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Draft Tier 1 Environmental Impact Statement and Preliminary Section 4(f) Evaluation

Section 3.17, Indirect and Cumulative Effects

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3.17 Indirect and Cumulative Effects

This section identifies potential indirect and cumulative effects that would result from the implementation of the Build Corridor Alternatives.

3.17.1 Regulatory Guidance

The Council on Environmental Quality (CEQ) states that indirect effects "*are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems"* (Code of Federal Regulations Title 40, Sec. 1508.8[b]). Indirect effects are commonly categorized as effects that would not occur "but for" the implementation of a project. Indirect effects also can be considered "ripple effects" (Transportation Research Board 2002).

The CEQ states that cumulative effects result from the *"incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time"* (Code of Federal Regulations title 40, sec. 1508.7). An action cannot contribute to the cumulative effects on a resource if it will not have either a direct or indirect effect on that resource. The CEQ recommends that cumulative impact analyses examine resources that could be impacted by the action(s) under investigation or that are known to be vulnerable. Additionally, spatial and geographic parameters must be established to evaluate effects that may occur in a different area and to capture effects from past or future actions. The CEQ has released a document, *Considering Cumulative Effects under National Environmental Policy Act*, to aid in assessment of cumulative impacts in National Environmental Policy Act documents (CEQ 1997).

The Federal Highway Administration (FHWA) guidance, *Secondary and Cumulative Impact Assessment in the Highway Project Development Process*, (FHWA 1992) reiterates the CEQ's message of the importance of considering potential indirect and cumulative effects in decision making for transportation projects and provides direction on implementation of CEQ requirements. It emphasizes the importance of considering the functionality of the resources and trends in the condition of the resources that may be impacted. This guidance, along with the United States Environmental Protection Agency's (USEPA) document titled *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (USEPA 1999), provided direction for the cumulative impact assessment for this study.

3.17.2 Methodology

The methodology below explains how indirect and cumulative effects are assessed in this Draft Tier 1 Environmental Impact Statement (EIS).

3.17.2.1 Indirect Effects

The methodology follows the steps outlined in the *National Cooperative Highway Research Program Report 466: Desk Reference for Estimating Indirect Effects of Proposed Transportation*

Projects (Transportation Research Board 2002). The initial step is to identify an Area of Influence (AOI) for each Build Corridor Alternative where indirect, or project-induced, effects could occur. Once the AOI identified, the potential for indirect effects is assessed and mitigation strategies are considered to minimize adverse effects.

Area of Influence

The determination of an AOI for the Build Corridor Alternatives considered the potential changes in travel patterns and demand that could result from the implementation of the Interstate 11 (I-11) Corridor. This was accomplished through the consideration of the following:

- **Where would faster travel times occur?** Faster travel times benefit freight carriers, for whom costs are sensitive to travel time, and faster routes may shift the movement of freight away from congested areas. Currently, Interstate 19 (I-19) and Interstate 10 (I-10) carry substantial amounts of international, national, and regional freight traffic. Interstate 8 (I-8) also plays a role in the movement of goods to California to the west. Trips that are destined for areas outside of Arizona may seek a route that avoids urban areas if it offers a more direct, less congested route that could result in faster arrival times at the ultimate destination.

  Faster travel times also would benefit the traveling public through improved access to employment and economic centers, which in turn may affect land uses in terms of location and density. More convenient commute times to employment centers can promote residential development farther from those employment centers. In addition, better access to the transportation network may promote employment centers in new locations.

- **Where would new access occur?** Interchanges provide direct access to interstate facilities. The locations of new interchanges generally coincide with improved accessibility, thus increasing the development potential of nearby land along the corridor. Businesses (e.g., restaurants, gas stations, and accommodations) and residents may move to take advantage of the accessibility of the new interstate. For the purposes of this analysis, it was assumed that new interchanges would influence commercial development up to 0.5 mile away and residential development up to 5 miles away.

  Interchange locations for I-11 would not be determined as part of the Tier 1 process, but rather would be developed as part of more detailed alignments subject to project-level or Tier 2 environmental review. However, the Arizona Statewide Travel Demand Model (Arizona Model) includes interchange assumptions based on current regional transportation plan networks that would warrant connections to a new high-capacity transportation facility. Additional information about interchanges and transportation modeling can be found in **Chapter 2**, Alternatives Considered and Section 3.2, Transportation. In the future, additional or different interchange locations could be identified based on land use patterns, growth, and specific access needs.

- **Where would growth occur?** Improved access could induce growth. Developable areas within 5 miles of interchanges are assumed to have project-induced growth.

Evaluation of Indirect Effects

To identify the potential for indirect effects, the Project Team completed the following steps.

- Assessed potential for changes in transportation and land use that would result from the changes in travel patterns and accessibility within the AOI. **Figure 3.17-1** (Purple Alternative

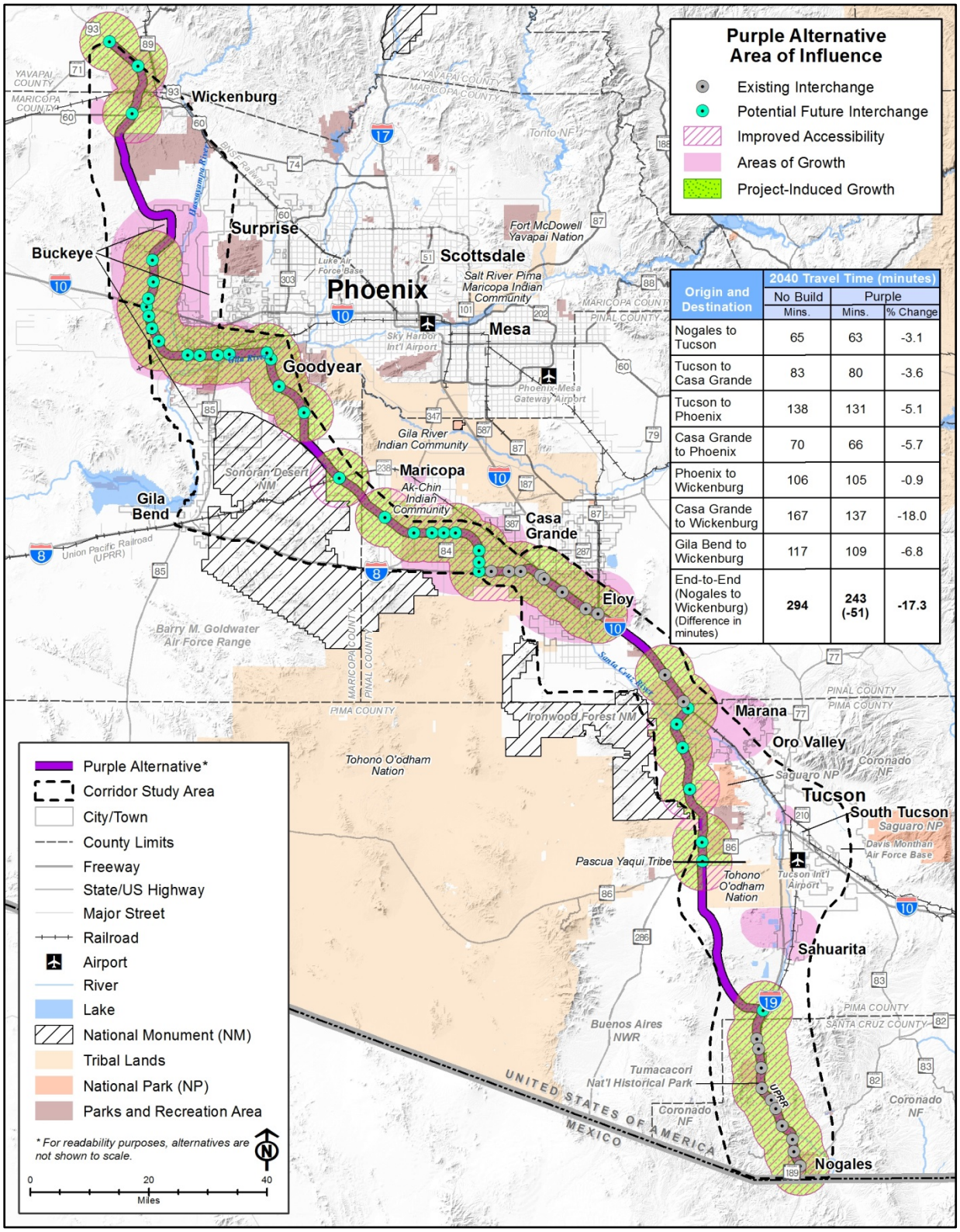
Area of Influence), **Figure 3.17-2** (Green Alternative Area of Influence), and **Figure 3.17-3** (Orange Alternative Area of Influence) illustrate contributors to the AOI for each Build Corridor Alternative.

- Reviewed resources that are present within the AOI and considered whether environmentally sensitive areas may be indirectly affected by changes in land use and transportation patterns and accessibility, or related economic activity.
- Determined if regulatory restrictions or mitigation strategies (provided in the previous sections of **Chapter 3**) could effectively minimize or avoid the potential for indirect effects, or whether additional measures could be warranted. These strategies would be used to inform the Tier 2 studies and mitigation commitment made in future decision documents.

Figures 3.17-1 through **3.17-3** illustrate the future growth areas in the I-11 Corridor Study Area (Study Area), as reflected in municipal general and county comprehensive plans, and supported by interviews with local planning and economic development staff (**Appendix E6**). These figures also show generalized areas where improved accessibility and project-induced growth may occur, based on a preliminary list of potential future interchange locations utilized for travel demand modeling purposes based on current regional transportation system plans. As noted earlier, additional or different interchange locations could be identified based on land use patterns, growth, and specific access needs.

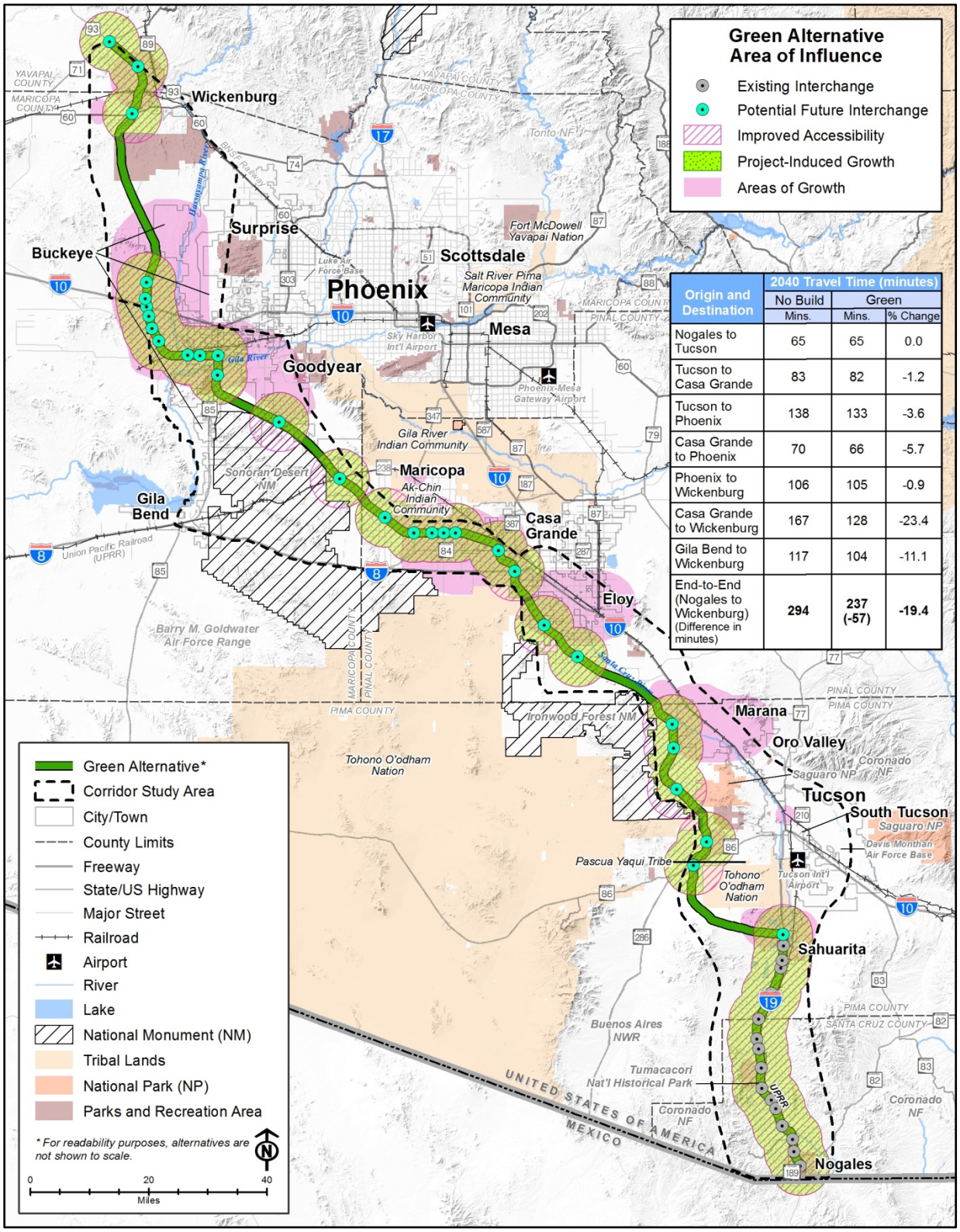
The discussion of indirect effects is qualitative and identifies the types of indirect effects that could occur for each alternative. Indirect effects may be positive or negative and differ by resource as well as alternative, meaning an indirect effect may be positive for one resource and negative for another. For example, a change in tax base due to increased development may be positive for the economy and negative with regard to the opportunities for primitive recreation or solitude.

While the I-11 Corridor has the potential to influence changes in land development and travel patterns, regulation of land use occurs at the local level. Therefore, potential mitigation strategies proposed in the Draft Tier 1 EIS are limited to those within the purview of FHWA and Arizona Department of Transportation (ADOT). However, the indirect impact analysis may aid local governments in managing potential induced development in their jurisdictions.



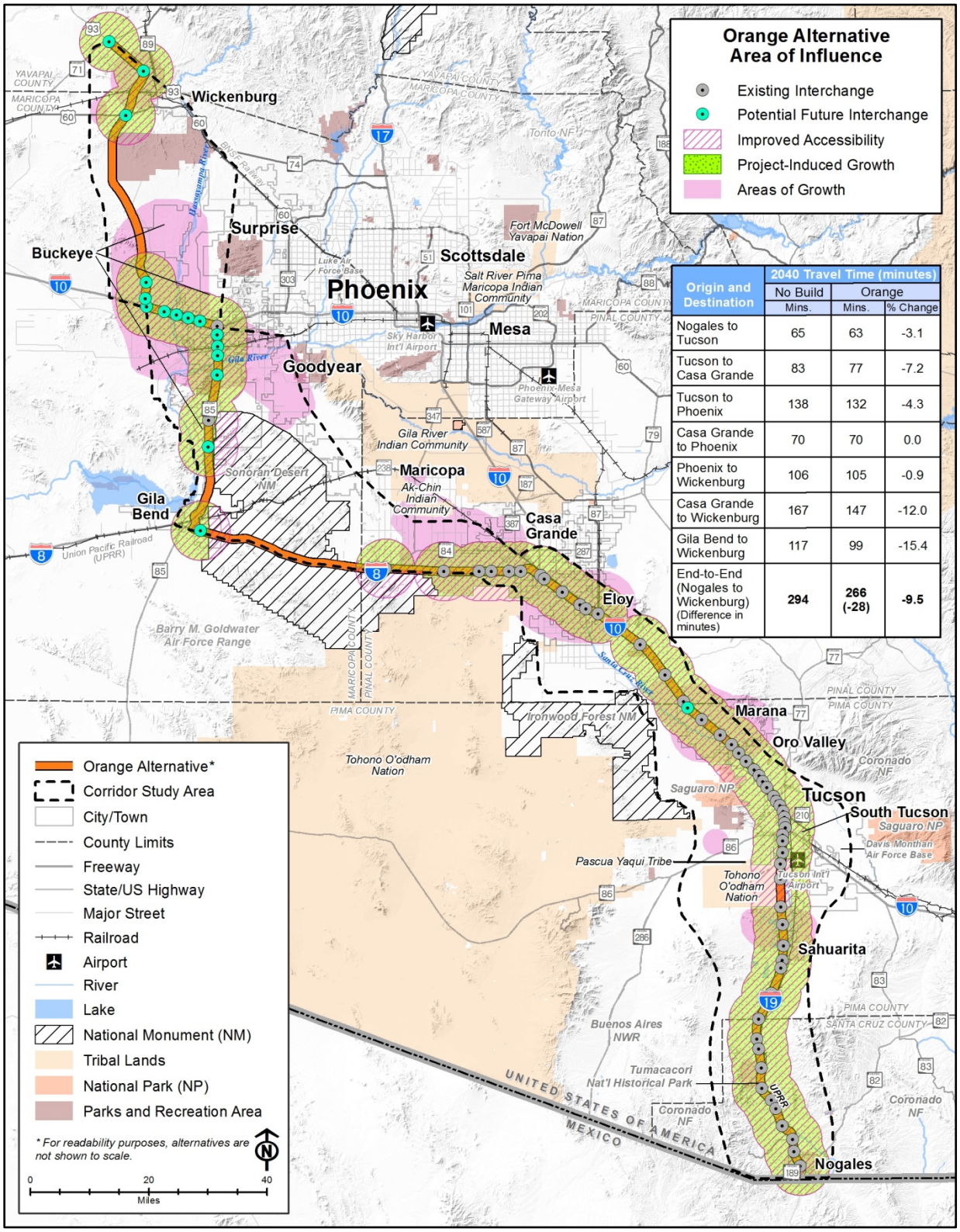
Origin and Destination	2040 Travel Time (minutes)		
	No Build	Purple	
	Mins.	Mins.	% Change
Nogales to Tucson	65	63	-3.1
Tucson to Casa Grande	83	80	-3.6
Tucson to Phoenix	138	131	-5.1
Casa Grande to Phoenix	70	66	-5.7
Phoenix to Wickenburg	106	105	-0.9
Casa Grande to Wickenburg	167	137	-18.0
Gila Bend to Wickenburg	117	109	-6.8
End-to-End (Nogales to Wickenburg) (Difference in minutes)	**294**	**243 (-51)**	**-17.3**

Figure 3.17-1 Purple Alternative Area of Influence



Origin and Destination	2040 Travel Time (minutes)		
	No Build	Green	
	Mins.	Mins.	% Change
Nogales to Tucson	65	65	0.0
Tucson to Casa Grande	83	82	-1.2
Tucson to Phoenix	138	133	-3.6
Casa Grande to Phoenix	70	66	-5.7
Phoenix to Wickenburg	106	105	-0.9
Casa Grande to Wickenburg	167	128	-23.4
Gila Bend to Wickenburg	117	104	-11.1
End-to-End (Nogales to Wickenburg) (Difference in minutes)	**294**	**237 (-57)**	**-19.4**

Figure 3.17-2 Green Alternative Area of Influence



Origin and Destination	2040 Travel Time (minutes)		
	No Build	Orange	
	Mins.	Mins.	% Change
Nogales to Tucson	65	63	-3.1
Tucson to Casa Grande	83	77	-7.2
Tucson to Phoenix	138	132	-4.3
Casa Grande to Phoenix	70	70	0.0
Phoenix to Wickenburg	106	105	-0.9
Casa Grande to Wickenburg	167	147	-12.0
Gila Bend to Wickenburg	117	99	-15.4
End-to-End (Nogales to Wickenburg) (Difference in minutes)	**294**	**266 (-28)**	**-9.5**

Figure 3.17-3 Orange Alternative Area of Influence

3.17.2.2 Cumulative Effects

To assess the potential for cumulative effects, the Project Team completed the following steps.

- *Established a temporal scope for the cumulative impact assessment.* The timeframe established for the cumulative impact analysis extends between 1950 and 2040, to correspond with adopted demographic data utilized in the Arizona Model. The year of 1950 was the beginning of the interstate era with the construction of I-10 starting in 1956, the construction of the first section of I-8 completed in 1959, and the opening of the Colorado River Bridge, which completed I-8, in 1979. The first section of I-19 opened to vehicular traffic in 1966 with its last section opening in 1979. Therefore, 1950 was selected as the temporal starting point for analyses as it captures the travel and development patterns associated with the construction of the Interstate System in the State of Arizona.
- *Established a geographic scope for the cumulative impact assessment.* The geographic Cumulative Effects Study Area (CESA) varies by resource and is as large as the area of direct and indirect effects. The CESAs are established to encompass an area that includes past, present, and reasonably foreseeable actions that have or may contribute to the trend in the health of the resource. The CESA takes into account watersheds, ecosystems, geopolitical boundaries, and other large-scale areas–such as wildlife movement corridors–that have the potential to be directly or indirectly affected by the project.
- *Determined other actions – past, present, and reasonably foreseeable – and their effect on each resource.* Future actions were identified out to 2040 and beyond, if possible. Reasonably foreseeable actions were identified by review of resource sections; professional knowledge; review of studies and plans that are readily available; and input from the Cooperating and Participating Agencies. Additionally, information was gleaned from a series of interviews held in August and September 2017 with municipalities, counties, and Tribes to bolster the understanding of reasonably foreseeable actions (see **Appendix E6**). The objective of the interviews was to identify changes in development, economic patterns, and other actions that local, state, and federal agencies are considering in response to the direct effects that could result from I-11 and due to agency's planned projects independent of I-11.

3.17.3 Affected Environment: Past, Present, and Reasonably Foreseeable Future Actions

Following World War II, Arizona's population and road construction began to grow. By 1950, the state's population was 750,000, an increase of 50 percent since 1940. By 1960, the population had grown to 1.3 million, and by 1970, the population was 1.8 million. Most new residents settled in the Phoenix and Tucson areas (ADOT 2011). The increased population growth led to an increase in the number of automobiles within the state, and in 1945 there were 154,000 motor vehicles in Arizona. By 1959, the number had risen to 649,000 vehicles and by 1974 there were 1.7 million (ADOT 2011).

During the late 1940s and 1950s, Arizona began to overhaul its state highway system, rebuilding routes such as United States (US) 60 and US 66. The Federal Aid Highway Act of 1956 appropriated $25 billion to build the National System of Interstate and Defense Highways, and authorized funding construction on a pay-as-you-go basis. Arizona's interstate routes were designed to replace existing highways: Interstate 40 replaced US 66; I-10 replaced parts of US 80 and US 60; I-8 replaced the remainder of US 80; I-19 replaced US 89 from Nogales to Tucson; and I-17 replaced State Route (SR) 69 and SR 79 between Phoenix and Flagstaff (ADOT 2011).

Policies established by the Bureau of Public Roads (predecessor to FHWA) required the alignments to be located away from existing highways. The Bureau of Public Roads established this policy to secure the rights-of-way (ROWs) needed to build wider and straighter roads and to establish the most direct routes between Arizona's most important cities and towns. One of the more controversial projects was I-10. Instead of following US 60 from Phoenix through Wickenburg and Aguila, a more direct route west of Phoenix was constructed, which was known as the Brenda Cutoff. I-10 also encountered opposition to their proposal for a new alignment through Pinal County. Instead of passing through Casa Grande and Coolidge, as US 80 then did, the new I-10 followed a more direct route midway between the two towns. Local farmers opposed this route because the new alignment angled across their cotton and alfalfa fields and cut their properties into triangular parcels (ADOT 2011).

By 1967, just under half of the state's total interstate mileage was open to traffic, with almost all of the remaining mileage either under construction or being designed. By 1972, the interstate system was 79 percent complete. In 1978, Arizona completed I-8 between Yuma and its intersection with I-10 (ADOT 2011). Construction of these interstates supported population growth and development.

Agricultural development in Arizona is concentrated along major river systems, resulting in population and land use increases in Pima, Pinal, and Maricopa counties, with concentrations around established towns and cities, such as Tucson, Casa Grande, Buckeye, and Goodyear. Irrigation canal systems, including Salt River Project, Central Arizona Project (CAP), and San Carlos Irrigation Project, maximized agricultural production in Maricopa and Pinal counties, while public lands beyond these cultivated areas were leased as grazing allotments, explored for profitable mining resources, or sold for private development.

Increasing urbanization has resulted in cities like Casa Grande, Buckeye, and Goodyear extending their incorporated boundaries in anticipation of future residential and commercial development. Construction projects have occurred on public lands that surround urban areas, such as solar plant development, road and highway construction, and flood control structures, while preservation of large areas as city or regional parks and recreation areas has provided a measure of protection for intact cultural resources that might otherwise have been destroyed by development.

To assess the potential for cumulative effects to the resource areas, trends in the status of the resources were reviewed since the 1950s. Each resource was evaluated and an assessment of whether the alternatives may affect trends when combined with other past, present, and reasonably foreseeable actions was completed. Past, present, and reasonably foreseeable future actions that were considered are provided in **Table 3.17-1** (Summary of Past and Present Actions), **Table 3.17-2** (Reasonably Foreseeable Future Actions), and **Figure 3.17-4** (Reasonably Foreseeable Future Actions).

3.17.4 Environmental Consequences: Indirect and Cumulative Effects

This section discusses the potential indirect and cumulative effects for the No Build and Build Corridor Alternatives. Section 3.17.4.1 addresses transportation and land use, and Section 3.17.4.2 addresses the remaining resource topics.

Table 3.17-1 Summary of Past and Present Actions

Action/Project	Description	Location
Past and Present Actions		
Community and Population Growth	Population growth within the Study Area has led to land use changes over the last century, expanding urban development and the associated demand for services. Within the Maricopa County portion of the Study Area, population and employment is projected to more than triple, increasing by 259 percent and 248 percent from 2015 to 2040, respectively. During that same time period, similar high growth rates also are forecasted for employment within the Pinal County portion of the Study Area at 234 percent. Pima County would have growth in both population and employment at 25 percent and 38 percent, respectively (ADOT 2017).	Arizona statewide
Tribal Lands	The Gila River Indian Community was established in 1859; the Tohono O'odham Nation was established in 1874; the Salt River Pima-Maricopa Indian Community in 1879; the Ak-Chin Indian Community in 1912; and the Pascua Yaqui Tribe in 1978 (Arizona Geographic Alliance 2014).	Arizona statewide
Southern Pacific Railroad; now Union Pacific Railroad (UPRR)	The Southern Pacific Railroad was extended from Yuma to Tucson in 1880; the line between Tucson and Phoenix was established in the late 1800s. In 1996, the Southern Pacific Railroad merged with the UPRR. In 2016, UPRR employed 1,126 persons in Arizona, with 13,800 rail cars originating and more than 82,650 rail cars terminating in Arizona (UPRR 2017). UPRR recently double-tracked several segments of the Sunset Corridor (UPRR mainline across the southern US) in Arizona and completed plans to double-track the remaining segments for near-term completion. The Nogales Subdivision links with the Sunset Route through a direct connection into the Tucson Yard. Pending the construction of the UPRR Red Rock classification yard, a connection between the Nogales Subdivision and UPRR Sunset Route would permit direct traffic flow between Nogales and Red Rock, avoiding the Tucson Yard and increasing capacity.	Rail facilities owned by UPRR parallel I-19 and I-10 from Nogales to the vicinity of the I-8/I-10 junction, then crosses I-10 and extends west to California, generally parallel and located in close proximity to I-8.
Burlington Northern Santa Fe Railroad (BNSF)	The BNSF Phoenix Subdivision branch line (i.e., Peavine Line) parallels Grand Avenue/US 60 in the Phoenix metropolitan area and passes through Wickenburg. The Forepaugh Industrial Rail Park is located in Wickenburg, adjacent to the BNSF rail line and currently consists of 76 acres with plans for an expansion to over 700 acres.	Maricopa County

Table 3.17-1 Summary of Past and Present Actions (Continued)

Action/Project	Description	Location
Central Arizona Project (CAP) canal	The CAP canal was constructed between 1973 and 1993 to bring water from Lake Havasu on the Colorado River over a distance of 336 miles to Tucson. It is a major potable water supply source for all of south central Arizona.	South and Central Arizona
Palo Verde Nuclear Power Plant	The Palo Verde Nuclear Power Plant went into commercial operation in 1986 and became fully operational in 1988. It is a major source of electric power, generating approximately 4,000 megawatt (MW) annually for the Tucson, Phoenix, Los Angeles, and San Diego metropolitan areas. Various transmission lines extend from the power plant as well as from other power generation facilities, including Roosevelt Dam located east of Phoenix.	Maricopa County
Agricultural Production	Arizona data from the Census of Agriculture indicate that the quantity of land in cultivation grew in the early 1900s, peaked in the mid-1950s, and then gradually declined. Approximately 14 million acres of Arizona land was in cultivation in 1935. In 1954 the figure approached 42 million acres, but dropped to about 38 million acres by 1969, 36 million acres in 1987 (US Department of Agriculture [USDA] 2014), and 25.9 million in 2016 (USDA 2017). While the amount of land in agricultural cultivation has been declining from historic levels, agricultural production remains an important component of land use in the Study Area. The 2012 Census of Agriculture reports that Pima County had 855 farms with acreage of land in cultivation not disclosed; Pinal County had 938 farms and 1,174,727 acres of land in cultivation; and Maricopa County had 2,479 farms and 475,898 acres of land in cultivation (USDA 2012). While county statistics are not necessarily a reflection of the Build Corridor Alternatives, the corridors intersect with land in agricultural production in each county. However, the majority of the farmland crossed by the Corridor Options is in Pinal County.	Arizona statewide
Rangeland/Grazing Allotments	Ranching has been a historic land use in Arizona and grazing allotments remain active within the Study Area, particularly in Pinal County.	Arizona statewide
Proving Grounds	Proving grounds in the Study Area include Toyota, Nissan, Ford, and Volkswagen.	South and Central Arizona
Mining Operations	Mines within the Study Area include Sierrita Mine (open-pit copper), Mission Mine (open-pit copper), Silver Bell Mine (open-pit copper), and Rillito Mine (cement). Vulture Mine is located in Maricopa County.	Pima County Maricopa County

Table 3.17-1 Summary of Past and Present Actions (Continued)

Action/Project	Description	Location
State Highway and Road System	The major transportation features in the Study Area include I-8, I-10, I-19, US 60, US 93, SR 77, SR 79, SR 84, SR 85, SR 86, SR 87, SR 189, SR 210, SR 238, SR 287, SR 347, and SR 387. The metropolitan areas of Tucson and Phoenix also have a system of major and minor arterial streets contributing to the transportation system.	South and Central Arizona
Urban and Rural Development	Approximately 20 to 25 percent of the Build Corridor Alternatives pass through developed areas, including residential, industrial, and commercial/business land uses. Emerging economic centers throughout the corridor include, but are not limited to: Forepaugh Industrial Railpark in Wickenburg, Casa Grande Commerce Park, UPRR Red Rock Classification, Sonoran Corridor Economic Development region, and Mariposa International Commerce/Industry Park in Nogales.	Study Area
Port of Tucson	An intermodal freight facility fulfilling both domestic and international shipments along I-10 and the UPRR Sunset Corridor east of Tucson.	City of Tucson
Downtown Tucson	Primary employment center in the Tucson metropolitan area, located along I-10 north of the I-10/I-19 junction, includes a mix of employment types, including office, commercial, institutional, and industrial, combined with residential and other mixed uses.	City of Tucson
San Carlos Irrigation Project (SCIP)	The SCIP was authorized by an act of Congress in 1924. It is managed by the Bureau of Indian Affairs and was established to provide irrigation and electricity on the San Carlos Apache Tribe, Gila River Indian Community, and certain lands adjacent to the reservation. SCIP provides service to approximately 2,400 square miles in Pinal County and parts of Pima, Maricopa, Graham, and Gila counties. The customer base is primarily agricultural and rural.	Pinal County
Solar Energy Projects	A number of solar projects have been considered in western Maricopa County. Several have been built; examples of larger projects include: Arlington Valley Solar Energy – 125 MW on 1,433-acre site; Arlington Valley Solar Energy II – 125 MW on 1,160-acre site; and Solana Generating Station in Gila Bend – 280 MW on 1,920-acre site. Other examples include photovoltaic facilities in Marana, Avra Valley, and Picture Rocks; Red Rock Power Plant, and Saguaro Power Plant.	Study Area

Table 3.17-1 Summary of Past and Present Actions (Continued)

Action/Project	Description	Location
National Monuments and other Open Space Preservation	The Ironwood Forest National Monument was established in 2000 (Encyclopedia Britannica 2017) and was quickly followed by the designation in 2001 of the Sonoran Desert National Monument (The American Southwest 2017). Other parks and dedicated open space have designated throughout the Study Area. Key parks are shown and labeled on **Figure 3.17-4**, and are discussed in more detail in Section 3.4.	Maricopa, Pima, and Pinal counties
Mariposa Land Port of Entry (LPOE) Expansion and Modernization	The LPOE, accessible via SR 189, was reconstructed to improve efficiency and security by increasing the number of lanes and pedestrian walkways. The new LPOE facilities opened in 2014 and are able to process 4,000 trucks per day and have an additional 12 car lanes and a bus lane (Greater Nogales Santa Cruz County Port Authority 2017). Mariposa is the country's fourth busiest land port. All commercial traffic entering the US at Nogales enters through the LPOE.	Santa Cruz County

NOTES: BNSF = BNSF Railway, CAP = Central Arizona Project, I-8 = Interstate 8, I-10 = Interstate 10, I-19 = Interstate 19, LPOE = Land Port of Entry, MW = megawatts, SCIP = San Carlos Irrigation Project, SR = State Route, UPRR = Union Pacific Railroad, US = United States.

Table 3.17-2 Reasonably Foreseeable Future Actions

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
1	Transportation	US 93 Tegner Drive to SR 89	Widen existing transportation facility from two to four lanes.	Town of Wickenburg
2	Industrial Park	Forepaugh Industrial Rail Park	A 76-acre industrial park approximately 10 miles west of Wickenburg that is planned for over 700 acres of light and heavy industrial uses and would serve as a transportation distribution center.	Town of Wickenburg
3	Master Planned Communities (MPCs)	Various	Numerous MPCs are located within the Study Area and are in various stages of planning (e.g., concept design, platting, or construction). Many of these plans have been in place for nearly 10 years, evolving with the regional economy post-Great Recession, while new community development initiatives continue to arise on a frequent basis. Creating a comprehensive and up-to-date list is not realistic, as it will only reflect one snapshot in time during this study. The majority of large-scale MPCs are located in Buckeye, Casa Grande, Goodyear, and unincorporated Maricopa County, with hundreds of smaller developments throughout the Study Area. An illustrative list of major MPCs within the Study Area includes: ▪ Douglas Ranch – 33,800 Acres (City of Buckeye) ▪ Belmont – 25,000 Acres (Maricopa County) ▪ Estrella – 25,000 Acres (City of Goodyear) The Draft Tier 1 EIS analysis is based on current adopted land use plans in the local jurisdictions, which reflect planned developments, as well as input from local jurisdictions and other stakeholders on the status of major MPCs.	South and Central Arizona
4	Industrial	Nikola Motor Company facility	Nikola Motor Company, the maker of zero-emissions commercial trucks, will establish operations in Coolidge. The investment will include a $1-billion capital investment, with 4,000 construction jobs and an additional 2000 permanent jobs.	City of Coolidge

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
5	Industrial	Buckeye Industrial Corridor	More than 16 miles of industrial and business park property supporting both domestic and international business, oriented around the Buckeye Municipal Airport.	City of Buckeye
6	New Transportation Facility*	SR 30/Tres Rios Corridor	Formerly SR 801, also known as the I-10 Reliever, is a planned high capacity roadway in the southwest portion of the City of Phoenix and the southwest metropolitan suburbs. Maricopa Association of Governments (MAG) has included interim construction of SR 30/Tres Rios Corridor as a Group 1 (Fiscal Year 2018-2022) project.	Maricopa County
7	Solar	Mesquite Solar	The Mesquite Solar project is a photovoltaic power plant being built in Arlington, Maricopa County, owned by Sempra Generation. Phase 1 has a nameplate capacity of 150 MW. The project has a planned capacity of up to 700 MW when completed.	Maricopa County
8	New Transportation Facility*	Loop 202-South Mountain Freeway	ADOT is currently constructing the South Mountain Freeway project to complete the Loop 202 highway system with a 22-mile freeway running east and west along Pecos Road and then turning north between 55th and 63rd avenues, connecting with I-10 on each end. As of 2018, this project is under construction and will open in late 2019.	Maricopa County
9	New Transportation Facility	Passenger Rail Corridor	The Federal Railroad Administration (FRA) completed a Tier 1 EIS and issued a Record of Decision for this intercity passenger rail corridor in 2016 connecting the Phoenix and Tucson metropolitan areas.	Maricopa, Pinal, and Pima counties

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
10	New Transportation Facility*	SR 303L Extension/Loop 303 Spur	The Loop 303 would extend south of the interchange with I-10 in Goodyear to the planned SR 30/Tres Rios Corridor. MAG has included SR 303L from I-10 to SR 30/Tres Rios Corridor as a Group 1 (Fiscal Year 2018-2022) project. Its ultimate terminus is planned at the Riggs Road alignment; however, the current MAG Regional Transportation Plan only provides for ROW preservation between SR 30/Tres Rios Corridor and Riggs Road. MAG's Hidden Valley Regional Transportation Framework Study, which includes the 303-spur concept, also assumes the presence of an I-11 Corridor to further connect the network.	Maricopa County
11	Solar	Sonoran Solar Project	Sonoran Solar Energy proposed to construct and operate a 3,700-acre solar power plant and ancillary facilities located on land administered by the Bureau of Land Management (BLM). The proposed project would be located in the Little Rainbow Valley, east of SR 85 and south of the Buckeye Hills and the City of Buckeye (Sonoran Solar Energy, LLC 2011).	Maricopa County
12	New Transportation Facility	Sonoran Valley Parkway	A two- to six-lane parkway in Goodyear, Arizona that would originate on Rainbow Valley Road and Riggs Road at the southern end of Goodyear and proceeds southeast to intersect with SR 238 in Mobile, Arizona. The Record of Decision is expected in 2018. The project is contingent upon pace of development and according to City of Goodyear, staff will require developer involvement.	City of Goodyear
13	New Transportation Facility	North-South Corridor Study Tier 1 EIS	This highway study in Pinal County would improve regional connectivity, provide an additional way of getting around a growing area of the Sun Corridor (merging metropolitan areas between Tucson and Phoenix), and address current and future transportation needs in a growing area. A Tier 1 EIS was initiated in 2016, and is planned for completion in 2019. The project scope incorporates the extension of SR 24 from Ironwood Drive to the North-South Corridor.	Pinal County

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
14	Irrigation and Power	San Carlos Irrigation Project (SCIP)	Under the Arizona Water Settlement Act, Bureau of Reclamation (Reclamation) is lead agency undertaking a large rehabilitation project for the SCIP irrigation system.	Pinal County
15	New Transportation Facility	Pinal County East-West Corridor West Pinal Freeway	The purpose of this corridor is to improve the mobility and connectivity of the Pinal County regional transportation networks by providing a new, high-capacity facility that can handle the projected east-west travel demand from SR 347 to I-10. A Design Concept Report was completed in December 2015. The Pinal Transportation Plan revised in May 2016 incorporates the West Pinal Freeway.	Pinal County
16	Industrial	Casa Grande Airport Industrial Park	The Casa Grande Airport Industrial Park (SR 387 between Val Vista and McCartney Road) and the City of Casa Grande are considering zoning industrial all the way to I-8 between Burris and Thornton Road.	City of Casa Grande
17	Activity Center	Lucid	New 500-acre development featuring auto manufacturing at the southwest corner of Peters and Thornton roads. Expected to generate 2,200 jobs over the next 7 years.	City of Casa Grande
18	Activity Center	Phoenix Mart	Mixed-use development and proposed global trade center in Casa Grande that would be an international exposition center similar to the Merchandise Mart in Chicago, with numerous business and showroom suites as well as facilities to conduct major events.	City of Casa Grande
19	Activity Center	Casa Grande Commerce Park	Employment area consisting of nearly 600 acres.	City of Casa Grande
20	Activity Center	Attesa	Motorsports raceway, research and development center, and automotive services that will occupy 2,500 acres and provide 15,000 jobs at build out. Located south of I-8 between Montgomery and Bianca roads.	City of Casa Grande
22	Activity Center	Coolidge Inland Port/Logistics Zone	A planned 1,600-acre inland port on the eastern edge of the proposed North-South Freeway.	City of Coolidge

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
23	Improvement to Existing Transportation Facility**	I-10 Corridor Study: Junction I-8 to Tangerine Road	This corridor study recommended providing a 10-lane divided interstate highway with continuous parallel one-way frontage roads and reconstructed and/or relocated Traffic Interchanges (Tis) along I-10 between Earley Road (milepost 196) and Tangerine Road (milepost 240). A Finding of No Significant Impact based on the Final Environmental Assessment and Section 4(f) Evaluation for the project was signed in December 2010. Some segments along these limits have already been widened to three lanes in each direction from the existing two lanes. Work on a widening project to realign the highway and add one general-purpose lane in each direction between Sunshine Boulevard (milepost 209.59) and Picacho Highway (milepost 213) is currently under construction. The SR 87 TI also will be reconstructed.	Pinal and Pima counties
24	Solar	Picacho Solar Project	Proposed 400-MW solar facility on a 2,726-acre site of State Trust land east of Picacho Peak.	Pinal County
25	Industrial	UPRR Red Rock Classification Yard	UPRR submitted an application to purchase approximately 1,873 acres of land adjacent to I-10 from the Arizona State Land Department (ASLD) to construct a classification yard where rail cars would be separated and classified and trains assembled to improve operations efficiency.	Pinal County
26	Activity Center	Transportation Logistics Zone	Area encompassing the Pinal Airpark, I-10, and planned rail system improvements.	Pinal County
27	Activity Center	Tangerine Road Corridor	Planned activity center targeted for high-tech business park development, with surrounding residential, commercial, and mixed-use development.	Pima County
28	Improvement to Existing Transportation Facility*	I-10	I-10 widening (six lanes to eight lanes) from Prince Road to Ina Road.	Pima County

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
29	Improvement to Existing Transportation Facility*	I-10/Ina Road TI	Operational improvements including reconstruction of a TI and constructing railroad overpass. Currently under construction with planned completion in 2018.	Pima County
30	Improvement to Existing Transportation Facility*	I-10/Ruthrauff TI	Improve TI at I-10 and Ruthrauff Road.	Pima County
31	Activity Center	Ryan Airfield	Major improvements are underway at Ryan Airfield including hooking up to county sewer, Valencia Road improvements, and construction to remove land from the designated floodplain along with Federal Emergency Management Administration (FEMA) map revisions to position Ryan Airfield for future development. The amount of commercial and industrial land available is 1,800 acres. They have planned a flight campus and are looking at commercial development along Valencia Road. Pima County has identified this area as a major employment hub in Pima Prospers, its comprehensive plan.	Pima County
32	New Transportation Facility	I-10/SR 210 Improvements	Improvements to SR 210 and I-10 east of I-19. An Environmental Assessment is in preparation in 2018 to consider capacity improvements in this area.	City of Tucson
33	Improvement to Existing Transportation Facility*	I-19/Ajo Highway (SR 86) TI	Reconstructed TI on Ajo Highway (SR 86) is currently under construction with a planned completion in 2018.	Pima County

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
34	Improvement to Existing Transportation Facility	I-19, San Xavier Road to I-10	This 2012 study recommended widening I-19 to four lanes in each direction between San Xavier Road (milepost 56.3) and milepost 63.0. Many traffic interchanges and ramps within those limits also were recommended to be reconstructed. Some recommendations from this study have been constructed and are moving forward, including reconstruction of the interchange at Ajo Highway (SR 86) (detailed above).	Pima County
35	Improvement to Existing Transportation Facility	Ajo Highway (SR 86) reconstruction: Valencia Road to Kinney Road	Approximately 7-mile section of Ajo Highway (SR 86) is currently under construction from west of Valencia Road near Ryan Airfield to just east of Kinney Road with planned completion in 2018.	Pima County
36	New Transportation Facility	Sonoran Corridor	ADOT initiated a Tier 1 EIS in 2017 for the Sonoran Corridor, a potential new transportation corridor that would connect I-19 and I-10 south of the Tucson International Airport.	Pima County
37	Industrial	Sonoran Corridor economic development	Planned 50-square mile import/export logistics hub area that includes aviation and defense-related uses (e.g., Raytheon Missile Systems, Davis-Monthan Air Force Base, Tucson International Airport, University of Arizona Tech Park).	Pima County
38	Activity Center	Sahuarita Farms	A mixed-use development totaling approximately 5,592 acres including 3,416 acres of residential development with 16,605 housing units; 1,438 acres of employment development; 531 acres of mixed-use development; and 207 acres of open space.	Town of Sahuarita
39	Improvement to Existing Transportation Facility	SR 189	An approximately 4-mile-long, north-south, four-lane major arterial through Nogales beginning at the Nogales-Mariposa LPOE to the south and ending at Grand Avenue to the north. The Finding of No Significant Impact is complete for these improvements and ADOT is considering implementation. It serves at the connection with the southern terminus of the corridor.	Santa Cruz County

Table 3.17-2 Reasonably Foreseeable Future Actions (Continued)

Reasonably Foreseeable Future Actions/Projects				
#	**Project Type**	**Project Name**	**Description**	**Location**
NA	Transportation (General)	Planned transportation network	The Regional Transportation Plans adopted throughout the Study Area are considered as the planned transportation network.	Study Area

NOTES: EIS = Environmental Impact Statement, I-8 = Interstate 8, I-10 = Interstate 10, I-19 = Interstate 19, LPOE = Land Port of Entry, MAG = Maricopa Association of Governments, MPCs = Master-Planned Communities, MW = megawatt, ROW = right-of-way, SCIP = San Carlos Irrigation Project, SR = State Route, TI = traffic interchange, UPRR = Union Pacific Railroad, US = United States

* Included in Statewide Travel Demand Model (ADOT 2017).

** The additional new travel lanes identified in the ADOT 2017-2021 Five-Year Transportation Facilities Construction Program included: I-10: Earley Road to Jct I-8 – widen to 6 lanes and I-10: SR 87 to Town of Picacho – widen to 6 lanes. For these segments where the widening is identified, we updated the highway network to reflect three lanes in each direction instead of the two lanes in each direction that existed in 2015.

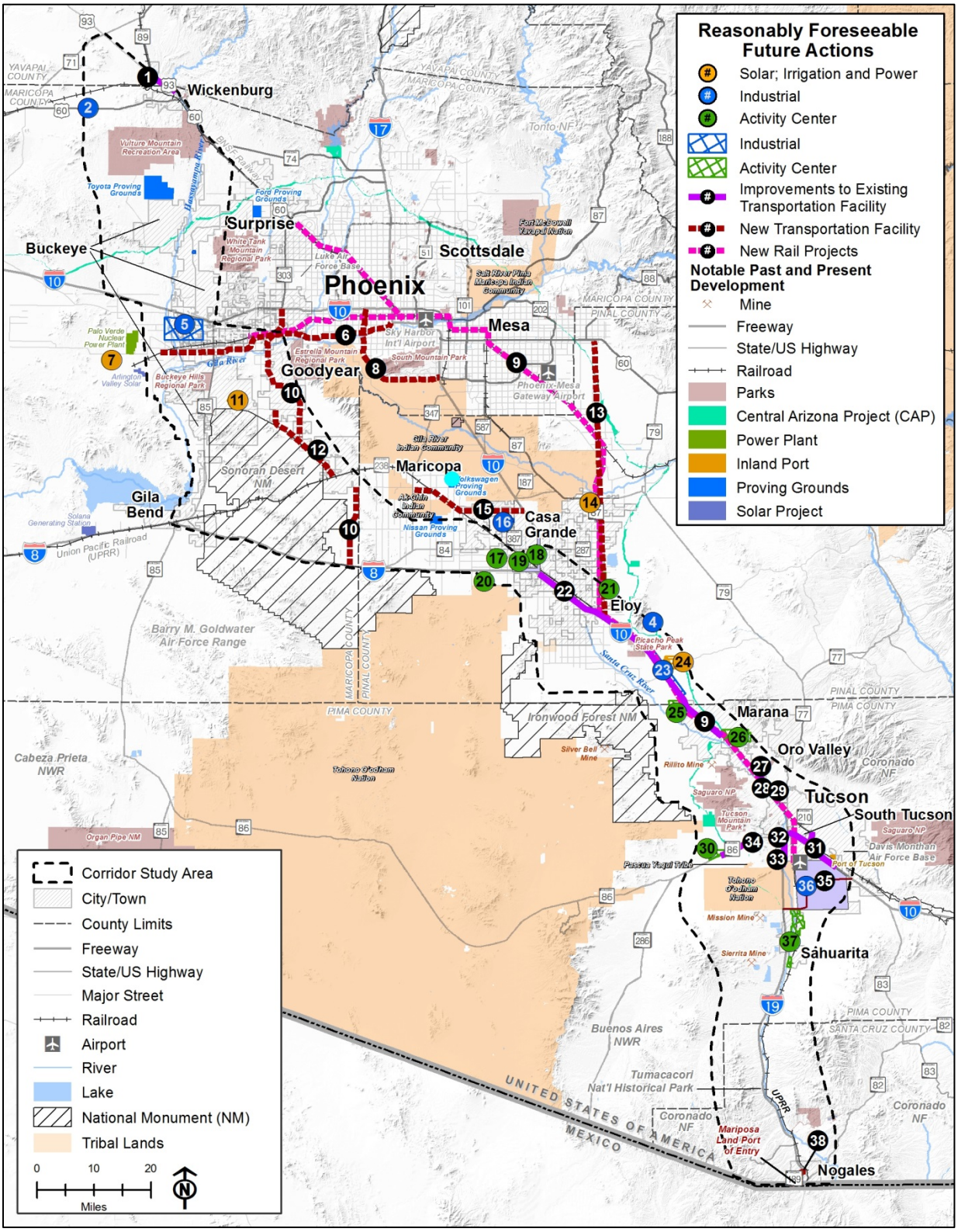


Figure 3.17-4 Reasonably Foreseeable Future Actions

3.17.4.1 Transportation and Land Use Indirect Effects

As described in Section 3.17.2.1, indirect effects to transportation and land use were considered by identifying potential changes to travel times and travel patterns resulting from the construction of I-11, which could influence the type and pace of land use change, as well as growth. The AOI for land use was defined as a 0.25-mile to 0.5-mile radius around potential interchange locations (see **Figures 3.17-1** through **3.17-3**) and properties generally within a quarter mile buffer along the Build Corridor Alternatives. Beyond that buffer but generally within a 5- to 10-minute drive there may be additional development as larger parcels become available. Induced development could include logistics parks, master-planned employment or industrial centers, or MPCs. It is anticipated that improved or new access could expedite the rate of development as well as the types of land uses. The density of development also might increase due to accessibility and improved travel times.

No Build Alternative

Under the No Build Alternative, travel demand is projected to increase and would be addressed on the existing and programmed transportation network. This is forecasted to result in reduced levels of service, particularly in the metropolitan areas (see Section 3.2).

Under the No Build Alternative, land uses would continue along current trajectories, with continued growth and development along existing transportation corridors. Planned developments are present in western Maricopa County (particularly Buckeye and Goodyear) and in the Casa Grande area. The pace of development and subsequent change in land use patterns would be guided by market forces and availability of public services. No indirect effects to land uses are anticipated.

Build Corridor Alternatives

Under all Build Corridor Alternatives, the construction of a new transportation facility could affect the type or pace of land use change in areas that are currently undeveloped. The introduction of new access could trigger or accelerate the development of land that would be better connected to employment and services; result in the development of commercial services that serve long-distance travel; or promote development of new industrial, manufacturing, or other businesses that value close access to high-capacity transportation. As noted previously, the Tier 1 analysis assumes the interchange locations included in the Arizona Model, which are based on current regional transportation plan networks that would warrant connections to a new high capacity transportation facility. In the future, additional or different potential interchange locations could be identified based on land use patterns, growth, and specific access needs.

Purple Alternative

In general, land around proposed new interchanges and areas with increased accessibility would be expected to experience changes in land uses as well as the rate of development in comparison to the No Build Alternative. Employment (business park, freestanding office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential type uses are likely in urban locations. Warehousing/distribution, convenience retail/filling stations, and convenience food service type uses are likely in rural locations. Key considerations for indirect effects on transportation and land use are summarized below.

South Section

- The Purple Alternative provides direct mobility benefits by diverting traffic from congested areas along existing highways, improving travel times for longer trips by avoiding those congested areas, and providing an alternate route to I-10 in some areas.
- Includes seven potential interchanges in generally rural areas: land around new interchanges is likely to experience changes due to creation of major transportation nodes. Employment (warehousing/ distribution, light industrial) and commercial (convenience retail/filling stations, convenient food service) type uses are likely in these rural locations.
- Includes 18 existing interchanges: these locations could experience additional land use activity due to an increase in traffic related to I-11.
- Developable land around new potential interchange locations in the South Section is mostly planned for residential. Development in the South Section is limited by the presence of National and local parks, National Monuments, and Tribal land, as well as Tucson Water's CAVSARP and SAVSARP facilities.
- Locations along the I-11 Corridor Options within incorporated jurisdictions such as Nogales, Marana, and Eloy are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

Central Section

- The Purple Alternative provides direct mobility benefits by diverting traffic from congested areas, improving travel times for longer trips by providing a more direct route through the Central Section, and providing an alternate route to I-10.
- Includes 20 new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (business park, freestanding office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential are likely in urban locations. Warehousing/distribution, convenience retail/filling stations and convenience food service type uses are likely in rural locations.
- The majority of planned land uses throughout the Central Section are categorized as open space/recreation with clusters of residential and commercial activity centers located within master-planned communities closer to Goodyear and I-10.
- Although this part of the corridor could attract trips away from the existing network, large parts of the area are not subject to development, including the Sonoran Desert National Monument and protected areas along the Gila River.
- Locations along the I-11 Corridor Options within incorporated jurisdictions such as Casa Grande, Goodyear, and Buckeye are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

North Section

- The Purple Alternative in the North Section provides direct mobility benefits by improving access to an area that is planned for development by local jurisdictions but contains no north-south connectivity today, improving travel times by providing a more direct and continuous high-capacity route through the North Section.

- Includes four new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (business park, freestanding office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential type uses are likely in urban locations. Warehousing/distribution, convenience retail/filling stations, and convenience food service type uses are likely in rural locations.
- The majority of planned land uses within the North Section are within master-planned communities within and near Buckeye, unincorporated Maricopa County, and Surprise, while the northern area immediately south of Wickenburg is categorized as open space/recreation due to the location of the Vulture Mountain Recreation Area (VMRA).
- Locations along the I-11 Corridor within incorporated jurisdictions such as Buckeye and Wickenburg are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

Green Alternative

The types of indirect effects for the Green Alternative are expected to be similar in nature to those of the Purple Alternative, although some different areas might experience effects.

South Section

- The Green Alternative provides direct mobility benefits by diverting traffic from congested areas along existing highways, improving travel times for longer trips by avoiding those congested areas, and providing an alternate route to I-10.
- Includes 10 new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (warehousing/ distribution, freestanding office, light industrial) and commercial (convenience retail/filling stations, convenient food service, community shopping centers) type uses are likely in urban locations, while warehousing/distribution, convenience/filling stations, and convenience food service uses are likely in rural locations.
- Includes 10 existing interchanges: these locations are likely to see additional land use activity due to increase in traffic related to I-11.
- Developable land around new potential interchange locations in the South Section is mostly planned for residential. Development in the South Section is limited by the presence of National and local parks, National Monuments, and Tribal land as well as Tucson CAVSARP and SAVSARP facilities.
- Locations along the I-11 Corridor within incorporated jurisdictions such as Nogales, Sahuarita, Marana, and Eloy are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

Central Section

- The Green Alternative in the Central Section provides direct mobility benefits by diverting traffic from congested areas, improving travel times for longer trips by providing a more direct route through the Central Section, and providing an alternate route to I-10.

- Includes 16 new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (business park, freestanding office, corporate office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential are likely in urban locations. Warehousing/distribution and convenience retail/filling stations and convenience food service type uses are likely in rural locations.
- The majority of planned land uses throughout the Central Section are categorized as open space/recreation with clusters of residential and commercial activity centers located in Casa Grande and Goodyear.
- Although this part of the corridor could attract trips away from the existing network, large parts of the area are not subject to development, including the Sonoran Desert National Monument and protected areas along the Gila River.
- Locations along the I-11 Corridor within incorporated jurisdictions such as Casa Grande, Goodyear, and Buckeye are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

North Section

- The Green Alternative in the North Section provides direct mobility benefits by improving access to an area that is planned for development by local jurisdictions, improving travel times by providing a more direct and continuous high-capacity route through the North Section.
- Includes four new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (business park, freestanding office, corporate office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid-density residential type uses are likely in urban locations. Warehousing/distribution, light industrial, convenience retail/filling stations, and convenience food service type uses are likely in rural locations.
- The majority of planned land uses within the North Section are categorized as mixed use or residential within and near Buckeye, Maricopa County, and Surprise, while the northern area immediately south of Wickenburg is categorized as open space/recreation due to the location of the VMRA.
- Locations along the I-11 Corridor within incorporated jurisdictions such as Buckeye and Wickenburg are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

Orange Alternative

South Section

- The Orange Alternative in the South Section provides direct mobility benefits by increasing capacity in existing transportation corridors, but would not provide benefits related to incident management since it provides relatively few new lane miles in the South Section and no alternate route.

- Includes one new potential interchange: land around the new interchange is most likely to see changes due to creation of a more major transportation node.
- Includes 50 existing interchanges: these locations may experience additional land use activity due to an increase in traffic related to I-10.
- Since land uses have already developed along the I-10 Corridor within incorporated jurisdictions such as Nogales, Sahuarita, Tucson, Marana, and Eloy, improvements along the existing corridor would not be expected to cause major changes in overall land use patterns.

Central Section

- The Orange Alternative in the Central Section provides direct mobility benefits by increasing capacity in existing transportation corridors, but would not provide benefits related to incident management since it does not provide an alternate route.
- Includes 11 new potential interchanges: land around new interchanges clustered around I-10 in Maricopa County are most likely to see changes due to creation of a major transportation node where I-11 and I-10 intersect. Employment (warehousing/distribution, light industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential type uses are likely in urban locations (particularly in the I-10 Corridor), while industrial/warehousing, convenience retail/filling stations, and convenience food service type uses are likely in rural locations.
- Includes four existing interchanges: these locations are likely to see additional land use activity due to increase in traffic related to I-11.
- Land around new potential interchange locations is mostly planned commercial and residential land along I-10 and the northern portion of SR 85.
- Locations along the I-11 Corridor within incorporated jurisdictions such as Casa Grande, Gila Bend, and Buckeye are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

North Section

- The Orange Alternative in the North Section provides direct mobility benefits by improving access to an area that is planned for development by local jurisdictions, improving travel times by providing a more direct and continuous high-capacity route through the North Section.
- Includes three new potential interchanges: land around new interchanges is most likely to see changes due to creation of major transportation nodes. Employment (business park, freestanding office, corporate office, industrial); commercial (convenience retail/filling stations, convenience food service, community shopping centers, regional shopping centers); and mid- to high-density residential type uses are likely in urban locations. Warehousing/distribution, light industrial, convenience retail/filling stations, and convenience food service type uses are likely in rural locations.
- The majority of planned land uses within the North Section are categorized as mixed use or residential within and near Buckeye and Surprise, while the northern area immediately south of Wickenburg is categorized as open space/recreation due to the location of the VMRA.

- Locations along the I-11 Corridor within incorporated jurisdictions such as Buckeye and Wickenburg are more likely to experience land use change compared to others, based on access to existing utilities/services (water/sanitary sewer/storm drainage/private utilities).

3.17.4.2 Transportation and Land Use Cumulative Effects

Transportation

The CESA for transportation is the existing and planned transportation network in the regions included in MAG, Sun Corridor Metropolitan Planning Organization, Pima Association of Governments, and Santa Cruz County. Transportation facilities (e.g., I-19, I-10, I-8, local roadways) have historically been developed to address mobility associated with urbanization and to facilitate commerce. As a result, an extensive regional highway and local road network has been developed within south and central Arizona. Potential direct effects to the transportation system were evaluated in Section 3.2, and included changes in vehicle miles traveled, travel times, level of service, safety performance, travel patterns, and incident management. The evaluations also provided a range of expected changes to freight, transit, and air travel.

In support of the transportation analysis, the Arizona Model was used to develop the travel forecasts for development and growth in the region through the year 2040. The Arizona Model covers the entire state's transportation network and has more than 6,000 Traffic Analysis Zones representing population, employment, and other socioeconomic data for different regions of the state. The traffic network used in the model includes not only facilities and services in place today, but also those transportation improvements funded and committed for implementation through 2040. Forecast socioeconomic data by traffic analysis zone account for land development and related trips expected within the forecast horizon year. Because the transportation analysis is based on accepted regional land use forecasts and assumes transportation improvements programmed within the same timeframe, transportation effects evaluated under the Build Corridor Alternatives include many of the cumulative effects of development within the region. The Arizona Model includes SR 30/Tres Rios Corridor and portions of SR 303L, which have some near-term funding in the current MAG Regional Transportation Plan.

In addition to the development projects included in the 2040 forecasts, there are other major proposed transportation projects in the CESA not included in the Arizona Model, which could contribute to additional cumulative effects not already evaluated (see **Table 3.17-2** for more information). These include:

- the Arizona Passenger Rail Corridor, an intercity rail project in Maricopa, Pinal, and Pima counties;
- the SR 303L Extension/Loop 303 Spur, extending from planned SR 30/Tres Rios Corridor south through Goodyear to I-8, west of Casa Grande;
- the Sonoran Valley Parkway, a two- to six-lane parkway in Goodyear;
- the North-South Corridor, a proposed high capacity transportation facility between US 60 in Apache Junction and I-10 near Eloy and Picacho;
- the West Pinal Freeway Corridor, a high-capacity facility to support the projected east-west travel demand from SR 347 to I-10 in Pinal County; and

- the Sonoran Corridor, a new transportation facility that would connect I-19 and I-10 south of Tucson International Airport in Pima County.

Many of these projects have not been funded and no schedule has been identified; however, once constructed the projects would provide added capacity and congestion relief to the regional transportation network. The projects would result in additional beneficial cumulative transportation effects.

No Build Alternative

Under the No Build Alternative, I-11 would not be constructed. Travel demand (including passenger cars and freight) would be accommodated on the existing and programmed transportation network, including the potential transportation projects identified above. Based on the 2040 analysis, travel demand is forecast to increase throughout the region. While many of the highway segments in the Study Area would continue to operate at acceptable levels of service with the No Build Alternative, some segments are forecast to operate poorly under the No Build Alternative, resulting in potential cumulative effects on the transportation system. Additional potential cumulative effects include reduced travel times and speeds. Cumulative increases in roadway congestion also would increase truck travel times and freight operating costs.

Build Corridor Alternatives

Based on the 2040 analysis, all the Build Corridor Alternatives would result in additional beneficial effects on the efficiency and mobility benefits provided by the transportation system. These include diversion of traffic from existing facilities because of demand for the proposed I-11 Corridor, improved travel times and lower congestion levels, improved safety performance, and a new long-distance and more direct route, which is particularly important for improved freight mobility. The project also would increase the number of new alternate lane miles, which improves the ability to provide effective incident management.

With implementation of the project, traffic conditions within the Study Area would improve in the horizon year; therefore, no cumulatively considerable adverse direct or indirect traffic effects are anticipated. However, the project would likely result in adverse temporary cumulative effects during construction. Given the magnitude of the project, it is anticipated that construction of the project would coincide with construction of multiple other projects throughout the Study Area. Construction-related traffic would overlap with other project-related traffic, resulting in potential construction-related cumulative effects. These effects would be determined during the project level analyses and would be temporary.

Land Use

Arizona continues to be one of the fastest growing states in the country. Economic growth has caused increased urban development activities within the communities in the Phoenix and Tucson metropolitan areas, which includes suburban communities such as Sahuarita, Marana, Goodyear, and Buckeye. Most cities, towns, and counties already have adopted local general or comprehensive plans to manage growth and development within their jurisdictions.

No Build Alternative

Under the No Build Alternative, existing land use trends would be expected to continue. The No Build alternative will not create cumulative land use effects. Development is expected to

progress according to market trends and in line with adopted general or comprehensive plans and/or in response to regional/local transportation initiatives.

Build Corridor Alternatives

Within Maricopa and Pinal counties, many adopted plans and transportation studies already contemplate the addition of a general I-11 Corridor, and have planned land uses accordingly. The implementation of an I-11 Build Corridor Alternative, in combination with other past, present, and reasonably foreseeable future actions, would contribute to the trend in expanding development activities throughout southern and central Arizona. The implementation of multiple projects in the same region could have a synergistic effect of accelerating the timing of planned developments.

Purple Alternative

The Purple Alternative may cause accelerated growth with the implementation of the I-11 Corridor. However, much of this Build Corridor Alternative is already planned as a future transportation corridor in local transportation and land use plans (e.g., West Pinal Freeway, SR 303L, SR 30/Tres Rios Corridor, Hassayampa Freeway), so new growth would not be inconsistent with planned growth. Implementation of this freeway not only provides new access to communities along the corridor, but to the wider planning area. For example, in the North Section, one impediment to new development in the Hassayampa Valley (west of the White Tank Mountains) is limited transportation access – both north/south (connecting I-10 and US 93/US 60 and east/west). I-11 would provide a critical connectivity solution for the existing local roadway network, enhancing access to such large master-planned communities such as Festival Ranch or Trillium West, which are both located east of all Build Corridor Alternatives.

Green Alternative

The cumulative effects of the Green Alternative are similar to the Purple Alternative, but may be exacerbated because the Green Alternative has the greatest potential to change planned land uses in the Study Area. Because the Green Alternative is primarily composed of new unplanned corridor development, it would increase access within the Study Area more than the other Build Corridor Alternatives. Land uses along the Green Alternative are primarily vacant today, and largely planned for residential uses. I-11 may influence adjacent growth if planned residential uses along the corridor and in the nearby vicinity instead build out as commercial, office, or industrial in response to new and enhanced access.

Orange Alternative

In the South and Central Sections, the Orange Alternative has the least amount of direct, indirect, and cumulative effects, as the alternative is improving an existing corridor with existing access in place. Added capacity that increases reliability could make these existing highway corridors more attractive by lessening congestion, but land uses are expected to change to a much lesser degree. However, the Orange Alternative in the North Section is similar to the Purple and Green Alternatives. With no current north-south high capacity transportation access, this alternative has the potential to induce growth in the overall vicinity.

3.17.4.3 Indirect and Cumulative Effects on Other Resources

This section qualitatively assesses the potential for indirect and cumulative effects, as defined in Section 3.17.1, on environmental and social resources other than land use and transportation. The analysis of the direct effects, which occur in the same time and place as the action, is identified in each respective resource section within **Chapter 3** and it is not replicated in this section. Summary statements regarding the potential for indirect and cumulative effects on each resource area are provided in **Table 3.17-3** (Summary of Indirect and Cumulative Effects) located at the end of this section.

3.17.5 Summary

The No Build Alternative would result in higher travel times and congestion levels throughout the Study Area. As the region continues to grow, the transportation projects identified and approved for funding through 2022 and beyond will come online. The anticipated effects associated with transportation projects to meet projected demands would include a general increase in traffic noise and congestion; a continuing trend to develop areas that are currently mapped as agricultural, rural communities or privately owned open space; increased highway capacity affecting conditions on local roadways; changes to visual character; pressure on cultural resources; increased demand for water; increased loss of water quality; and a general trend toward urbanization and development corridor-wide.

Population and employment growth are forecasted under the No Build Alternative; however, the implementation of the I-11 Corridor under any of the Build Corridor Alternatives would be expected to direct growth and accelerate its pace. The potential change in land use and travel patterns is expected to be greatest with the implementation of the Purple or Green Alternative, which would introduce the most new highway miles in rural and undeveloped areas. They would introduce the most new access points as well as reduce travel time between city pairs. This will tend to accelerate the rate of development in areas further away from current urban centers and locate it near new or improved interchanges.

Since it follows existing roadways the most, the Orange Alternative may not introduce as many new effects but rather is highly likely to intensify existing effects. There is potential for indirect and cumulative effects to be concentrated in the downtown Tucson area and the surrounding neighborhoods, which include historic properties and districts. Within the North Section, there is less to distinguish between the Build Corridor Alternatives with regard to potential indirect and cumulative effects.

3.17.6 Mitigation Strategies

ADOT would be an active partner in a broader effort with Metropolitan Planning Organizations, local jurisdictions, resource agencies, and private stakeholders to cooperatively plan development in the I-11 corridor. The effort would coordinate wildlife connectivity, local land use planning, and context sensitive design for the I-11 facility. The White Tanks Conservancy may be a model for this type of effort. Coordination with Pima County on the implementation of the Sonoran Desert Conservation Plan also could be part of the effort.

All mitigation strategies in technical resource areas to address direct impacts also would mitigate cumulative impacts.

3.17.7 Future Tier 2 Analysis

The methodology to address indirect and cumulative effects would be revisited during future Tier 2 analysis to reflect a more detailed understanding of a proposed project. A typical analysis used at the project level to identify and assess cumulative effects would incorporate the following general concepts: identifying resources, identifying geographic boundaries, discussing current health and historic context, identifying reasonably foreseeable future actions, assessing effects, and reporting. *Guidance for Preparers of Cumulative Impact Analysis: Approach and Guidance* is one example of the type of policy implemented by a state to address the complexity of Indirect and Cumulative effects. This document generally addresses those concepts within the framework for a Tier 1 analysis, which is based on broad corridors rather than specific alignment concepts. During Tier 2 environmental review, ADOT would revisit the issue in coordination with the USEPA and all applicable agencies to either identify or develop an appropriate methodology for the indirect and cumulative effects analysis.

Future Tier 2 analysis would refine the indirect and cumulative effects based on a more detailed alignment. Coordination would occur with state, regional, and local agencies to identify local projects for consideration as part of the analysis. Future Tier 2 analysis would further refine the mitigation to minimize direct, indirect, and cumulative effects on resources.

Table 3.17-3 Summary of Indirect and Cumulative Effects

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Economic Effects				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Result in high levels of congestion in the I-10 and I-19 corridors that would hinder business growth.	Land development induced by the project could: • Improve access to existing employment centers (and tourist attractions), thereby promoting their growth. • Attract new businesses to the corridor, thereby providing new employment opportunities. • Generate large travel time savings for both passenger car and truck drivers. • Increase business productivity by lowering shipping and logistic costs. • Cause adverse effects to existing businesses in the corridor during construction (i.e., commercial displacements and limited access to businesses). • Decrease property tax revenues from land acquired for ROW. • Provide better access and opportunities for appropriate gateway services to support ecotourism, such as lodging.	Similar to the Purple Alternative.	Similar to the Purple Alternative. In addition, land development induced by the project could: • Result in out-of-pocket cost savings (i.e., vehicle operating and fuel cost savings) for passenger car drivers.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
		• Deter park visits and economic contributions from outdoor enthusiasts by reducing the rural character of parks, impinging on wildlife habitats, or diminishing visitor experiences.		
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Lead to incremental economic losses and fewer economic opportunities due to increased levels of congestion.	Past, present, and reasonably foreseeable projects could: • Stimulate economic growth in Arizona by means of the economic multiplier (i.e., increase in supplier spending and employee spending across all sectors of the economy).	Similar to the Purple Alternative.	Similar to the Purple Alternative. In addition, past, present, and reasonably foreseeable projects could: • Re-allocate household consumption (from fuel cost savings) towards more productive sectors of the economy.
Archaeological Sites, Historic Structures, and Historic Districts and Buildings				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Increase pressure for potential land use conversion with an associated loss of cultural resources. • Define an extent of potential indirect effects that is much less than for Build Corridor Alternatives. • Generally avoid potential adverse effects if the project is subject to regulatory review.	Land development induced by the project could: • Increase loss of archaeological sites and historic properties due to land use conversions. • Increase access to previously unknown cultural resources which potentially degrade the site. • Define an extent of potential indirect effects rated moderate because of extent of co-located Corridor Options (122 miles). Generally avoid potential adverse effects if the project	Similar to the Purple Alternative, except: • Greater potential for indirect effects because of shorter length of co-located Corridor Options (90 miles).	Similar to the Purple Alternative, except: • Longer length of co-located Corridor Options (263 miles) may reduce or slow induced growth in new areas. • More potential for indirect effects on historic districts and buildings in Tucson due to visual and auditory effects on nearby historic neighborhoods. • Generally avoid potential adverse effects if the project is subject to regulatory review.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
		is subject to regulatory review.		
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Have and will continue to affect cultural resources. • Have minor incremental effects.	Past, present, and reasonably foreseeable projects could: • Have and will continue to affect cultural resources. • Have potential incremental effects, such as increased noise, public access, or visual effects on archaeological sites; effects are expected to be moderate in the South Section near Tucson and Eloy; in the Central Section near Casa Grande, Goodyear, and Buckeye; and in the North Section near Buckeye and Wickenburg. • Have minor incremental effects on historic districts and buildings.	Similar to Purple Alternative except: • Potential incremental effects on archaeological sites are expected to be greater because more archaeological sites are likely to be affected.	Similar to Purple Alternative except: • Potential incremental effects on historic districts and buildings are expected to be greater if new right-of-way is needed for Option B near historic Tucson neighborhoods.
Parks, Recreational Land, and Open Space				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Reduce the availability of land that could be used for future parks, recreational facilities and open space. • Increased use of park, recreational facilities and open space due to an	Land development induced by the project could: • Reduce the availability of land that could be used for future parks, recreational facilities and open space. Could increase the rate and geographic extent of this impact compared to the No Build Alternative. • Increased use of park,	Similar to the Purple Alternative, except: • The resources present within the corridor have greater potential to be indirectly affected by induced changes to land use and traffic.	Similar to the Green Alternative, except: • More resources are present within the corridor and so could be indirectly affected by induced changes to land use and traffic. However, these resources are already located adjacent to a transportation facility in the South and Central Sections.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
	increased population. • Reduce the availability of certain recreation opportunities and experiences due to the expansion of urban areas into formerly rural areas. • Lack transportation facilities to reach recreational facilities.	recreational facilities and open space due to an increased population. Could cause more pressure for open space protection if the Build Alternative results in induced growth in additional areas. • Affect the visitor experience at recreation resources that are close to the corridor, by changing the views from the park or the visual character of the area outside the park, adding to noise or traffic levels in the vicinity and changing visitor use of recreation resources. • Improve accessibility and increased park visitors due to increasing population in proximity to parks, recreation lands and open space increasing awareness of natural and historic resources. • Improve firefighting and emergency accessibility.		

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects and planning could: • Decrease the potential land available for recreation uses. • Increase the demand to provide parks, recreational facilities and open spaces in growing urban/suburban areas. • Increase the demand to provide protected land with recreational components in rural/undeveloped areas. • Alter the recreation setting for existing and future recreation resources. • Change the existing and potential recreation opportunities, ability to reach recreation destinations, and experiences available within an area.	Past, present, and reasonably foreseeable projects could: • Reduce the amount of land available for future parks, recreational facilities or open space, compared to No Build Alternative. • Alter the recreation setting, opportunities, and experiences, as well as user expectations similar to the No Build Alternative, particularly for existing recreation resources due to an increase in accessibility of these sites due to I-11 and other planned transportation facilities and a potential increase in use of existing facilities due to increased accessibility and potential radiating urbanization around I-11 in conjunction with new planned developments.	Similar to the Purple Alternative.	Similar to the Purple Alternative, except: • Effects to specific parks, recreational facilities or open space, but these are more likely to already be in proximity to an existing transportation use. • Reduce the amount of land available for future parks, recreational facilities or open space, compared to No Build Alternative (less than Purple and Green Alternatives because large portions of corridor are in developed areas). • Alter the recreation setting, opportunities and experiences, but to a lesser degree than the Purple and Green Alternatives due to the already developed nature of most of the Orange Alternative.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Noise and Vibration				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Continue to follow the trend in increasing noise levels, which are already exceeding FHWA Noise Abatement Criteria in certain locations.	Land development and the affiliated increase in traffic induced by the project could: • Alter the soundscape in areas that have lower existing ambient noise conditions. • Potentially reduce noise levels through mitigation measures on existing infrastructure in the South and Central Sections where improvements are made. • Increase noise levels for cultural/historic and recreation resources. • Increase the noise levels affecting biologic resources in areas that are currently not developed.	Similar to the Purple Alternative.	Similar to the Purple Alternative, except: • Noise levels potentially increase in areas where there is an existing transportation use in the South and Central Sections.
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Potential incremental increases in noise levels in communities as population growth occurs.	Past, present, and reasonably foreseeable projects could: • Increase noise levels and the associated effects in communities surrounding the corridor.	Similar to the Purple Alternative.	Similar to the Purple Alternative.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Visual and Aesthetic Resources				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Generally continue current growth and development, with associated visual effects, along existing transportation corridors.	Land development induced by the project could: • Change the visual character, particularly in rural areas or near recreation areas where development is currently limited. • Create potential for changes in visual character near new interchanges as agricultural land or open space is developed.	Similar to the Purple Alternative, except: • Potential effects may have increased intensity due to more Corridor Options requiring new facility development.	• Overall potential indirect visual effects would be lower than the other Purple and Green Alternatives in the South and Central Sections due to co-location with existing transportation facilities. • Within Tucson ordinances authorize designation of Tucson Historic Preservation Zones, Tucson Neighborhood Preservation Zones, and City Historic Landmarks that require review of new construction to protect the settings of historic buildings. • Within Tucson, the Rio Nuevo and Downtown Zone requires that exterior alterations to National Register of Historic Places listed or eligible building follow national standards for rehabilitation of historic buildings. • Similar to Purple and Green Alternatives in the North Section.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Change visual character and quality due to the reasonably foreseeable continued urbanization of corridor, especially in the Tucson, Casa Grande, and metropolitan Phoenix areas.	Past, present, and reasonably foreseeable projects could: • Increase potential visual effects on cultural resources and in viewsheds near recreation resources.	Similar to the Purple Alternative.	Similar to the Purple Alternative.
Air Quality				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Decrease air quality due to population growth, increasing traffic and the resulting traffic congestion.	Land development induced by the project could: • Impact I-10 through a reduction in traffic volumes potentially reducing congestion. This could improve regional air quality and could reduce future delays due to congestion. • Lead to the creation of localized air pollution hotspots that exceed the National Ambient Air Quality Standards.	Similar to the Purple Alternative, except: • There is a greater potential for induced growth, which could occur at a faster pace than the Purple Alternative. It also has the second highest number (16) of new interchanges that increase automobile accessibility.	Similar to the Purple Alternative, except: • There is a greater potential for temporary increases in emissions due to dependency on the existing highway, greater traffic delays and congestion during the construction phase. • Induced growth may be lower than the other build alternatives due to co-location with existing facilities.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Generate minor potential incremental effects due to the combined effects of indirect effects and additional traffic volumes and congestion. Potential implementation of new air quality regulations, improving diesel and dust controls, reduced dependence on fossil fuels, and adoption of cleaner car engine technologies may offset these effects.	Past, present, and reasonably foreseeable projects could: • Not generate potential incremental effects due to reduced congestion, the potential implementation of new air quality regulations, improving diesel and dust controls, reduced dependence on fossil fuels, and adoption of cleaner car engine technologies.	Similar to the Purple Alternative.	Similar to the Purple Alternative.
Hazardous Waste and Contaminated Material				
Indirect Effects	No potential indirect effects.	Land development induced by the project could: • Result in improved accessibility that induces commercial and/or industrial development in new areas. • Increase the potential for spills or releases to land that is not currently impacted by hazardous materials.	Similar to the Purple Alternative.	Similar to the Purple Alternative, except: • Less potential for effects in South and Central Sections due to the planned co-location with existing transportation facilities.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Increase use of the existing transportation infrastructure for transport of materials.	Past, present, and reasonably foreseeable projects could: • Generate potential incremental effects greater than the No Build alternative due to the increase in transport of materials and the release of existing hazardous materials during construction.	Similar to the Purple Alternative.	Similar to the Purple Alternative.
Geologic Resources, Soils, and Prime Farmlands				
Indirect Effects	No potential indirect effects.	Land development induced by the project could lead to: • Loss of access to geologic material through covering with construction materials. • Improved access to geologic materials (sand and gravel) needed for construction. • Additional isolation of remnant prime and unique farmland parcels. • Changes in agricultural land use where land value inflation occurs as a result of land conversion from farmland to developed land.	Similar to the Purple Alternative, except: • Overall indirect effects would be increased due to the corridor being located in undeveloped areas with limited planned future development and due to greater area of new ground disturbance in the Central Section.	Similar to the Purple Alternative, except: • Potential effects would be less than that of both the Green and Purple Alternatives due to smaller area of new ground disturbance.
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Drive effects through land conversion to residential, commercial, and industrial uses.	Past, present, and reasonably foreseeable projects could: • Increase incremental effects including the use of geologic resources and soils; loss of those resources through covering, and the loss of farmland potentially	Similar to the Purple Alternative.	Similar to the Purple Alternative.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
		accelerated by increasing land value.		
Water Resources				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Generate neutral effects on water quality. • Impact routine operations and maintenance including stormwater management and compliance with the Municipal Separate Sewer System permit and applicable local MS4 permits. • Trigger new stormwater controls in areas with programmed improvements along existing facilities (I-10).	Land development induced by the project could: • Change surface water flow impacting the quality and quantity of water available for uses including recreation, habitat, drinking, or agricultural purposes. • Drive new construction to require compliance with MS4 permitting and would include water quality features such as Best Management Practices. • Impact water resources with runoff containing pollutants, fragmentation, or changes in hydrology. • Influence design and construction of new structures (bridges and/or culverts) leading to local effects on erosion and sedimentation. • Infringe on floodplains.	Similar to the Purple Alternative. • Infringe on the Santa Cruz floodplain.	Similar to the Purple Alternative, except: • Potentially less magnitude and intensity in the effects, due to fewer new areas of induced growth. • There is greater potential to improve current water quality, as new construction would require modernization of infrastructure such as stormwater management features associated with existing transportation facilities.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Increase incremental effects due to increasing demand for water resources.	Past, present, and reasonably foreseeable projects could: • Increase incremental effects to a greater extent than the No Build Alternative.	Similar to the Purple Alternative.	Similar to the Purple Alternative.
Biologic Resources				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Continue historical trends where construction added to the fragmentation and destruction of biotic communities. • Generally increase development pressure that will further degrade and fragment wildlife habitat.	Land development induced by the project could: • Introduce or exacerbate the introduction of unwanted or invasive plant or wildlife species into new areas. Impacts associated with new alignments would take longer to occur and have potentially greater indirect negative impacts to native species than impacts associated with co-located alignments. • Cause or increase gradual changes in species composition, diversity, genetic makeup, and/or health due to impacts to habitat, habitat fragmentation, or genetic isolation. • Change the quantity and quality of habitat and the resources that species rely on for food, hunting/ scavenging, and breeding due to the introduction of	Similar to the Purple Alternative, except: • Increased potential for indirect effects to biotic communities due to a greater portion of alternative being on new alignment as compared with the Purple and Orange alternatives. • Greater potential for increased wildlife mortality, including SERI, due to wildlife/vehicle collisions than the Purple or Orange alternatives because of the greater amount of new alignment. • Greater potential for possible disruption of mating or feeding by wildlife species within the immediate vicinity of the highway than the Purple or Orange alternatives due to the introduction of increased noise or light pollution from the highway as well as to	Similar to the Purple Alternative, except: • This alternative has the most co-located highway segments, which may or may not require widening. Most of these highway segments are already considered impermeable to most wildlife due to high traffic volumes; therefore selection of this alternative would provide more opportunities to improve wildlife connectivity by adding wildlife crossings into the design. • Least potential for increased wildlife mortality, including SERI, due to wildlife/vehicle collisions than the Purple or Green alternatives. • Least potential for possible disruption of mating or feeding by wildlife species within the immediate vicinity of the highway than the

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
		contaminants or pollutants from runoff or changes in hydrology. • Within the North Section, the Purple Alternative might have the least amount of indirect effects on biotic communities and wildlife habitat due to its location within the Douglas Ranch planned development. • Potential for increased wildlife mortality, including Species of Economic and Recreational Importance (SERI), due to wildlife/vehicle collisions on segments of new alignment. • Possible disruption of mating or feeding by wildlife species within the immediate vicinity of the highway due to the introduction of increased noise or light pollution from the highway as well as to induced development due to the highway.	induced development due to the highway.	Purple or Green alternatives due to the introduction of increased noise or light pollution from the highway as well as to induced development resulting from the highway.
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Cause localized, incremental effects in locations with planned corridor improvements and increased development.	Past, present, and reasonably foreseeable projects could: • Creates habitat loss, fragmentation, and isolation effects corridor-wide and of greatest concern near threatened and endangered species habitats and along wildlife corridors as land is developed.	Similar to the Purple Alternative, except: • Potential incremental effects could be somewhat greater than the Purple Alternative due to a greater amount of new alignment.	Similar to the Purple Alternative, except: • Potential incremental effects would be greater than the No Build Alternative and less than the Purple or Green Alternative.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
		• Within the North Section, the Purple Alternative might have a somewhat lesser cumulative effect on biotic communities and wildlife habitat due to its location within the Douglas Ranch planned development.		
Environmental Justice and Social Resources				
Indirect Effects	Programmed transportation improvements plus projected population and employment growth could: • Decrease mobility and access to job opportunities and housing options due to increased travel times and congestion.	Land development induced by the project could increase or change the nature and location of residential, business, and other uses could: • Increase traffic on local roads. • Displace existing residents and businesses. • Increase job opportunities and housing options. • Enhance mobility where future growth and development is planned. • Change property values. • Change air quality, noise, and visual characteristics. • Create demand for public facilities and services.	Similar to the Purple Alternative.	Similar to the Purple Alternative; except: • The benefits and changes from improved mobility would be reduced in the South and Central Sections.

Table 3.17-3 Summary of Indirect and Cumulative Effects (Continued)

Resource	No Build Alternative	Purple Alternative	Green Alternative	Orange Alternative
Cumulative Effects	Past, present, and reasonably foreseeable projects could: • Increase displacements, increase noise levels, and impact air quality as part of the ongoing trend to develop land in the region.	Past, present, and reasonably foreseeable projects could: • Potentially have an incremental role improving access to housing and jobs for minority and low income communities. • Increase the number of displacements. • Increase noise levels and new visual highway features. • Potentially reduce noise levels along existing infrastructure in the South and Central Sections. • Impact air quality. • Potential changes in access to community facilities. • Impact quality of life; however, changes will be subjective depending on individual perspective and personal value of their current rural or urban lifestyle.	Similar to the Purple Alternative.	Similar to the Purple Alternative.

NOTES: 1-10 = Interstate 10, I-19 = Interstate 19, SERI = Species of Economic and Recreational Importance.