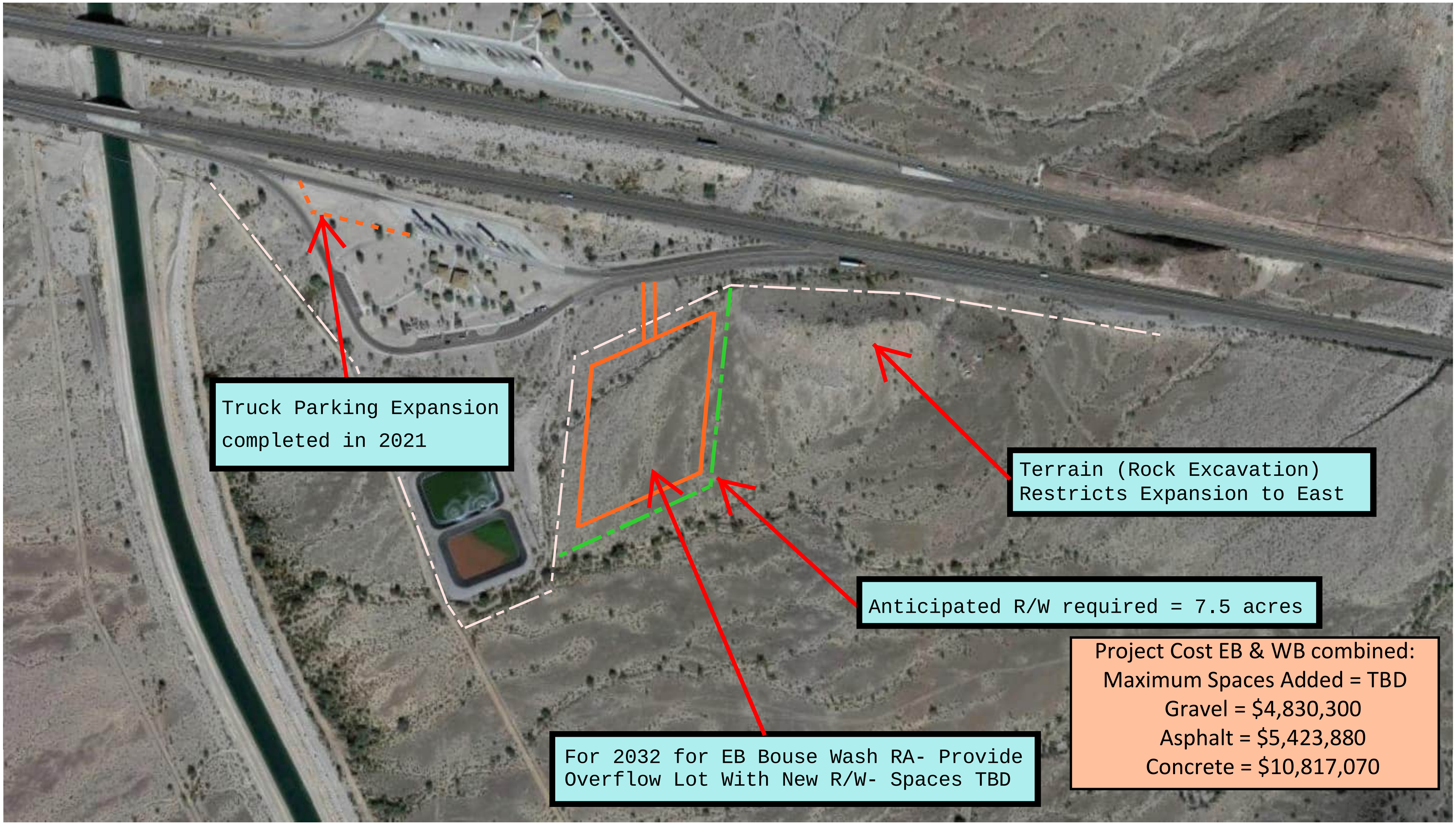
BOUSE WASH EASTBOUND REST AREA PARKING EXPANSION



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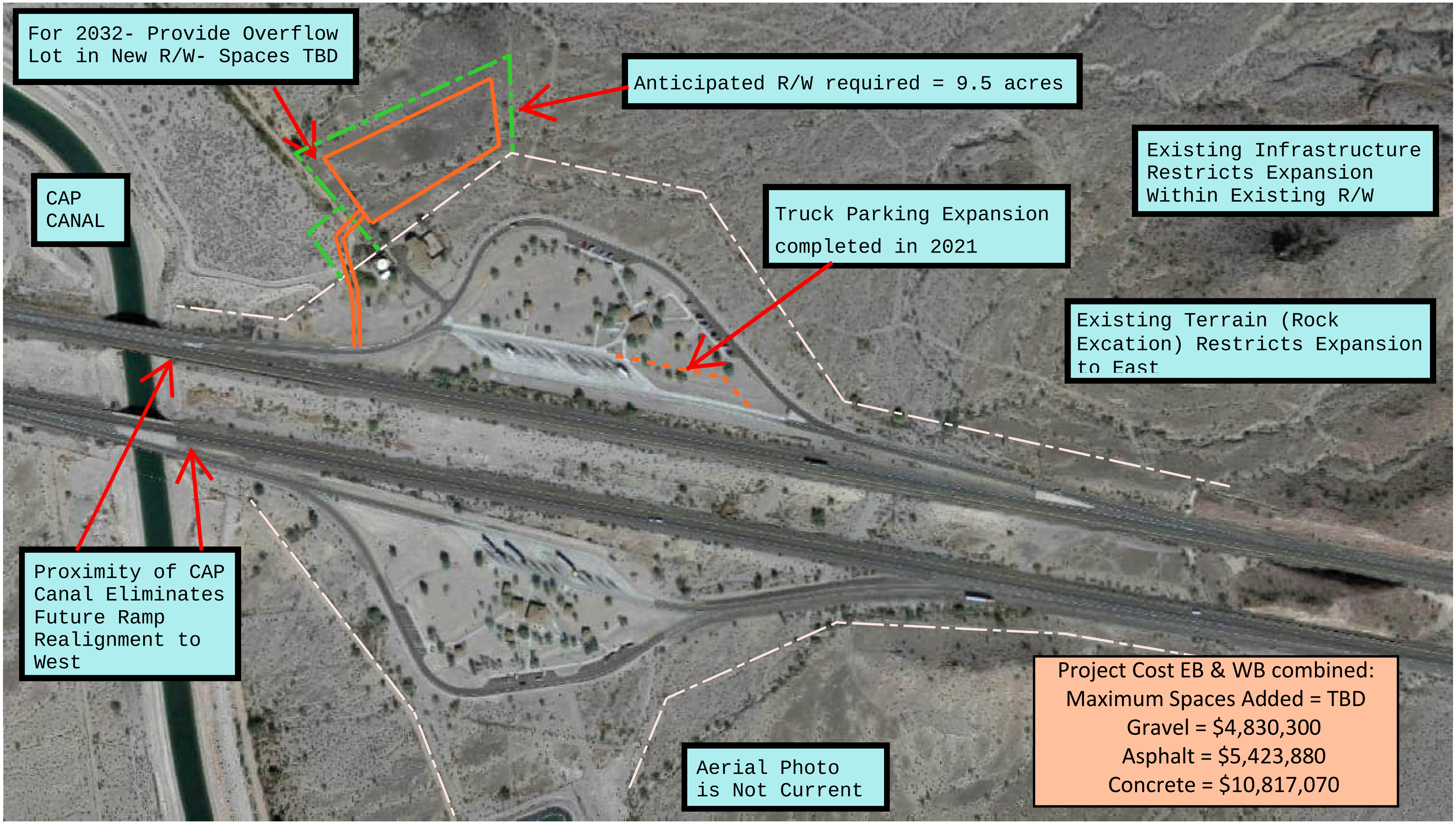
BOUSE WASH WESTBOUND REST AREA PARKING EXPANSION

Google Maps



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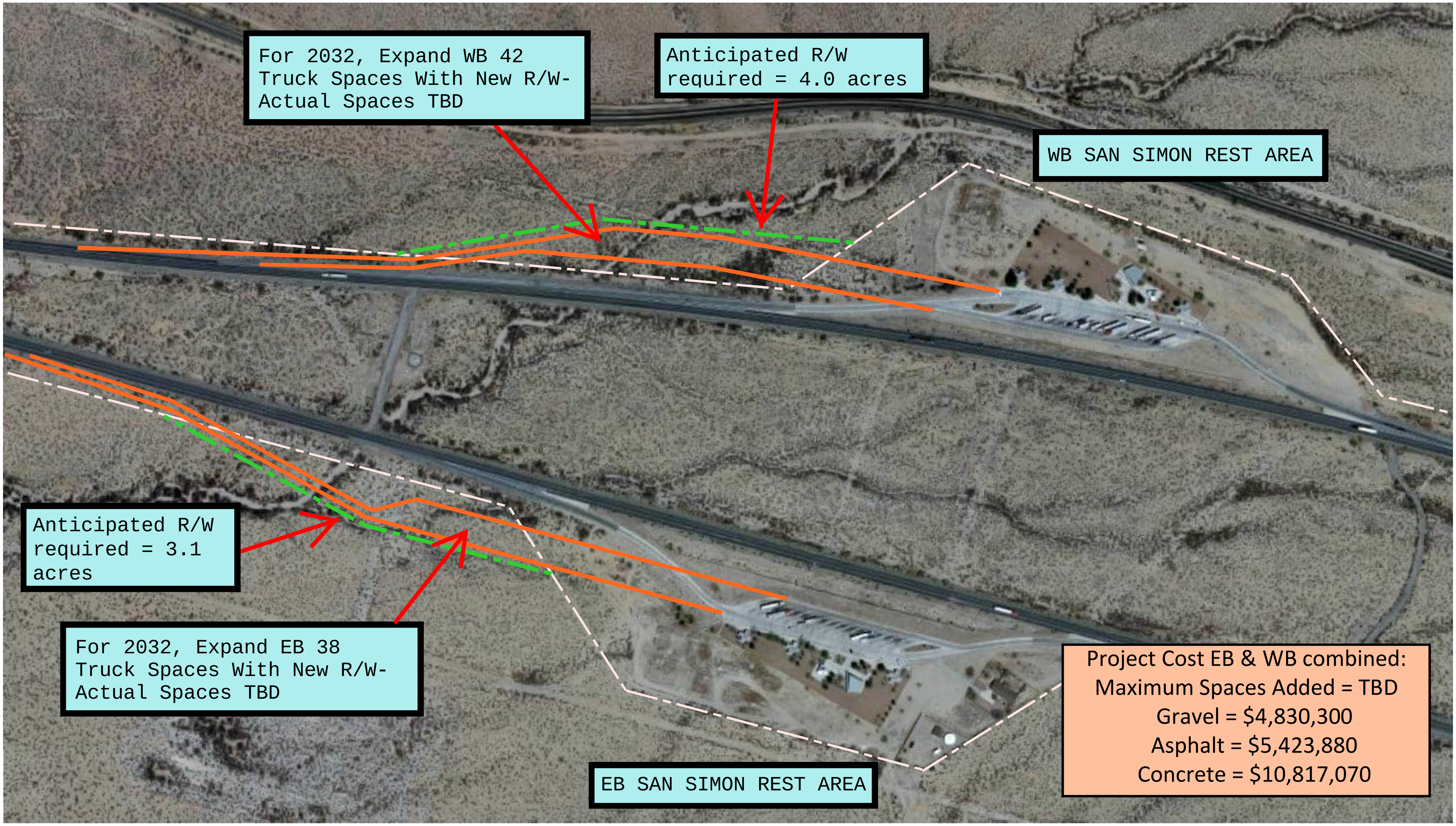
Google Maps

SAN SIMON REST AREAS PARKING EXPANSION



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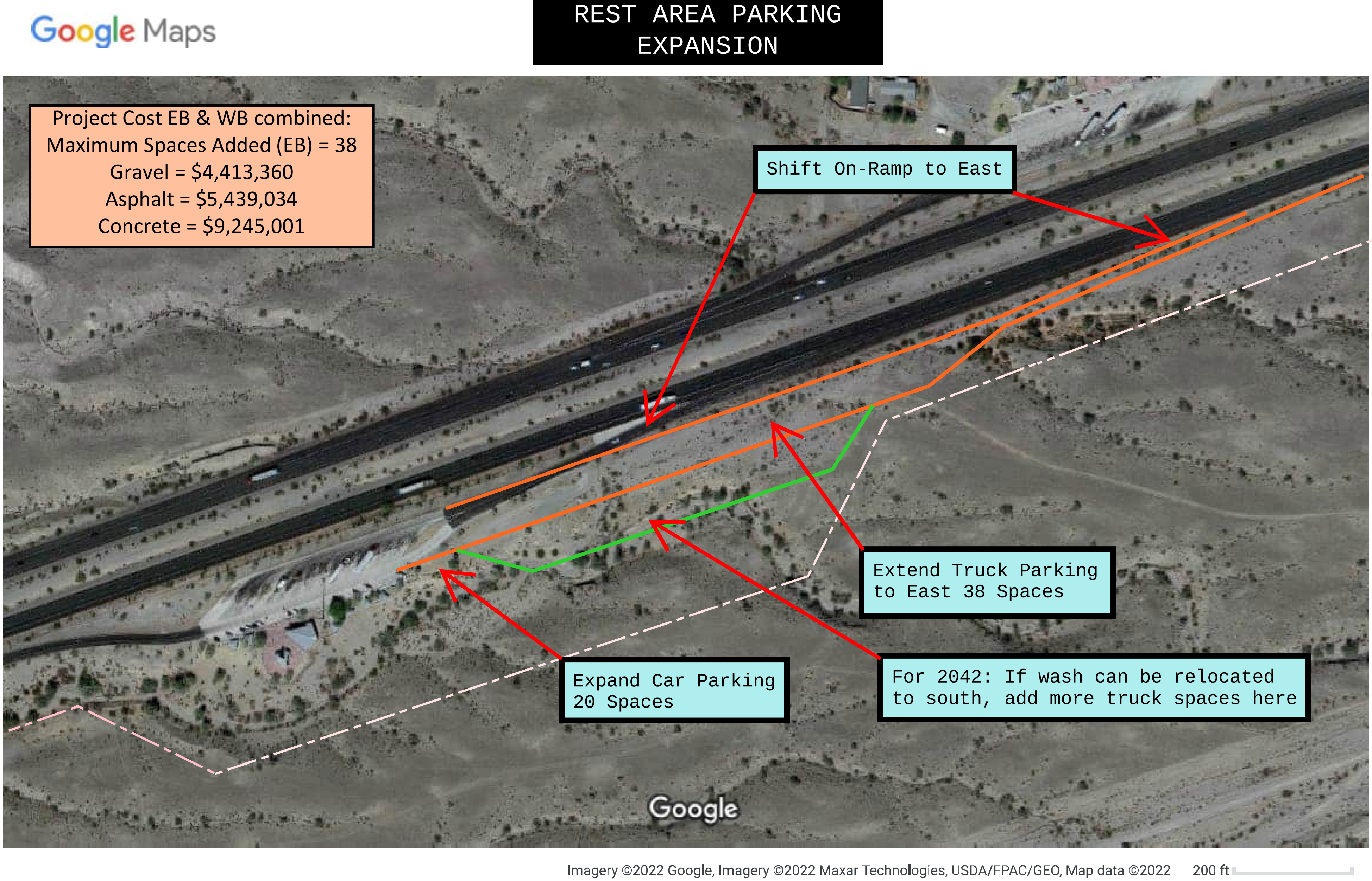
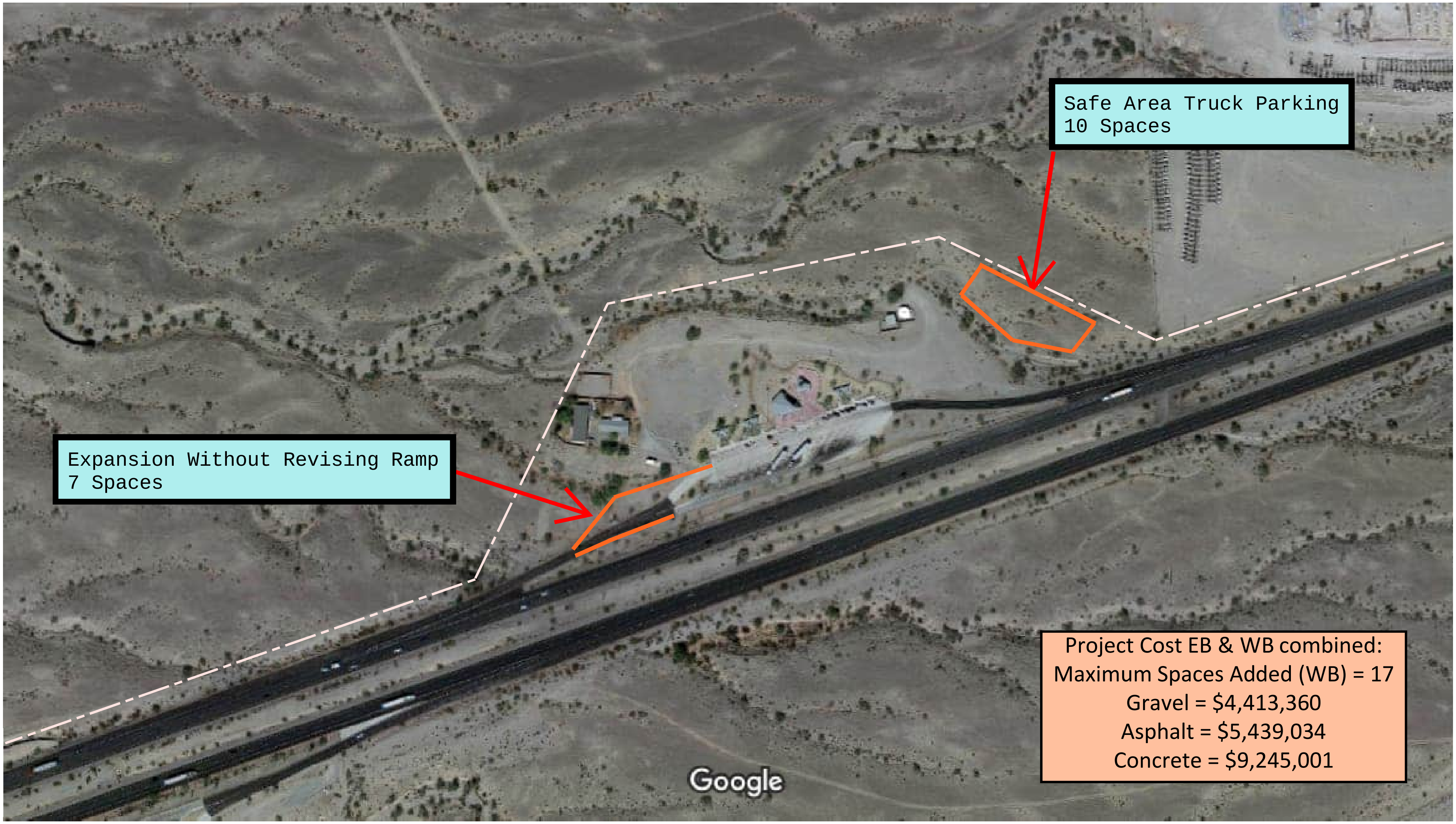
EHRENBERG EASTBOUND REST AREA PARKING EXPANSION



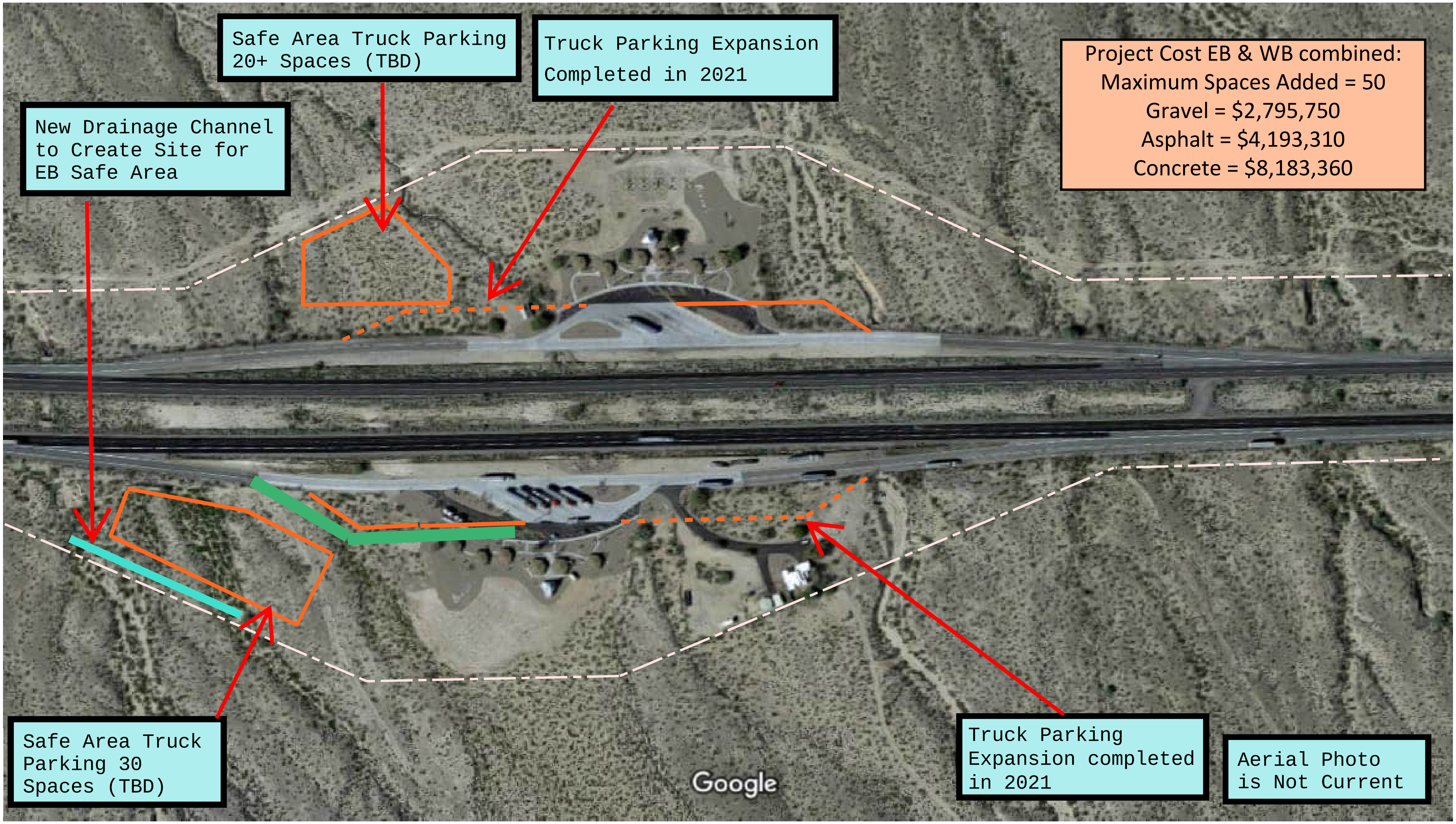
EHRENBERG WESTBOUND REST AREA PARKING EXPANSION



 200 ft

Google Maps

HAVILAND REST AREAS PARKING EXPANSION



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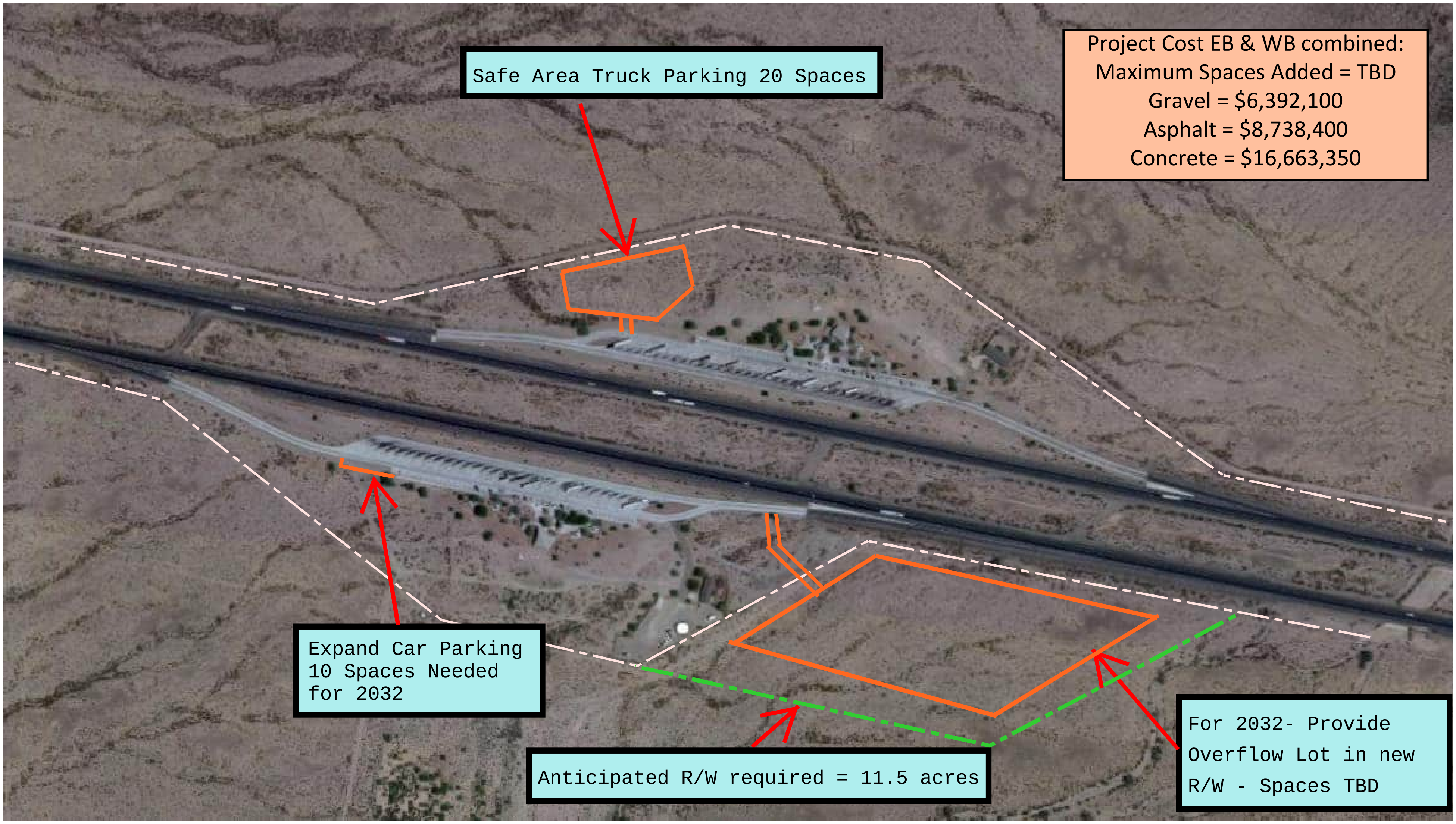
SUNSET POINT REST AREA PARKING EXPANSION

BURNT WELL REST AREAS PARKING EXPANSION



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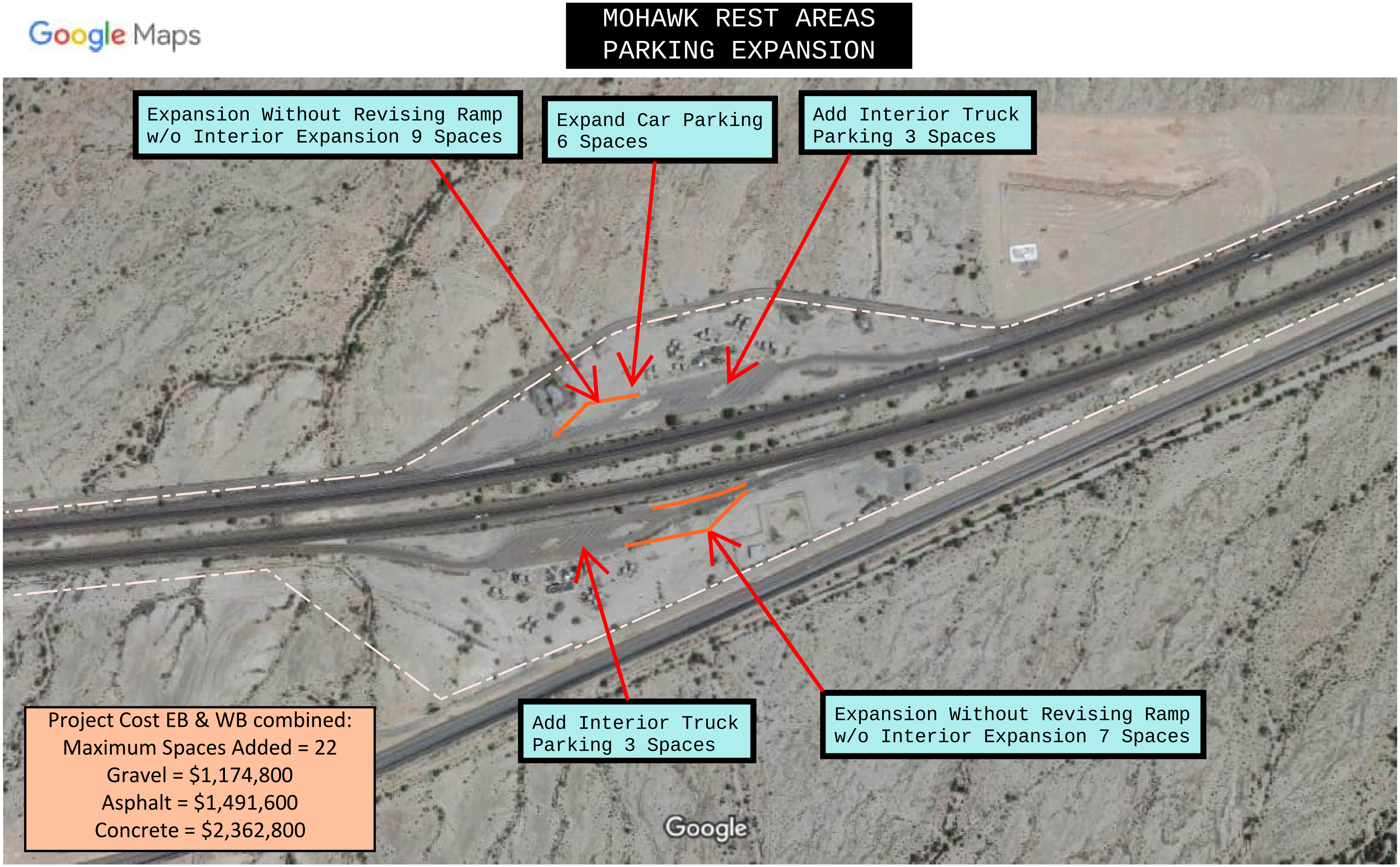
MOHAWK REST AREAS PARKING EXPANSION



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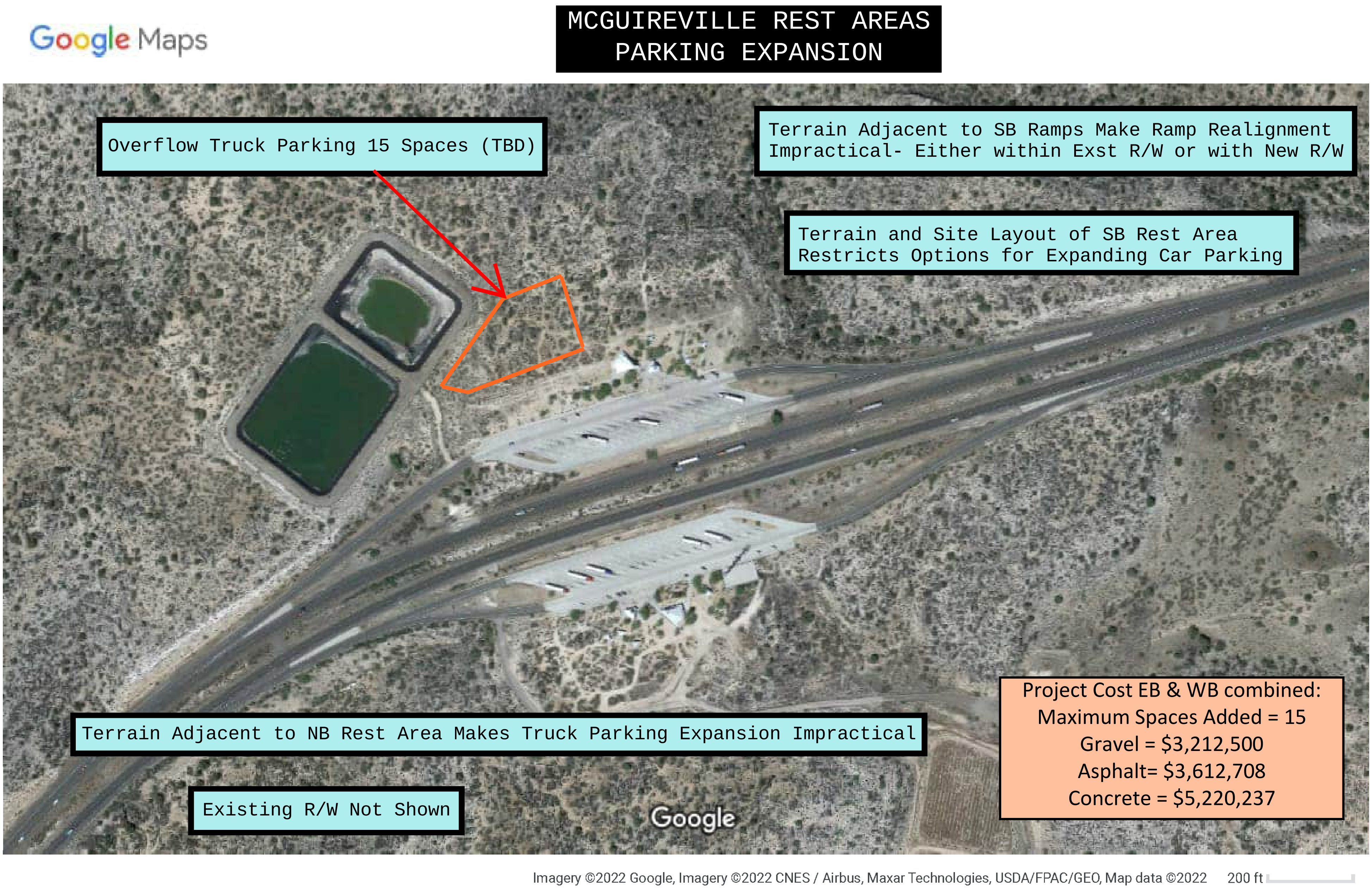
Google Maps
MCGUIREVILLE REST AREAS
PARKING EXPANSION
Overflow Truck Parking 15 Spaces (TBD)
Terrain Adjacent to SB Ramps Make Ramp Realignment Impractical- Either within Exst R/W or with New R/W
Terrain and Site Layout of SB Rest Area Restricts Options for Expanding Car Parking
Terrain Adjacent to NB Rest Area Makes Truck Parking Expansion Impractical
Existing R/W Not Shown
Project Cost EB & WB combined:
Maximum Spaces Added = 15
Gravel = $3,212,500
Asphalt= $3,612,708
Concrete = $5,220,237
Google
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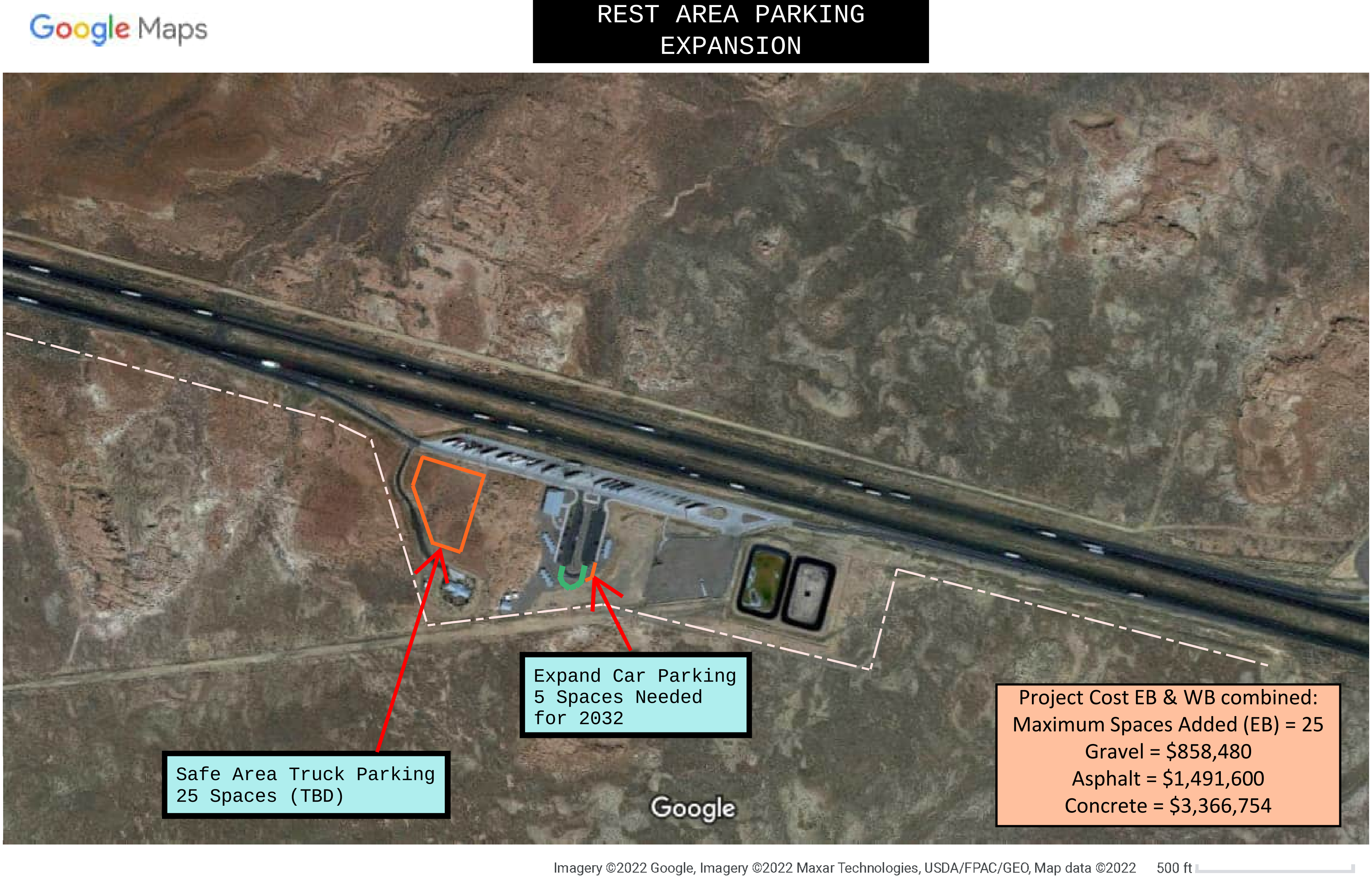
200 ft

METEOR CRATER EASTBOUND REST AREA PARKING EXPANSION

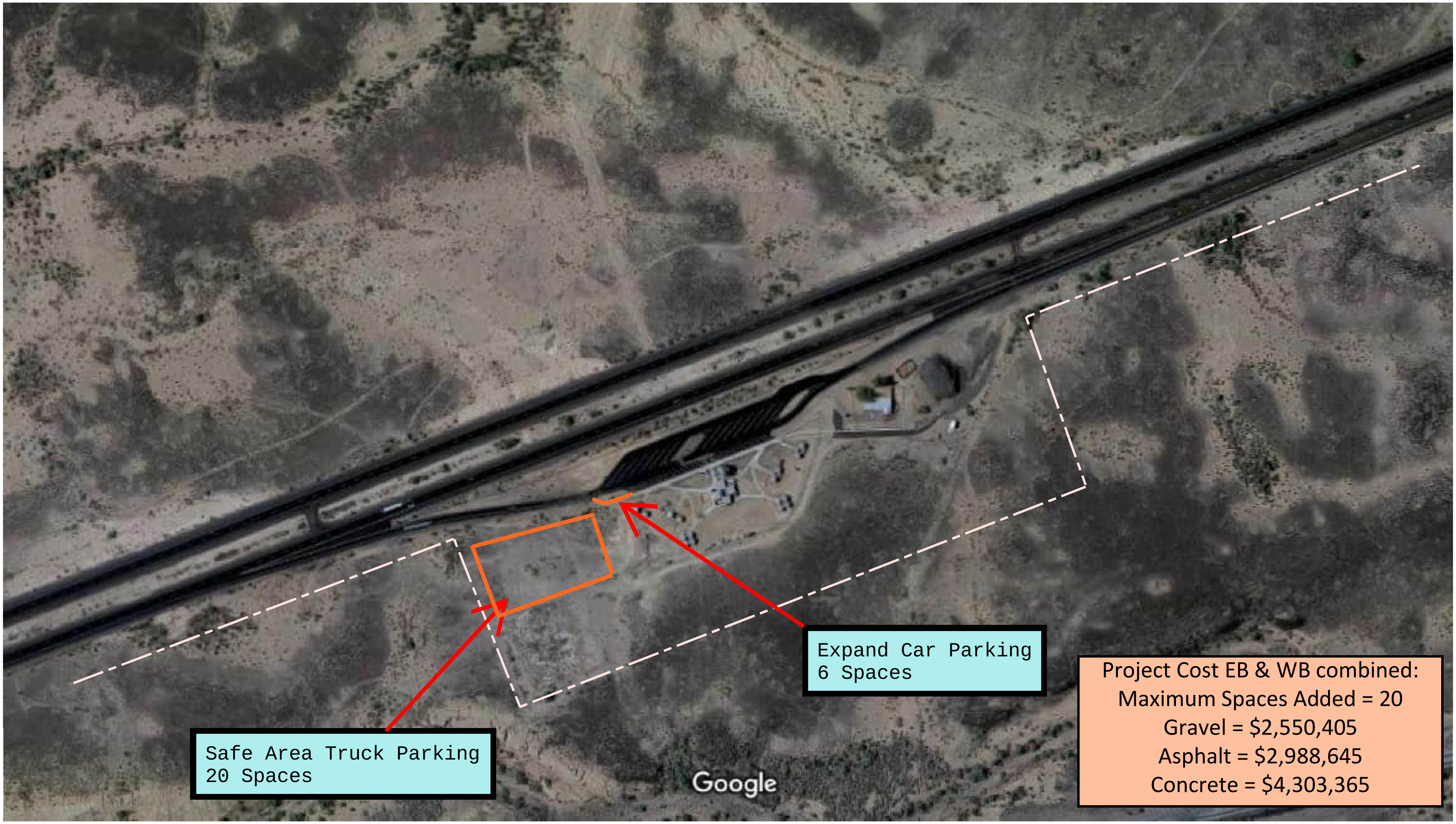


METEOR CRATER WESTBOUND REST AREA PARKING EXPANSION

 500 ft

Google Maps

SENTINEL EASTBOUND REST AREA PARKING EXPANSION



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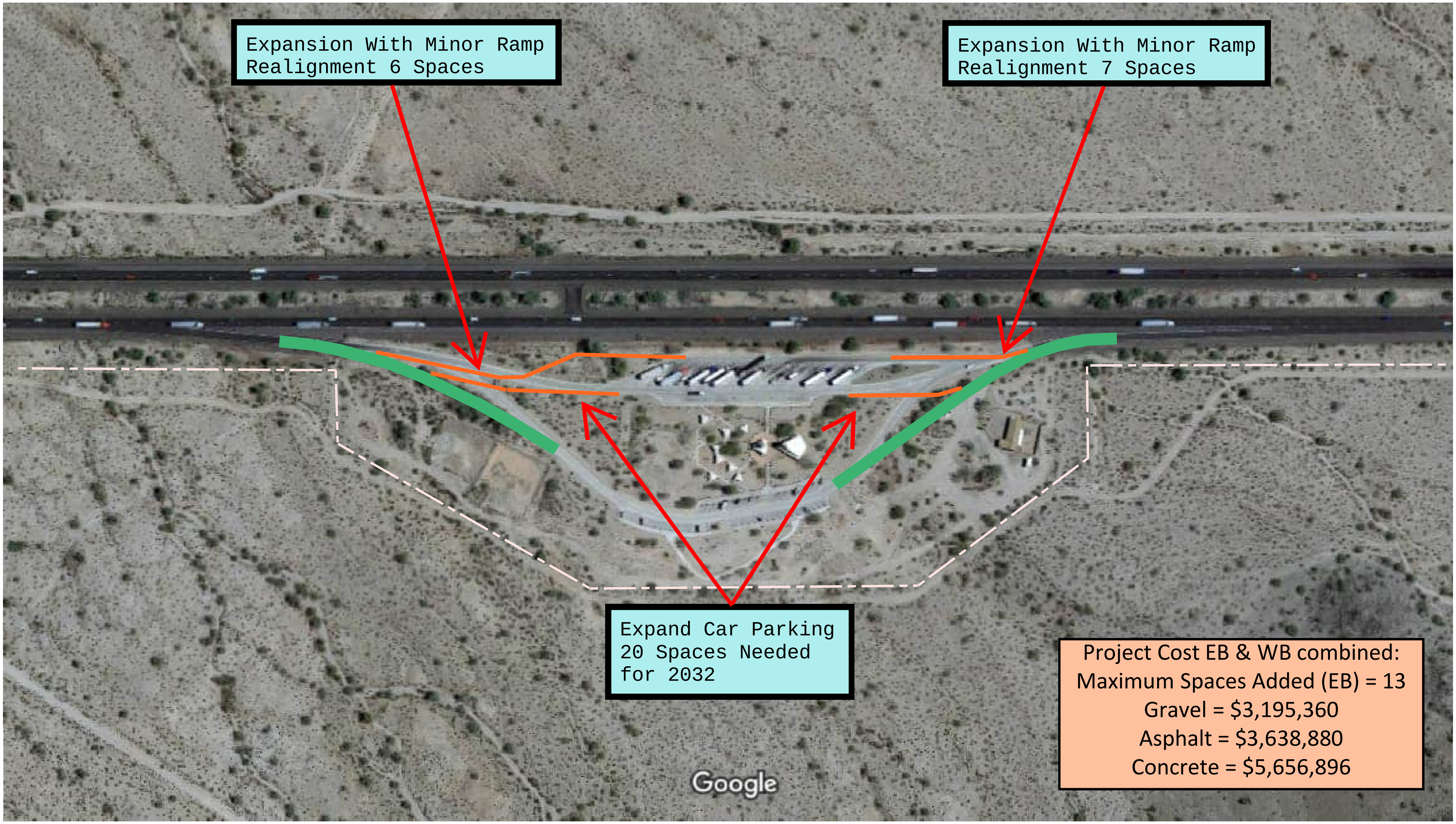
SACATON EASTBOUND REST AREA PARKING EXPANSION



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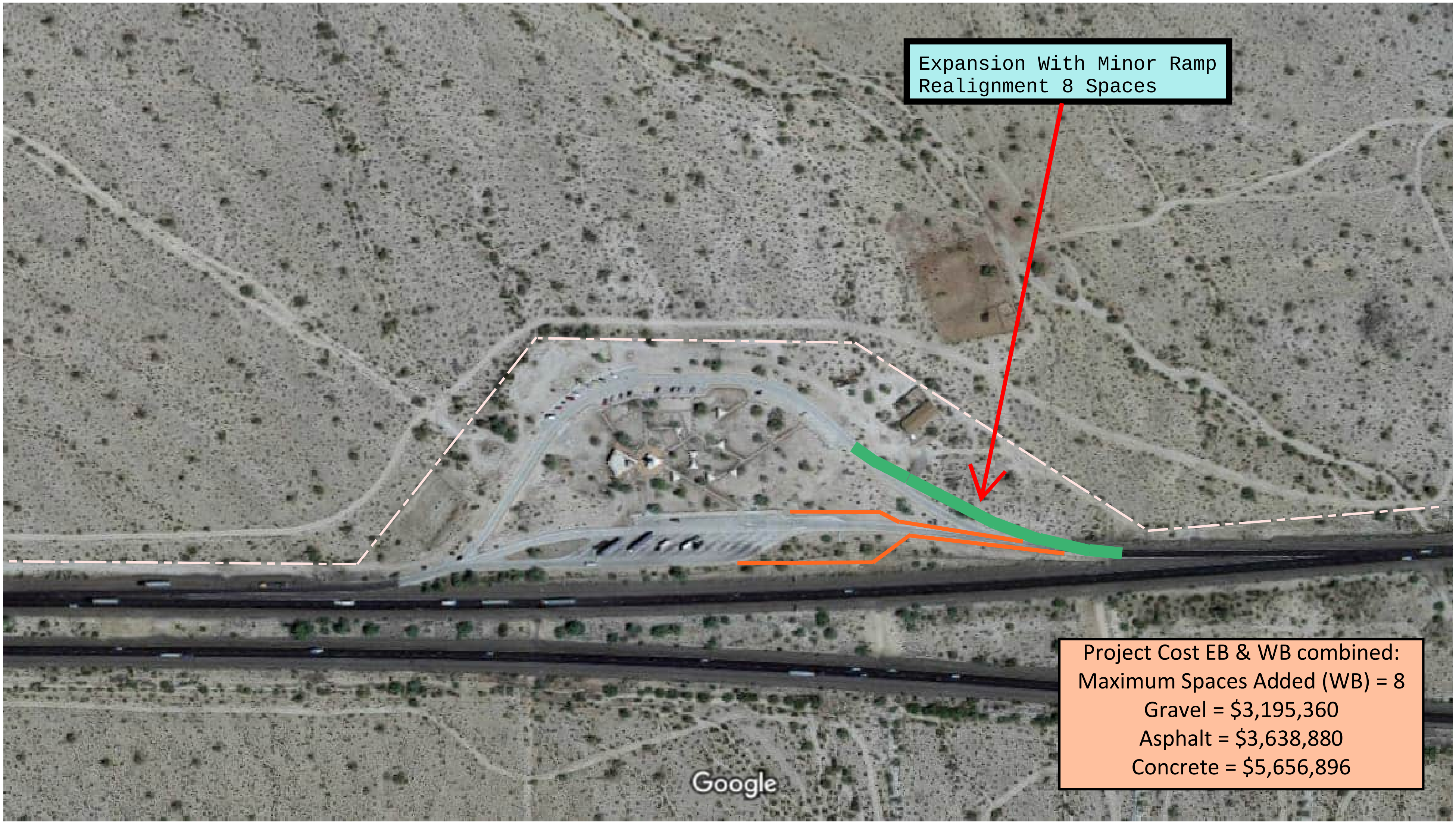
Google Maps

SACATON WESTBOUND REST AREA PARKING EXPANSION



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Appendix H
Basis of Design and Unit Cost Development

MEMORANDUM

Subject: Basis of Design and Unit Costs

Date: March 20, 2023

Project name: Arizona Statewide Rest Area Study

Project no: MPD0015-22

Attention: Myrna Bondoc

Prepared by: Paul Black, P.E.

Copies to: Giovanni Nabavi, ADOT; Robert Wheeler, ADOT; Shanthi Krishnan, Jacobs; Michael Baker, Jacobs

BASIS OF DESIGN AND UNIT COST DEVELOPMENT

Basis of Design:

Each rest area project involves adding truck and sometimes car parking spaces to meet the projected demand for 2032. Designs for new parking spaces are customized for each rest area to fit the site. The designs and cost estimates for this report are at a high level of magnitude, thus cost item units, such as cost per parking space and length of ramps, are used to avoid detailed calculation of pavement areas. See the section below for the derivation of unit costs that are not by square yard (sq. yd.).

New car parking spaces are typically diagonal and placed adjacent to existing diagonal spaces. They consist of 12" Portland Cement Concrete Pavement (PCCP) over 4" of Aggregate Base (AB).

New truck parking spaces are added in three ways:

1. Adjacent to existing diagonal spaces and are also diagonal. They consist of 12" PCCP over 4" AB.
2. Overflow lots that are typically rectangular in shape. Some fit within existing right-of-way (ROW) and some require additional ROW. They consist of 6" AB over graded and compacted subgrade. Access to these lots is provided via 32' wide paved connector roads that provide two-way truck traffic.
3. SAFE truck parking lots that are not located within an existing rest area. Instead, they are located within the 'infield areas' of existing traffic interchanges. They consist of 6" AB over graded and compacted subgrade. Access to these lots is provided via 32' wide paved connector roads to the interchange crossroad for two-way truck traffic.

Connector roads to overflow lots and SAFE truck parking lots are to be paved to reduce maintenance costs and reduce transfer of gravel onto other pave roadways (rest area roads and traffic interchange crossroads). They should be wide enough to provide for two-way truck traffic. Due to their small quantities and remote locations, Asphaltic Concrete (AC) pavement is not practical. Therefore, 12" PCCP over 4" AB is used for the connector roads.

Some rest areas will require new ramps to the Interstate Freeway and interior connector roads. These will be 22' wide paved roads consisting of 12" PCCP over 4" AB and will be estimated on a linear foot basis.

Some rest areas require rehabilitation of existing roadways, which will consist of 2" of mill and replace AC pavement. The depth is reduced to avoid impacting existing shallow AC depth. At these locations, the surface area of mill and replace (in Sq. Yds.) has been roughly measured from available aerial photography.

Basis of Pavement Costs:

Unit costs per new pavements are derived from sq. yd. unit cost from the April 2020 Change Order project 040-E(22)T H821401C to add truck parking to the Meteor Crater Rest Area via a new 31,280 Sq. Yd. truck parking overflow lot. The pavement for this lot is 12" PCCP over 4" AB. Costs are shown below.

Grading	$ 210,905
AB	$ 417,312
PCCP	$ 3,948,474
Striping	$ 29,862
Total	$ 4,606,553

Unit Cost for PCCP Pavement

$ 4,606,553/ 31,280 Sq Yd = $147.27/Sq Yd (2020 dollars)

Inflated to 2023 dollars = $147.27 x1.3 = $191.51
Use $ 192/Sq Yd

Unit Cost for 6" AB for Overflow and SAFE Lots

Unit cost for 4" AB = $ 417,312/ 31,280 Sq Yd = $ 13.34/Sq Yd (2020 dollars)

Inflated to 2023 dollars = $ 13.34 x 1.3 = $ 17.34/Sq Yd

Increase from 4" AB to 6" AB = $ 17.34 x 1.5 = $ 26.00
Use $ 26/Sq Yd

Unit Cost for 2" Mill and Replace AC for Pavement Rehabilitation

Unit cost for 2" Mill and Replace AC is based on a recent pavement rehab project in the Northwest District 093-B-(219)T. Various bid items that comprise mill and replace add up to $35/Sq Yd. However, this is a large paving project, and the unit price should be adjusted upwards to account for the smaller pavement rehabilitation associated to the rest areas.
Use $ 40/Sq Yd

Derivation of Unit Costs of Parking Spaces (Each) and Roadways (Linear Feet):

As noted above, some items are estimated in units that are not by surface area. These are derived below.

Unit Cost for Parking Spaces

Car Space = 10' wide by 30' long => Area=300 Sq Ft = 34 Sq Yd

Unit cost= $ 192/Sq Yd (PCCP) x 34 Sq Yd = $ 6,528
<u>Use $ 6,600/Space</u>

<u>Truck Space</u> = 15’ wide by 160’ long => Area=2,400 Sq Ft = 267 Sq Yd

Unit cost= $ 192/Sq Yd (PCCP) x 267 Sq Yd = $ 51,264
<u>Use $ 52,000/Space</u>

Unit Cost for Ramps and Interior Connector Roads

Unit cost (per Lin Ft) = 22’ wide => Area=22 Sq Ft/Lin Ft = 2.45 Sq Yd/Lin Ft

Unit cost= $ 192/Sq Yd (PCCP) x 2.45 Sq Yd/Lin Ft= $ 470.4
<u>Use $ 470/Lin Ft</u>

Unit Cost for Two-way Access Roads to Overflow and SAFE Lots

Unit cost (per Lin Ft) = 32’ wide => Area=32 Sq Ft/Lin Ft = 3.56 Sq Yd/Lin Ft

Unit cost= $ 192/Sq Yd (PCCP) x 3.56 Sq Yd/Lin Ft= $ 683.5
<u>Use $ 700/Lin Ft</u>