SONORAN CORRIDOR STUDY

Corridor Selection Report

June 2019

ADOT

U.S. Department of Transportation Federal Highway Administration

Corridor Selection Report

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LIST OF ACRONYMS AND ABBREVIATIONS

ADOT	Arizona Department of Transportation
ASLD	Arizona State Land Department
BIA	Bureau of Indian Affairs
CSR	Corridor Selection Report
DDI	Diverging Diamond Interchange
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
FAST	Fixing America's Surface Transportation
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
GIS	Geographic Information System
I-10	Interstate 10
I-19	Interstate 19
LEP	Limited English Proficiency
LOS	Level of service
NEPA	National Environmental Policy Act
NOA	Notice of Availability
PAG	Pima Association of Governments
RDG	Roadway Design Guidelines
RMAP	Regional Mobility and Accessibility Plan
ROD	Record of Decision
SECAP	Sahuarita East Conceptual Area Plan
SHCG	Species and Habitat Conservation Guide
SR	State Route
SXD	San Xavier District
Title VI	Title VI of the Civil Rights Act of 1964
TON	Tohono O'odham Nation
TUS	Tucson International Airport
US	United States
V/C	Volume/Capacity Ratio

1 INTRODUCTION/BACKGROUND

The Federal Highway Administration (FHWA) and the Arizona Department of Transportation (ADOT) are completing this Corridor Selection Report (CSR) as part of a Tier 1 Environmental Impact Statement (EIS) study for the Sonoran Corridor, a multimodal high-capacity facility that would connect Interstate 10 (I-10) and Interstate 19 (I-19). Figure 1 shows the location of the study within the State of Arizona. The study covers an area bounded by I-10 and I-19 and the southern boundary of the Town of Sahuarita (Figure 2).

This CSR compares corridor routes at a conceptual level to assemble a Reasonable Range of Alternatives for further environmental analysis in the Draft Tier 1 EIS. The Tier 1 EIS is a programmatic document that will be prepared in accordance with the National Environmental Policy Act (NEPA) and other applicable regulatory requirements and will disclose a range of possible impacts and mitigation strategies at a corridor level. A Tier 1 EIS is intended to provide guidance and preliminary environmental information for future project-level (i.e., Tier 2 EIS) studies based on more detailed and specific alignment analyses.

In December 2015, the United States (US) Congress approved the Fixing America's Surface Transportation (FAST) Act (Public Law 114-94), a 5-year legislation to improve the nation's surface transportation infrastructure. Section 1416 of the FAST Act, formally designates the Sonoran Corridor "along State Route 410 connecting Interstate Route 19 and Interstate Route 10 south of the Tucson International Airport" as a high-priority corridor on the National Highway System. Planning and coordination efforts undertaken for this proposed project will be subject to compliance with all federal requirements, which includes a formal process for identifying the need and purpose of the proposed action.

FHWA and ADOT are focusing on the developing area in Pima County north of Sahuarita and near Tucson International Airport (TUS), between I-19 and I-10. Based on previous planning efforts, additional transportation infrastructure will be needed to adequately move people and goods, as well as accommodate future travel demand anticipated in this region in the foreseeable future. Figure 1 and Figure 2 show the statewide context of the study and the study area, respectively.

Past and current regional transportation planning efforts in Pima County have studied a major transportation facility in the area south of TUS, between I-19 and I-10, termed the Sonoran Corridor[1]. These previous studies and others have identified a need for a transportation system that would accommodate future growth and strengthen the growing economy of southern Arizona by improving the connection between Mexico and the US states of Arizona, New Mexico, and Texas.

This CSR for the Sonoran Corridor considers the study's objectives as they are presented in the Need and Purpose, findings of previous studies and a series of assessments over recent years in addition to the technical information developed as part of this analysis.

[1] Pima County, Sonoran Corridor Alternatives Analysis, 2013; Pima Association of Governments [PAG], Regionally Significant Corridors Study, 2014; Pima County, Sonoran Corridor Economic and Revenue Impact Analysis, 2015

Figure 1 - Study Area Statewide Location Map

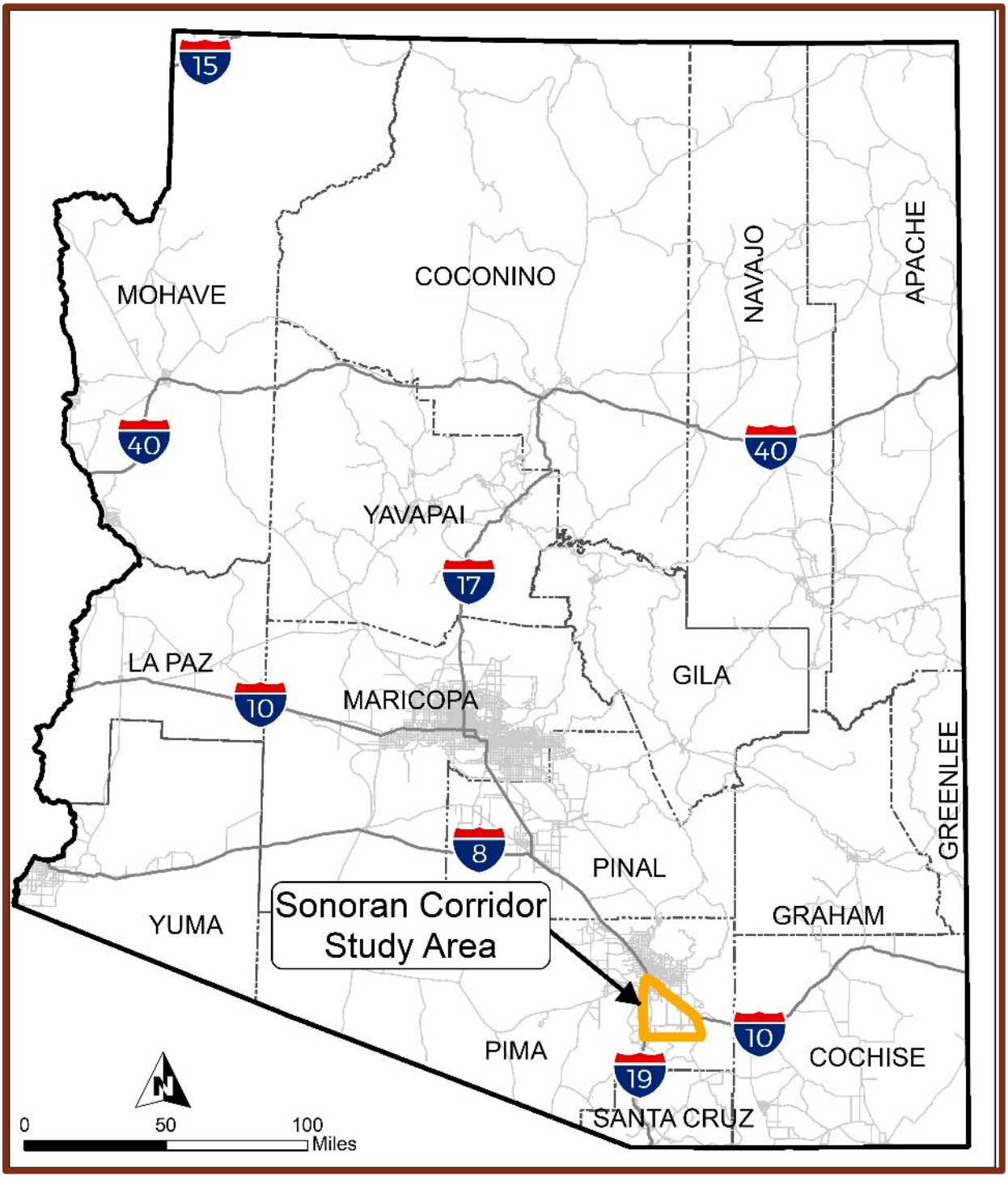
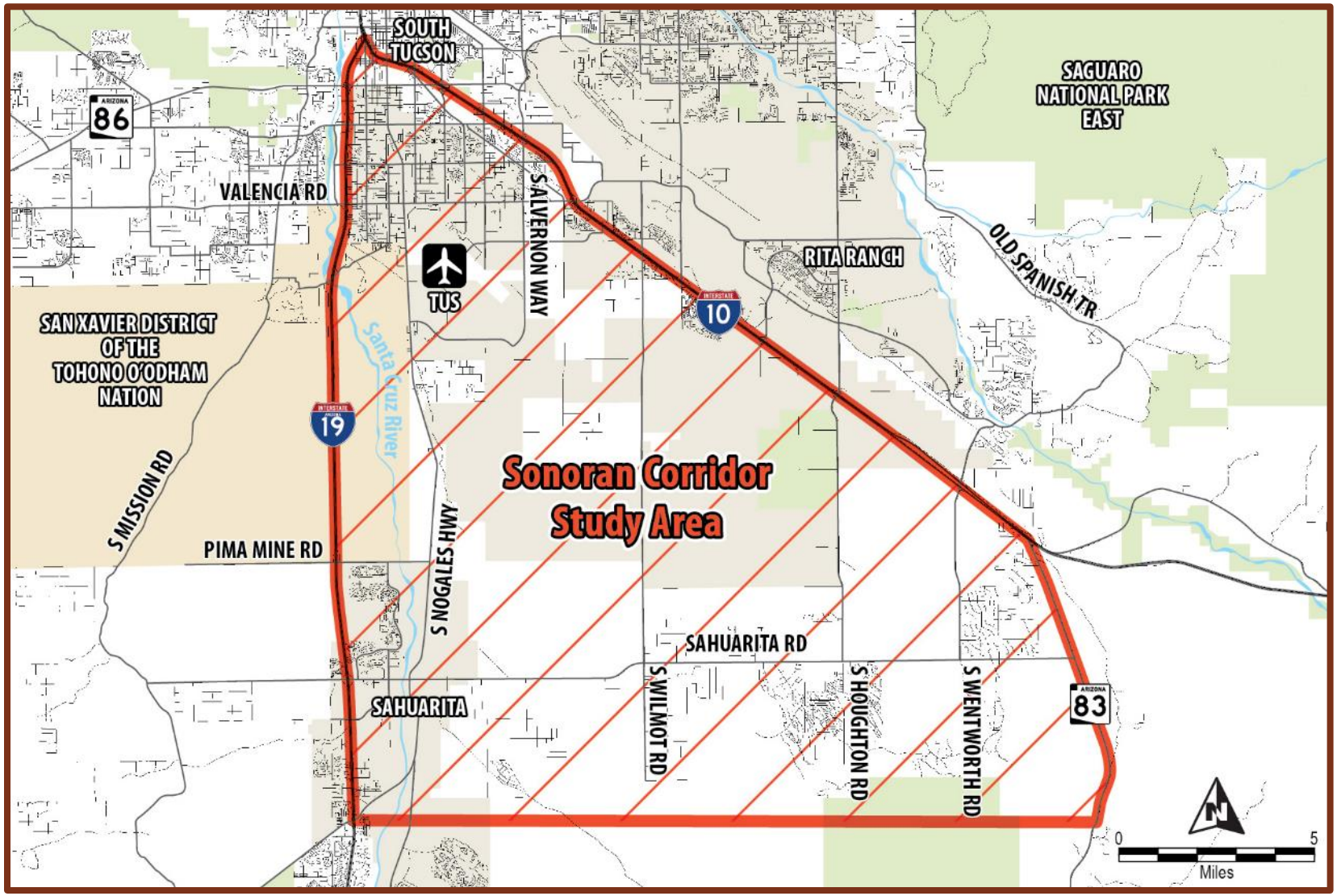


Figure 2 - Study Area Location Map



1.1 PROJECT SCOPING

Project scoping is undertaken to identify issues and opportunities and afford an open forum for public and agency comment about the study. Two phases of scoping were conducted: an early coordination pre-scoping and formal scoping under NEPA.

Scoping serves the following purposes at the beginning of the environmental review process:

- Informs the agencies and public about the study process and intent
- Examines previous planning studies within current study development
- Seeks early feedback from the agencies, tribal governments, and public on:
  - Need and Purpose Memorandum Statement
  - Alternatives to be studied
  - Impacts to be evaluated
  - Evaluation methods to be used
- Looks for opportunities to streamline the study process and collaborate with partners
- Establishes a decision-making framework, including agency participation and responsibilities

The input FHWA and ADOT received during scoping helped to identify the opportunities and constraints within the study area, possible corridor routes to be studied, and the depth and breadth of environmental analysis to be completed.

1.1.1 Early Coordination

FHWA and ADOT held eight early coordination pre-scoping meetings with federal, state, regional, county, local, and tribal governments, as well as other organizations. These meetings were conducted to elicit information, issues, and concerns and discuss the Tier 1 EIS process with the agencies and other key stakeholders in advance of formal Scoping for the environmental review process. These meetings served to discuss how the study would be conducted, preliminary timeline and work effort and identify the key participants from each agency. All agencies were encouraged to participate in the study and submit formal, written comments during the official scoping period. They were informed that information and input shared during meetings or other prior studies did not replace the official scoping period and comments submitted during the Scoping period.

1.1.2 Public and Agency Scoping

The scoping process was conducted in accordance with NEPA requirements. The approximate 60-day scoping period began with the publication of the Notice of Intent on May 12, 2017 and continued through July 15, 2017. The FHWA and ADOT invited federal, state, and local agencies, as well as tribal governments, by letter to participate in the study and attend an agency scoping meeting. The public was notified about the scoping process, public scoping meeting locations and schedule via newspaper advertisements, website, e-mail blasts, social media, news releases, media interviews, and blog posts. Two public scoping meetings were held in the corridor's Study Area, one each in Tucson and Sahuarita. The agency scoping meeting was held at the Pima Association of Governments (PAG) offices.

Input the team gathered during the Scoping process was summarized in a Scoping summary report entitled *Agency and Public Scoping Summary* posted on the ADOT Sonoran Corridor study website at: https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/overview.

The *Agency Outreach and Involvement Plan* posted on the ADOT website[2] lists the Cooperating and Participating Agencies involved in the Sonoran Corridor Tier 1 EIS who were contacted during this process.

1.1.2.1 Public Scoping

Members of the public were notified of and invited to participate in the scoping process for the Sonoran Corridor. Public scoping meetings were held in June 2017 in Tucson and Sahuarita to provide accessible options for all willing and interested participants. The meetings were designed to inform the public of the study and the environmental review process, as well as provide an opportunity to comment. Other methods were also available for the public to engage in the scoping process, such as comment cards, comments on the study website and a telephone project line in two languages. Forty-five people participated in each of the two public meetings and offered perspectives on corridor issues and opportunities.

During scoping, the public also provided feedback on potential corridor alternatives, considerations, and constraint areas, which include things such as potential locations for a transportation facility or areas to avoid. Figure 4 shows alternatives proposed for consideration by the public during Scoping. A full compilation of all public comments is provided in the scoping summary report (ADOT 2017), available at the website listed in Section 1.1.2.

A summary of the public scoping issue priorities is listed below:

- Traffic congestion and delays
- Sharing highways with commercial truck traffic
- Lack of highway connectivity south of TUS
- Impact on neighborhoods, residences, and diverse communities
- Air quality impacts of a new corridor
- Visual and aesthetic resources
- Alternative modes of transportation (rail, bicycle routes, etc.)
- Geology, soils, and farmland affected by a new corridor
- Preserving existing land uses as part of the introduction of a new corridor
- Protection of cultural sites

[2] https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/documents

1.1.2.2 Agency Scoping

An agency scoping meeting was held in Tucson at the PAG offices at 9:00 AM on June 7, 2017. Forty representatives from twelve agencies attended the meeting in person or by telephone. Cooperating and Participating agencies[3] asked questions and provided insights about their concerns and the conduct of the study.

A summary of agency comments is as follows:

- Make rail freight infrastructure part of the study
- Focus study on movement of commerce
- Consider a route that will provide access to TUS from the south
- Reduce travel times by getting regional motorists to Interstate 19 faster
- Consider a route that connects to I-19 at El Toro Road
- Consider a route that connects I-19 near Pima Mine Road
- Area south of I-10 is a major growth corridor. Consider commuter needs for workers in Vail and Tucson
- Be mindful of Tohono O'odham Nation (TON) processes and work with leadership and allottees as well as Bureau of Indian Affairs (BIA)
- Do not preclude the ability to implement the TON's water rights settlement.
- Consider effects of a new highway on air quality in the area
- Avoid impacts to existing electrical transmission lines
- Plan for how a new highway would interact with State Route (SR) 210 (Barraza-Aviation Parkway)
- Keep routes that would potentially accommodate trucks carrying hazardous materials away from existing schools and population centers
- Mitigate potential negative effects on habitat and wildlife corridors

A full compilation of agency comments can be found in the *Agency and Public Scoping Summary* posted on the ADOT Sonoran Corridor study website at https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/overview.

1.1.2.3 Tribal Scoping and Coordination

Based on the work completed by Pima County in 2015, at least one corridor alternative would cross tribal lands. The steps required to gain acceptance to study any such alternatives required establishing a project-specific process that involved the TON Tribal government, the San Xavier District (SXD), the TON-SXD Allottees Association, affected allottees and the Bureau of Indian Affairs (BIA). In addition to

[3] The Cooperating and Participating agencies for the Sonoran Corridor are identified in the Agency Outreach and Involvement Plan at https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/documents

ongoing informal contact with SXD staff, scheduled meetings have been held throughout the study with staff, Tribal and District government leadership and allottees.

- Pre-Scoping in May 2017– SXD staff
- Scoping in June 2017 – staff and district leadership
- June 24, 2017 – SXD Community meeting to present project and process
- September 28, 2017 – Project update with staff and SXD leadership
- January 20, 2018 - Meeting with TON SXD Allottees Association
- May 16, 2018 – Meeting with SXD staff and leadership and SXD Allottees Association
- June 21 and 23, 2018 – Meeting with potentially affected allottees
- December 20, 2018 – Meeting with BIA
- January 17 and 19, 2019 – Meeting with potentially affected allottees

1.2 Need and Purpose

The Need and Purpose for the study is based on scoping comments received from the public and agencies as well as previous studies completed in the study area. The Need and Purpose is fundamental to compliance with the NEPA process and provides the basis for identifying, evaluating, and screening alternatives (Code of Federal Regulations Title 40 [40CFR] Chapter 5 §1502.13 [2017]). Corridors that were considered for this study were assessed against their ability to meet the Need and Purpose. The Need and Purpose is available on ADOT's Sonoran Corridor webpage at: https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/overview.

The needs that exist within or are influenced by the Sonoran Corridor study are:

- Population and employment growth – projected growth in the study area is predicted to increase travel demand within an area with a transportation network that needs improvement.
- System linkages associated with regional, interstate, and international mobility – lack of a direct connection between I-19 and I-10 and activity centers, including the TUS and employers, to the south of TUS.
- Congestion and roadway capacity – much of the transportation network within the study area is expected to operate at an unacceptable level of service (LOS) by 2045.

The purposes of the Sonoran Corridor are to provide a high-priority, high-capacity, access-controlled transportation corridor that will:

- Accommodate future travel demand associated with the forecast growth by affording better access throughout the study area
- Provide an alternate direct connection between I-19 and I-10 south of TUS that will reduce commercial and commuter travel times and cost
- Improve 2045 LOS within the study area

2 CORRIDOR ALTERNATIVES DEVELOPMENT

The basis for identifying potential corridors in the Sonoran Corridor study area was information gathered from the public and agencies during Scoping, prior studies performed in the study area by other agencies and technical analysis conducted by the study team. Considering the specific characteristics of the study area, the connection points to I-10 and I-19 and the limitations and opportunities within the intervening study area defined the routing of each corridor.

2.1 ALTERNATIVE MODES AND PUBLIC FACILITIES

Alternative modes (e.g., rail, bicycle, utilities, etc.) were considered in developing the alternatives. For freight movement, Pima County has discussed the possibility of a rail connection between the Nogales Branch and the Sunset Route of the Union Pacific as an improved and shorter link between current rail activity coming or going to Mexico and the Port of Tucson. This rail connection would also reduce the impact of train activity in South Tucson by reducing the number of trains using that section of the Nogales Branch which still retains many at-grade crossings. Although there is an interest in a rail connection that would provide a system linkage for freight movement, the need to improve the transportation network within the study area to accommodate future travel demand from projected population and employment growth will still exist. For example, a potential rail connection within the corridor will not be precluded in the future.

The sparsely populated study area could not be effectively served by public transportation until there is sufficient growth to accommodate the level of demand appropriate for such services. While limited transit service can be provided to carry smaller demand, it will require an expanded roadway network that would include the Sonoran Corridor. On its own, public transportation does not effectively meet the Need and Purpose because it would not provide a system linkage that would effectively move freight through the study area to reduce commercial travel time and cost. As conditions change, demand for public transportation may grow would which will need to be addressed at that time.

Other modes such as bicycle and pedestrian linkages are not able to address the Need and Purpose because future travel demand would not be accommodated, a system linkage for commercial and commuter mobility would not be provided, and 2045 congestion would mostly still exist in the study area. All transportation networks must provide for these modal options, but they will serve a complementary role to the primary transportation function of the corridor.

Similar to bicycle and pedestrian linkages, utility corridors would not be able to address the Need and Purpose of the study. However, utility corridors can coexist with other transportation facilities, therefore utility corridors would not be precluded in the future. These will need to be evaluated as to the best way to collocate facilities in a future alignment study to avoid the potential for conflicts and minimize service challenges for both transportation and utility operators and users.

In conclusion, a new freeway facility has the best potential to meet the Need and Purpose of the study. While these other alternative modes may not meet the Need and Purpose, their potential contributions in the future are recognized so they will not be precluded in the future.

2.2 Corridor Connection Points (Logical Termini)

Federal legislation designated the Sonoran Corridor as a future Interstate, so the features of the corridor are intended to accommodate the demands and character of an Interstate highway. In that context, connection points must be capable of handling Interstate demands, including access to local activities that could be affected by the placement of a future interchange. Connection points must be located where they can contribute to the function of both the new corridor and the existing Interstates without impacting the performance of other network elements. A system interchange[4] typically requires a two-mile separation from any adjacent service interchanges according to ADOT's Roadway Design Guidelines (RDG). The separation ensures the interchange can operate efficiently and safely under a heavy traffic load on both freeways. There could be some flexibility in the spacing requirement, but it is limited and will require a formal approval process through ADOT and FHWA for design exceptions.

Converting an existing service interchange into a new system interchange is a possible option, but introduces the need to address the local access element of its current function. Generally, a system interchange is not preferred to provide local access and can be difficult to justify under the guidelines for Interstate access design. Another option is to construct a new system interchange in a new location, which is simpler in the design and system context, but which may not be available in the urban context of some locations. A current service interchange with local access could provide a reasonable connection point if access questions can be addressed appropriately. Figure 3 shows the potential corridor connection points for the Sonoran Corridor.

While all reasonable connection points within the study area were considered at the outset and in the preliminary technical analysis, some of the connection points identified were understood to have potentially negative effects on the local community or an inability to meet design requirements. Considerations related to both I-19 and I-10 are noted as follows.

2.2.1 Interstate 19

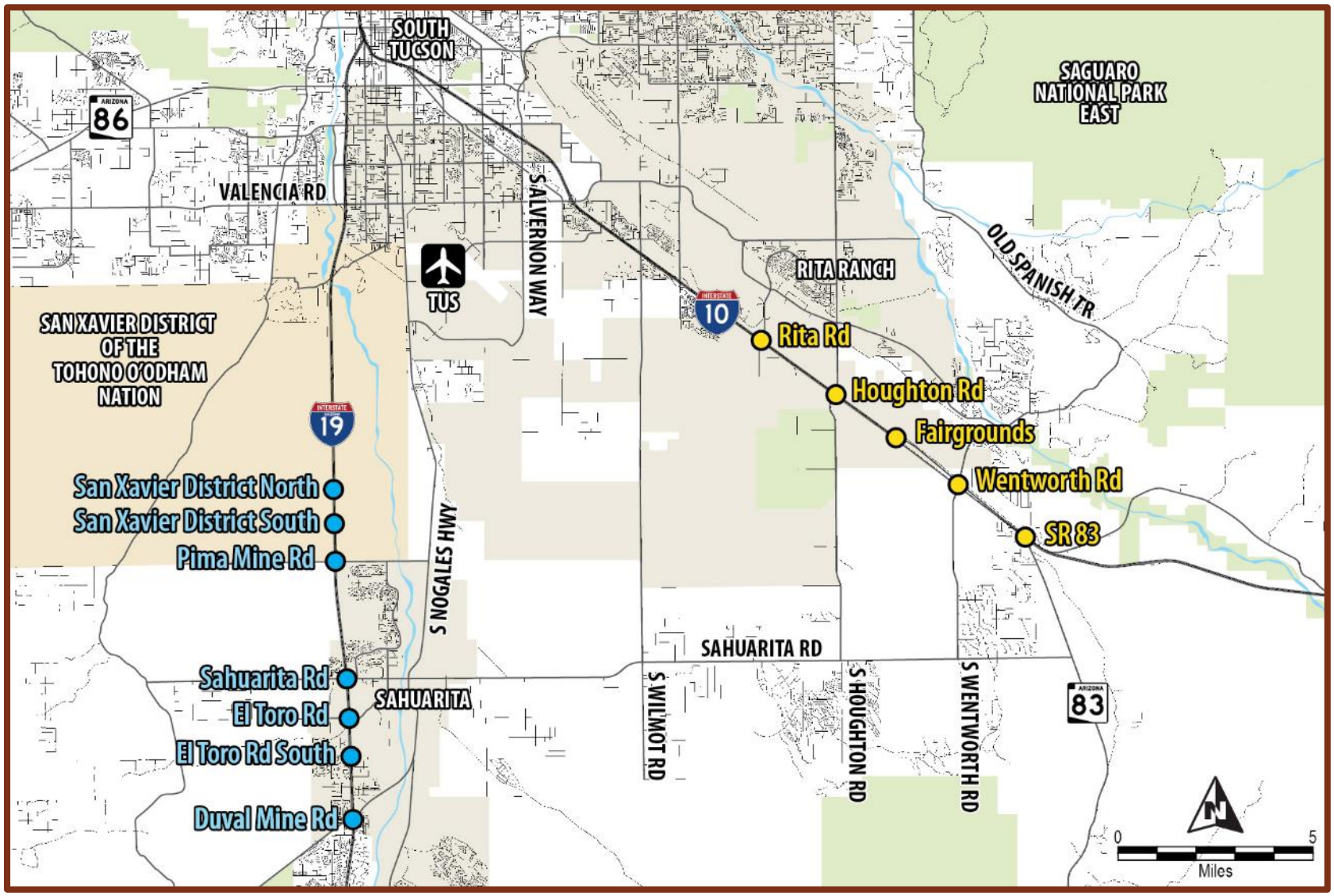
Along I-19, seven locations were considered based on the various sources of information from Scoping, prior studies and an evaluation of other opportunities along the freeway. They extend from two miles north of Pima Mine Road on the TON SXD to Duval Mine Road. Among them are:

- Duval Mine Road
- El Toro Road South (New[5]) - a location midway between Sahuarita Road and Duval Mine Road
- El Toro Road (New)
- Sahuarita Road
- Pima Mine Road
- SXD South (New) - a location less than one mile north of Pima Mine Road and the Desert Diamond Casino
- SXD North (New) - a location approximately two miles north of Pima Mine Road

[4] A system interchange is where two freeways intersect such as the interchange of I-10 and I-19 near downtown Tucson.

[5] "New" indicates the location does not currently have an interchange with the Interstate Highway.

Figure 3 – Connection Points Considered in Developing Corridor Alternatives



Prior studies have identified a location on the SXD as a potential future connection point on I-19. Other locations that are being considered relate to existing interchange locations and/or system interchange separation standards.

2.2.2 Interstate 10

On I-10, four existing service interchanges were considered able to connect to the Sonoran Corridor. All these locations are subject to fewer interstate highway design and operations restrictions. One new location, between Wentworth Road and Houghton Road, the Fairgrounds location, was also considered. The following are the I-10 connection points considered in the analysis:

- Rita Road
- Houghton Road
- Fairgrounds (New)
- Wentworth Road
- SR 83

Rita Road has been identified as a possible connection point in prior studies. Other possibilities considered were Houghton Road, Wentworth Road and SR 83 farther east along the freeway. The additional option introduced as part of this analysis is a potential interchange between Houghton Road and SR 83.

These connection elements provide a critical consideration in the identification and investigation of potential corridors to be studied in the Sonoran Corridor study.

2.3 Possible Corridor Alternatives

Once the termini at select connection points along I-10 and I-19 were identified, the routing of corridors to connect them was shaped by either previous studies, public and agency Scoping input, or technical analysis and application of pertinent design criteria through a computer modeling application known as Quantm. Each of those corridor routing approaches led to the Comprehensive Set of Corridor Alternatives shown in Figure 6 and discussed in Section 2.3.

2.3.1 Proposed Agency and Public Corridor Alternatives

During the Scoping process conducted in June of 2017, public agencies and the public proposed corridors to consider in the Sonoran Corridor analysis. The identified alternatives resulting from the Scoping process are shown in Figure 4. Proposed corridors were collected from previous studies completed or from actions taken by the legislative authorities within the jurisdictions or public input. The study completed by Pima County in 2015 and the extensive information gathered regarding the Sonoran Corridor provided a compelling basis for including those corridors in the Sonoran Corridor Study. A resolution by the Town of Sahuarita Town Council to place the corridor on the El Toro Road alignment served to justify its inclusion in the original corridor list that comprised the Comprehensive Set of Corridors. Similarly, discussion about the Duval Mine Road location by the Town of Sahuarita provided a basis for assessing its viability as a potential corridor terminus.

2.3.2 Proposed Technical Analysis of Corridor Alternatives

The understanding of the physical needs of the corridor and the most effective way to negotiate the terrain and features within the study area is an essential element of identifying the possible corridors for analysis. For this project, a computer-based model was used to generate multiple corridors, providing a wide variety of corridors from which to identify effective choices for analysis. The model, called Quantm, allows for an expeditious identification of possible corridors. It accounts for critical inputs, design expectations and areas of avoidance that generates many corridor options very quickly. The results of the Quantm application are shown in Figure 5 and must be evaluated and verified before inclusion in the analysis. More information about Quantm and how it functions is presented in Appendix C.

2.4 Comprehensive Set of Corridors

Based on identified I-19 and I-10 connection points and corridor alternatives proposed during the Scoping process by the public and agencies, previous studies, and corridor alternatives developed using Quantm the project team formed a Comprehensive Set of Corridor Alternatives. The 32 corridor alternatives that composed the Comprehensive Set of Corridors are shown in Figure 6.

2.5 Corridor Refinement

The Refinement process step that was applied to the Comprehensive Set of Corridor Alternatives relied heavily on the viability of the connection points shown in Figure 3. Some of the proposed connection points did not comply with the RDG. Others have the potential for major impacts to established facilities and services in the vicinity or in the affected community. Each potential connection point was assessed for these considerations to determine which met the appropriate criteria and should be carried forward in the Refined Set of Corridor Alternatives. This Refinement process is explained in further detail just below.

2.5.1 Refinement Process

The Comprehensive Set of Corridor Alternatives was reduced to a more manageable number of choices through a Refinement step that incorporates engineering criteria and local access impacts at proposed Interstate connection points. The viability of the connections to the existing Interstate system (system interchanges) is an essential element of successful Sonoran Corridor alternatives. This Refinement step advances a Refined Set of Corridor Alternatives that was later optimized.

The fundamental considerations in developing the Refined Set of Corridor Alternatives were based on the following factors:

Figure 4 - Alternatives Proposed during Scoping by Agencies and Public

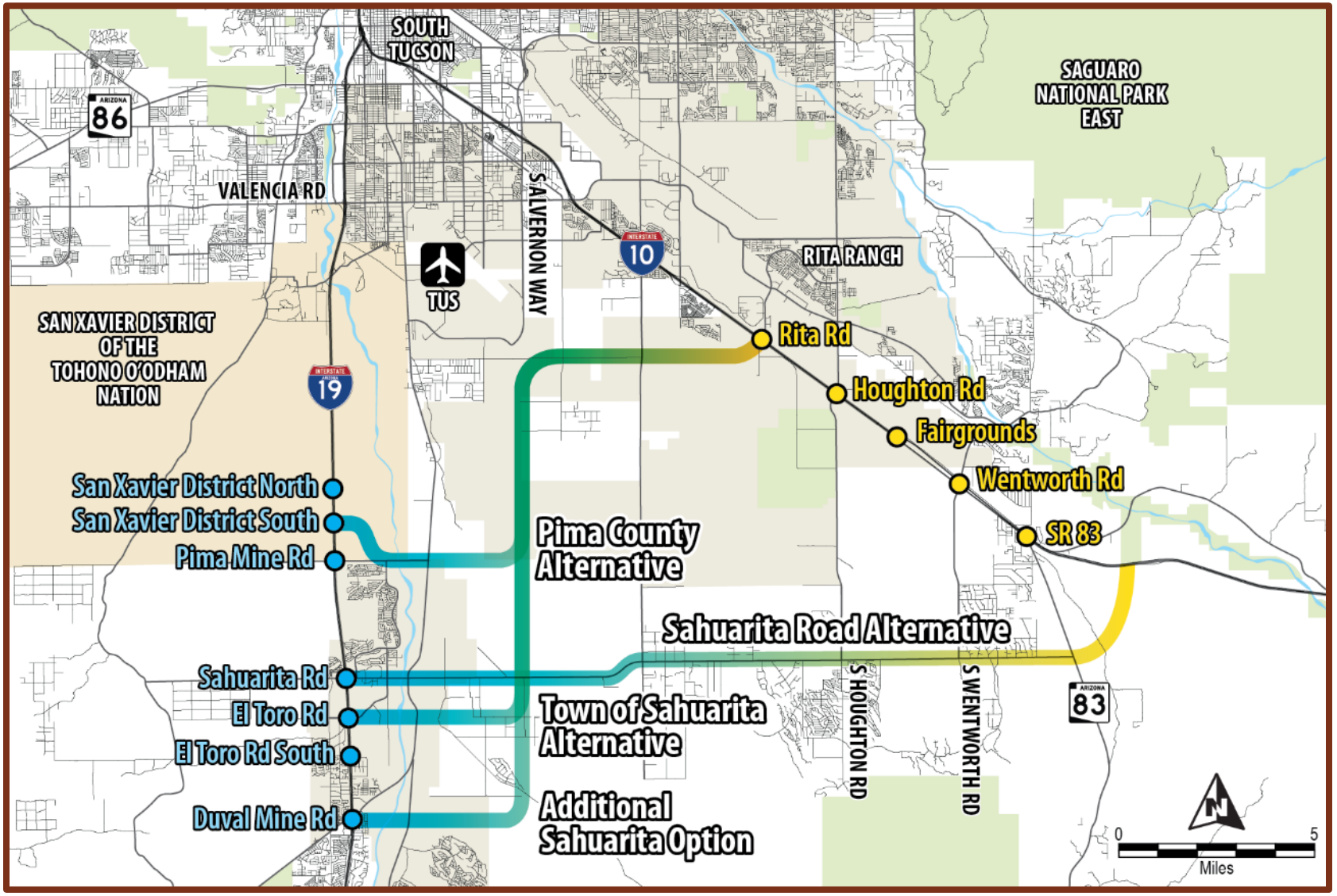


Figure 5 - 28 Proposed Technical Analysis Corridor Alternatives

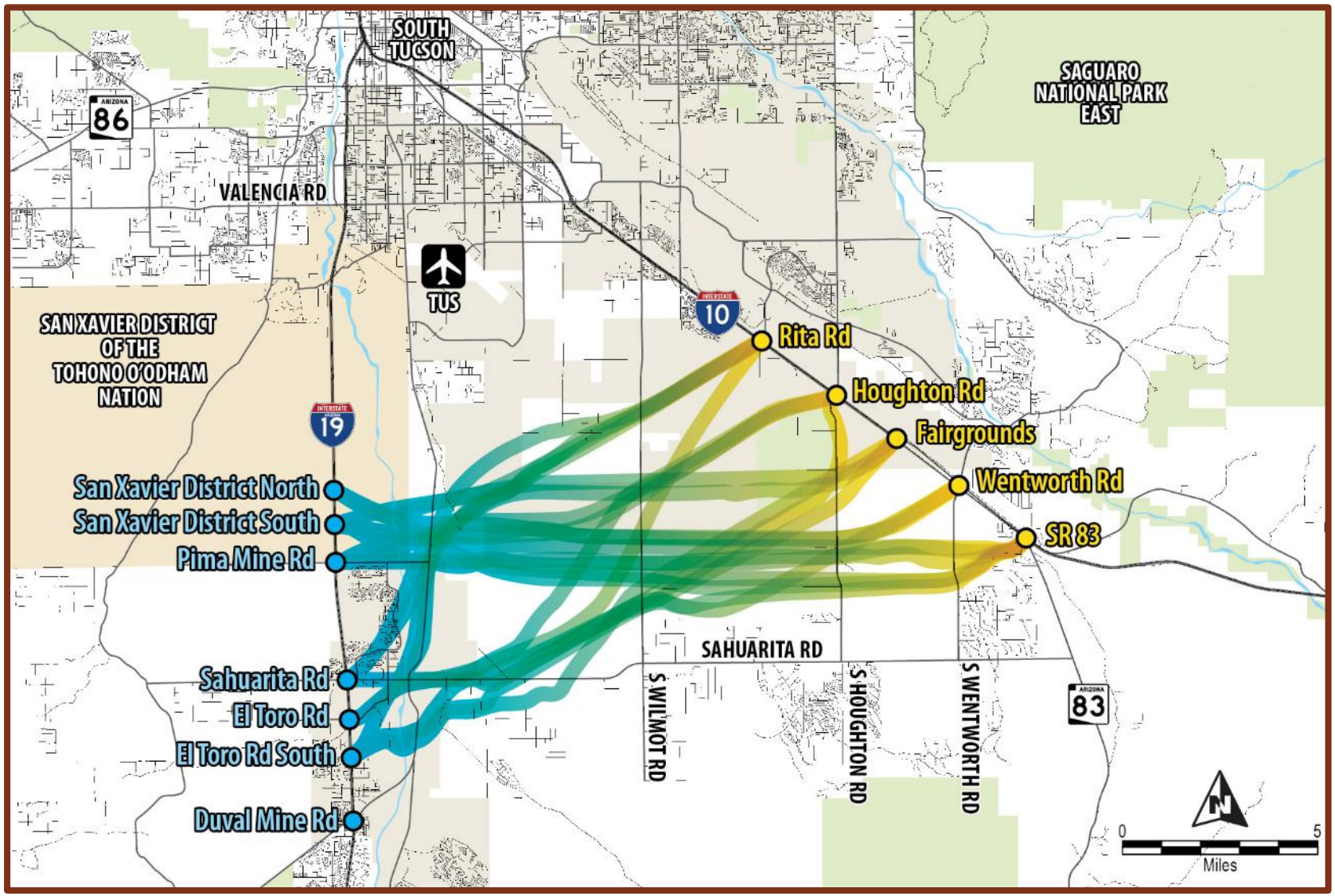
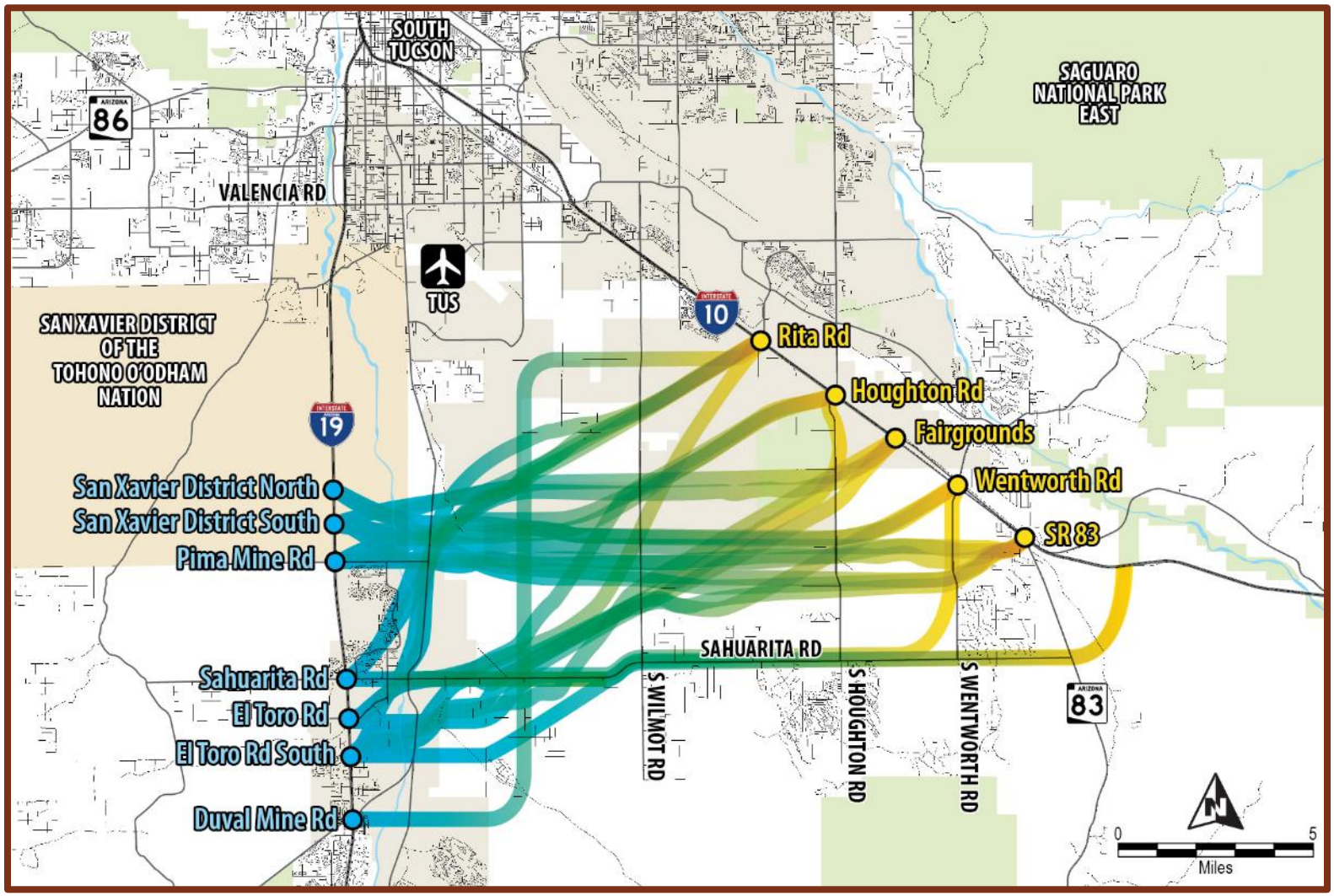


Figure 6 - Comprehensive Set of Corridor Alternatives



Note: These are not necessarily the corridor routings, only linkages between termini at the two freeways (blue at I-19 and yellow at I-10). Specific corridor routings were defined during the corridor optimization process once the Refined Set of Corridor Alternatives was identified.

- Severe local mobility impact caused by location of the corridor terminus on I-10 or I-19. Introducing a system interchange at an existing service interchange has significant implications for how local access dependent on that interchange would be maintained or reestablished. Local traffic can sometimes be rerouted to avoid the new system interchange, but in many cases, the effect on existing travel would be severe enough to constitute a fatal flaw regarding maintenance of local circulation. In some cases, the presence of a system interchange could also have a major effect on the viability of the established local community if the new roadway impedes the community's primary functions. This can include the:
  - impact on institutions such as local government offices and facilities, schools, places of worship, critical access to residential or employment centers, etc., and
  - inability to effectively replace local connections to destinations that depend on the existing interchange for access.
- Adherence to ADOT interchange separation requirements per the RDG. The ADOT RDG sets forth guidance for the placement of interchanges on the freeway system. In the case of system interchanges, a separation of two miles from neighboring service interchanges is recommended for safe and efficient operation. Many of the proposed termini along I-19 did not meet that guideline, and could pose challenges for operational effectiveness and safety since they do not comply with design requirements. Following the interchange analysis, the remaining termini locations and the input from agencies and the public in the study area contributed to the Refined List of Corridor Alternatives shown in Figure 20. Among the remaining corridors, one of the Scoping comments, which identified Sahuarita Road as a possible corridor, has been modified to follow a route consistent with the refined corridor termini described in Section 2.6.2.

The following two sections reflect the connection points that will be retained for further analysis and those removed from further analysis, respectively. Figure 20 shows the results of the Refinement step based on the connection points retained.

2.5.1.1 Connection Points Retained for Further Study

Each connection point was assessed for its potential impact to local access and for its ability to meet engineering design criteria. Based on the connection point analysis, a refined set of corridors was defined and optimized for evaluation in the screening process:

On I-19

- El Toro Road South
- Pima Mine Road
- San Xavier Compromise location (eliminated southerly location discussed in Section 2.5.1.2)

On I-10

- Rita Road
- Houghton Road
- Fairgrounds (new)

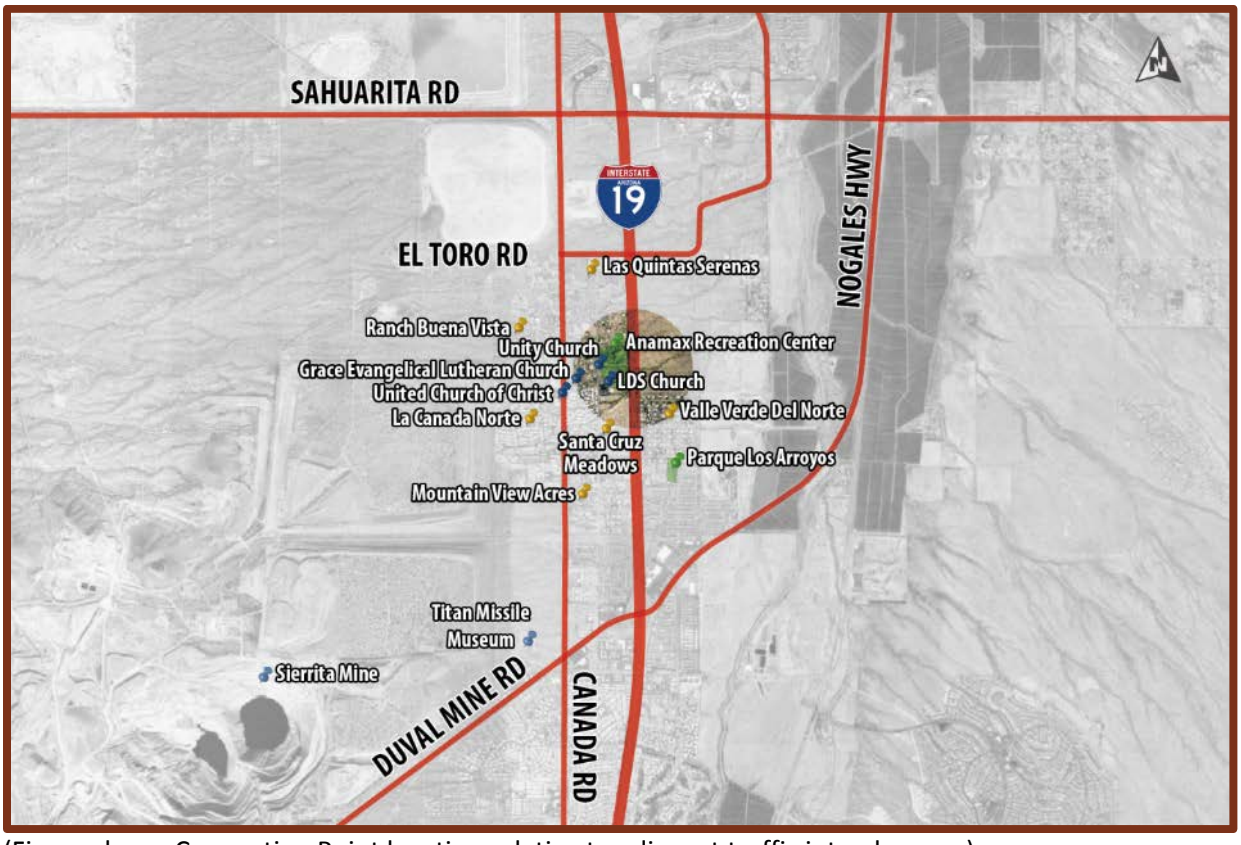
- Wentworth Road

These locations have been determined to reasonably meet the engineering and operating separation requirements and provide the service need to support existing traffic and anticipated growth in the study area.

I-19 at El Toro South

An interchange has not been previously proposed at this location, which splits the distance between Duval Mine Road and Sahuarita Road as indicated in Figure 7. It is about 1.8 miles from either interchange, so it does not fully meet the 2-mile separation between a system interchange and the adjacent service interchanges specified in the ADOT RDG, but it is well positioned with respect to adjacent uses with primarily open areas to the east. There is a potential Section 4(f) consideration in the nearby ball fields and recreation park on the west side of I-19, but there are few other significant direct corridor development impacts. Any such impacts will be identified in the Tier 1 EIS.

Figure 7 - I-19 at El Toro South



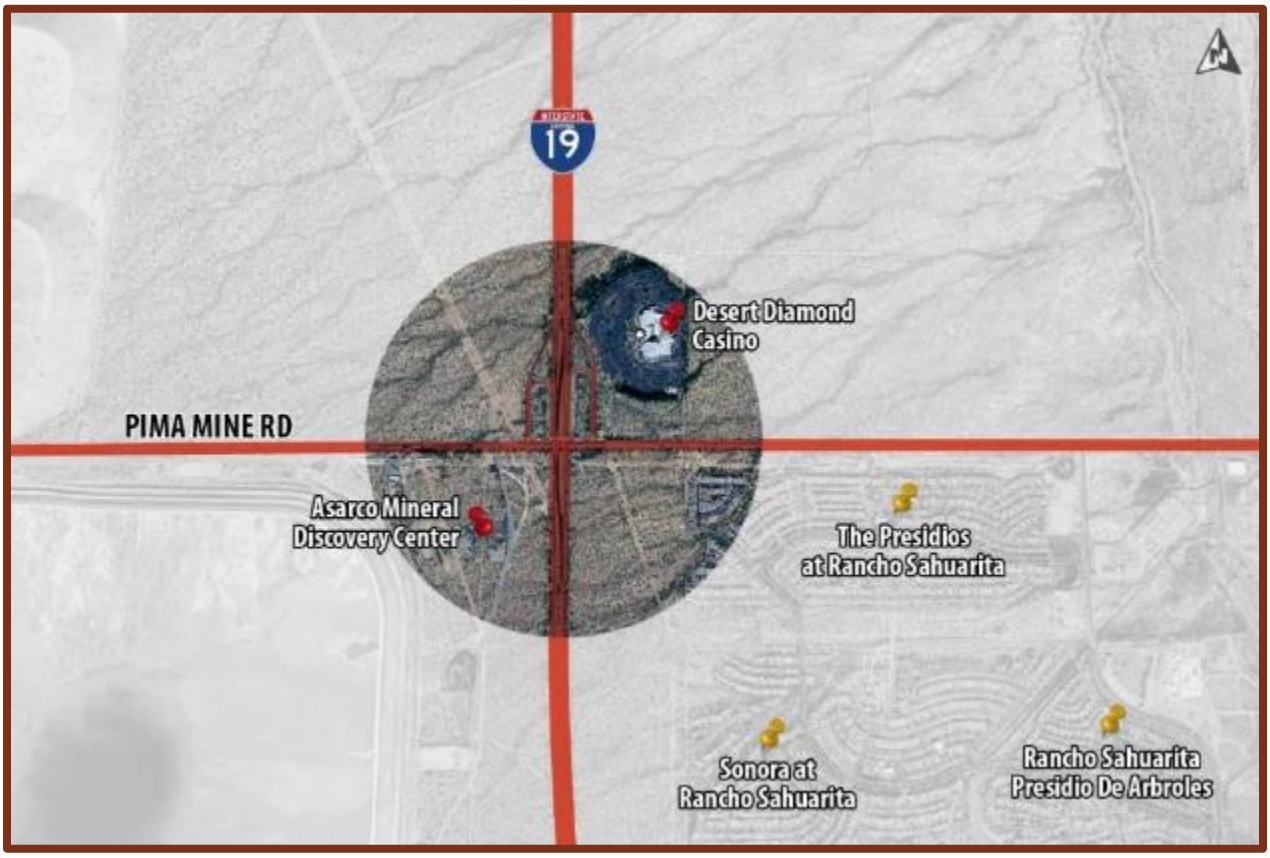
(Figure shows Connection Point location relative to adjacent traffic interchanges.)

I-19 at Pima Mine Road

Pima Mine Road meets the separation criterion, but is subject to some other important considerations. Among them are the main access to the Asarco Mission Mine Complex, the Desert Diamond Casino and the Presidios at Rancho Sahuarita and Sonora at Rancho Sahuarita residential developments

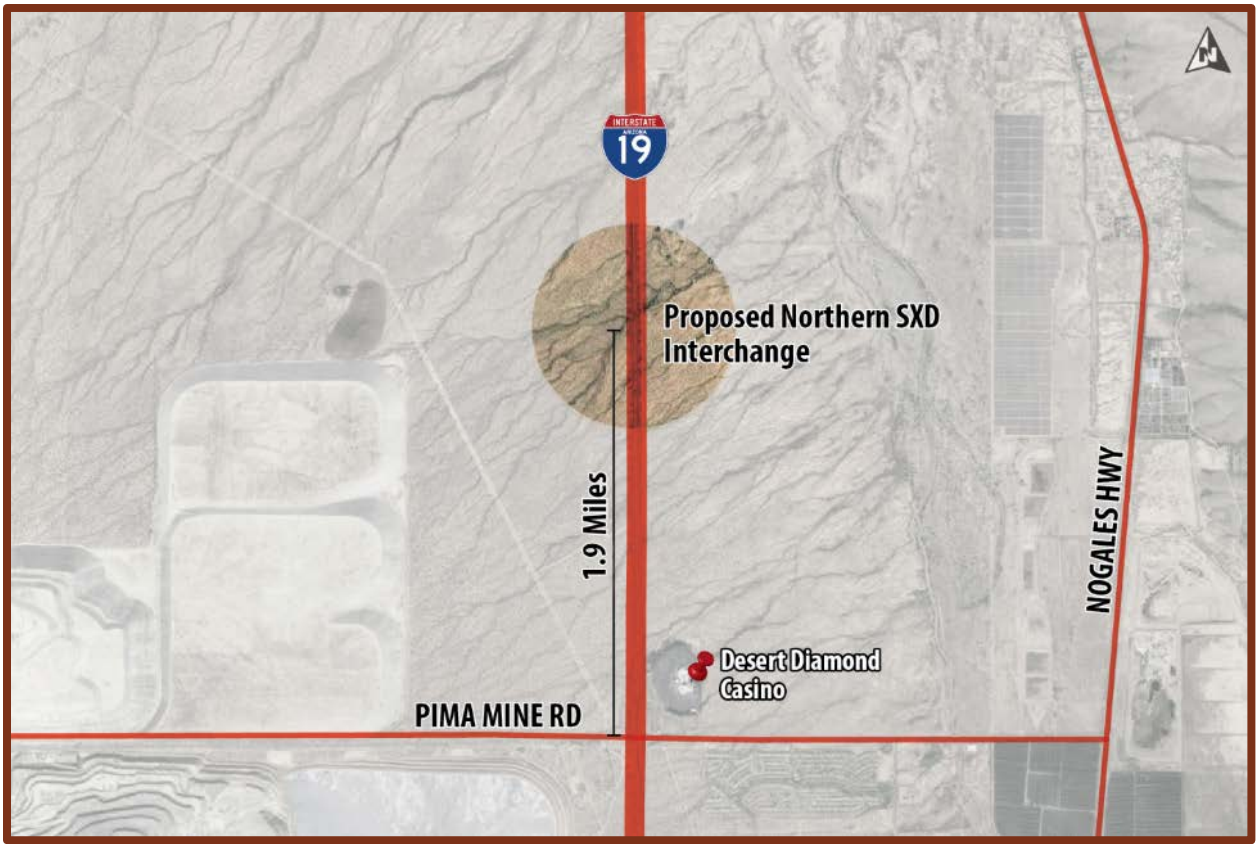
immediately south of Pima Mine Road (see Figure 8). All of these take direct access from the existing interchange and road. Access would have to be reestablished as part of placing a system interchange at this location. There is also an active rail line that serves the mine and connects to the UPRR Nogales Branch that may have historic value as well as several utilities that support the mine and other local needs. A system interchange at this location would require reconfiguration of these features and relocation of the access to a frontage road system that could accommodate all needed existing facilities. These challenges are also a factor in the screening process. This location is recommended for further study as a terminus pending additional information about access provisions for local activities.

Figure 8 - I-19 at Pima Mine Road



I-19 at SXD North Connection Point (basis for SXD Compromise Connection Point)
Another connection point is located about 2 miles north of Pima Mine Road. This is a good location for safety and operations reasons based on the SXD North connection point and is shown in Figure 9.

Figure 9 - I-19 at SXD North



(Figure shows Connection Point location relative to adjacent traffic interchange.)

Identification of compromise connection point on San Xavier District

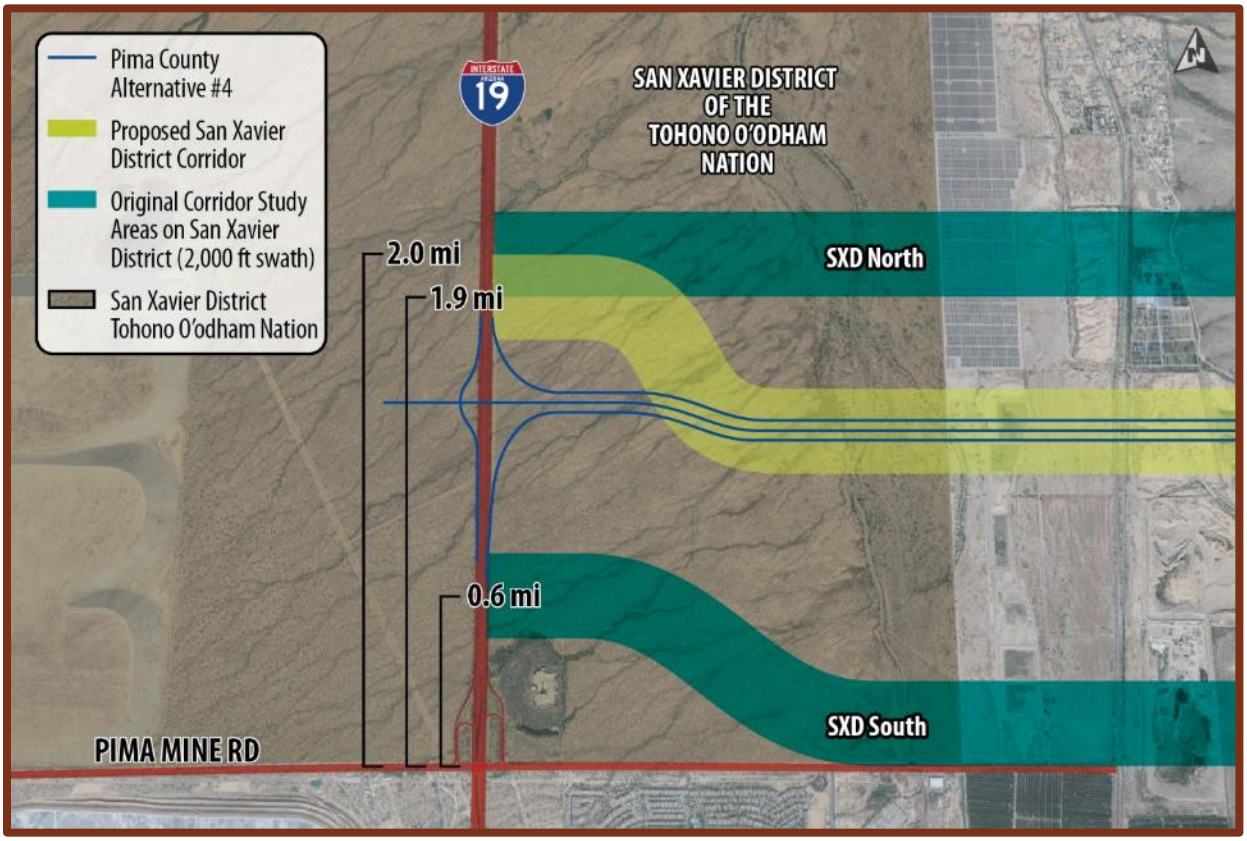
The original connection point on I-19 was identified from the Pima County Study in 2015 at a location just north of the Desert Diamond Casino (the southerly green corridor in Figure 10). The proposed location was not compatible with system Interchange separation needs without major design concessions that could impede effective performance of the interchange. The County study also evaluated other possible connection points located farther north of Pima Mine Road. None completely addressed the separation need and they had the potential to impact sensitive cultural areas to the east, but they offered improved performance potential and were identified as possible connection points for further study.

Because the identified SXD South location is not viable and the SXD North location, if carried directly east from I-19, has high potential to disturb sensitive cultural resources, a single compromise location was defined that favors the northerly SXD connection point. The proposed location addresses system interchange needs as well as protects local resources and reduces the impact on allotted lands. It is

located about 1.9 miles north of Pima Mine Road as shown in Figure 10. The compromise corridor was generated from Pima County information developed in the 2015 study and discussed with the SXD staff and leadership, TON Tribal Historic Preservation Officer, and the SXD Allottees Association. Also, two sets of meetings, in June 2018 and January 2019, were held with the allottees potentially affected by the two proposed corridors. The figure shows the original two corridor locations and the new proposed connection point on I-19 with preliminary routing to avoid sensitive sites. This SXD North corridor configuration was used in the screening analysis.

Alternatives farther north of the proposed connection point could impact more cultural and historic sites near the Santa Cruz River, could infringe on the ability of the BOR and TON to implement the water rights settlement and the development of the San Xavier Cooperative Farms expansion.

Figure 10 - Compromise SXD Interchange Location



I-10 at Rita Road

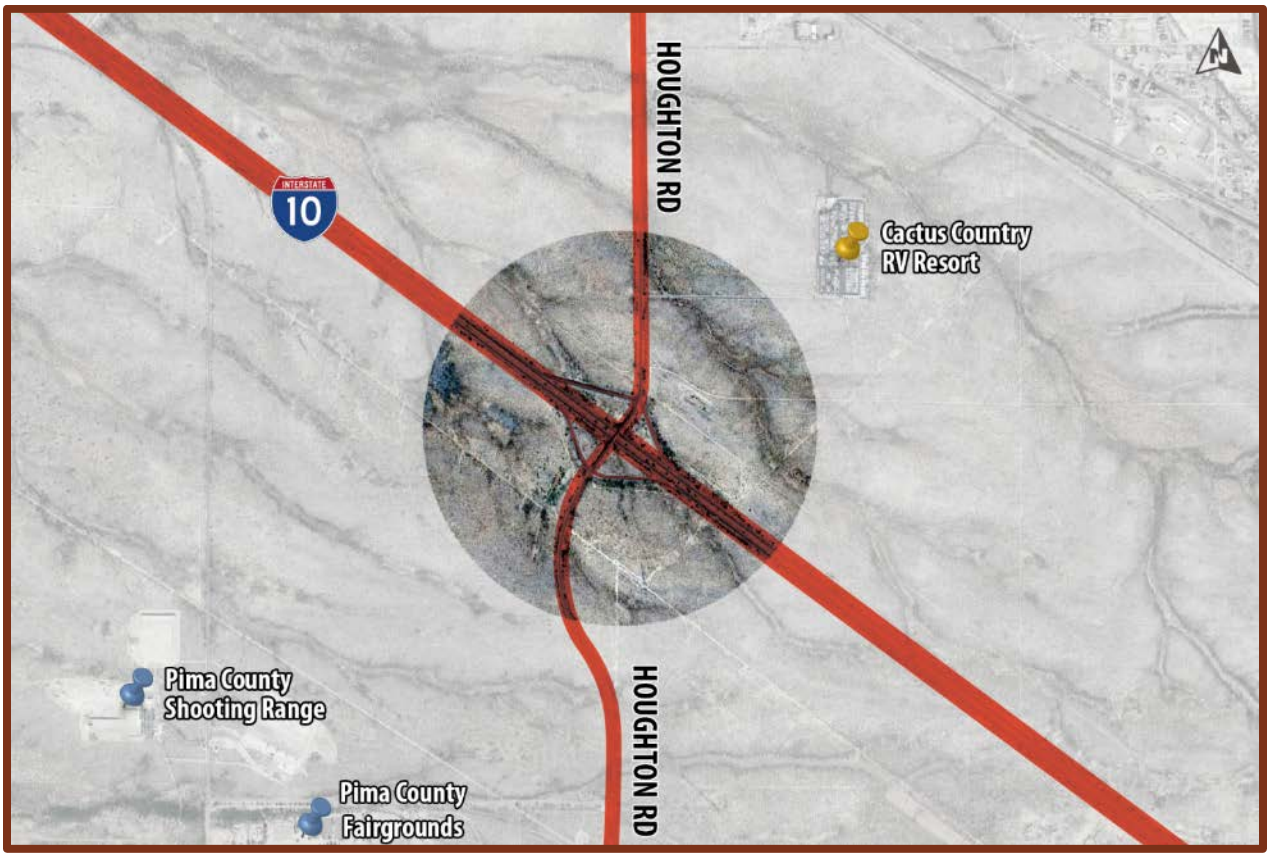
The connection point at Rita Road (shown in Figure 11) serves as the primary entrance to the UA Tech Park on the northeast side of I-10. If the interchange were to be located at the current service interchange, it would require relocating the access to the Tech Park or developing a modified concept for a system interchange that would continue to allow local access to the Tech Park and residential development north of I-10. The location meets RDG requirements. What provides flexibility in the installation of a future system interchange possible at Rita Road is the lack of any substantial development on the southwesterly side of I-10. A system interchange will need to be designed to maintain access to the Tech Park and residential communities.

Figure 11 - I-10 at Rita Road

I-10 at Houghton Road

Houghton Road services a large residential population north of I-10 and is in a good location for a connection to the Sonoran Corridor. The roadway is also the primary access to the Pima County Fairgrounds and locations south toward Sahuarita Road as shown in Figure 12. ADOT has already committed funding to the design and construction of a diverging diamond interchange (DDI) to accommodate existing and future growth at this location. If the DDI is built, it will complicate the accommodation of a system interchange for the Sonoran Corridor. Alternative local access or a modified system interchange design would have to be considered if this were to become a system interchange.

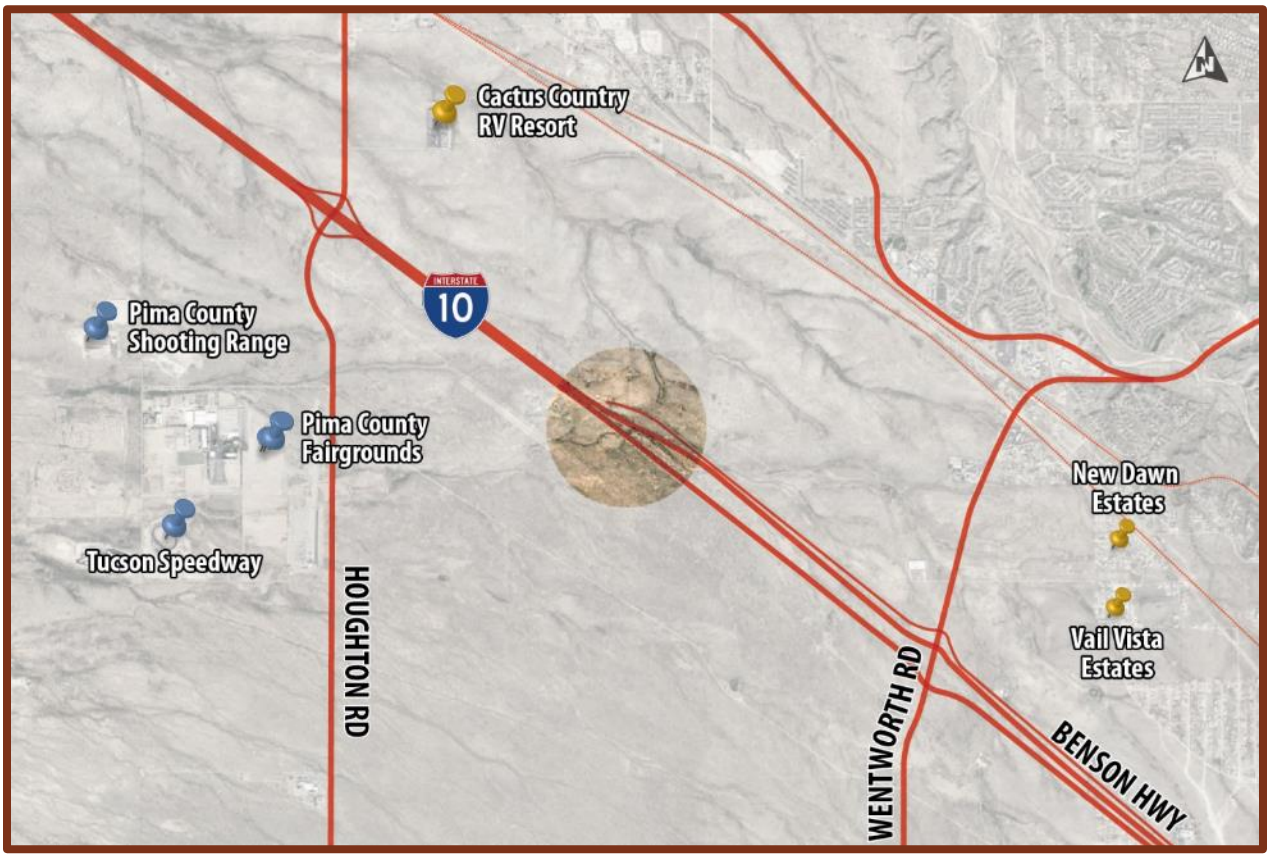
Figure 12 - I-10 at Houghton Road



I-10 at Fairgrounds

As seen in Figure 13, there is currently no interchange near this location. It was named "Fairgrounds" because of its proximity to the Pima County Fairgrounds. Placement of the system interchange could be handled without major access challenges for existing uses. It could also provide a favorable link to I-19 depending on the I-19 connection point selected.

Figure 13 - I-10 at Fairgrounds

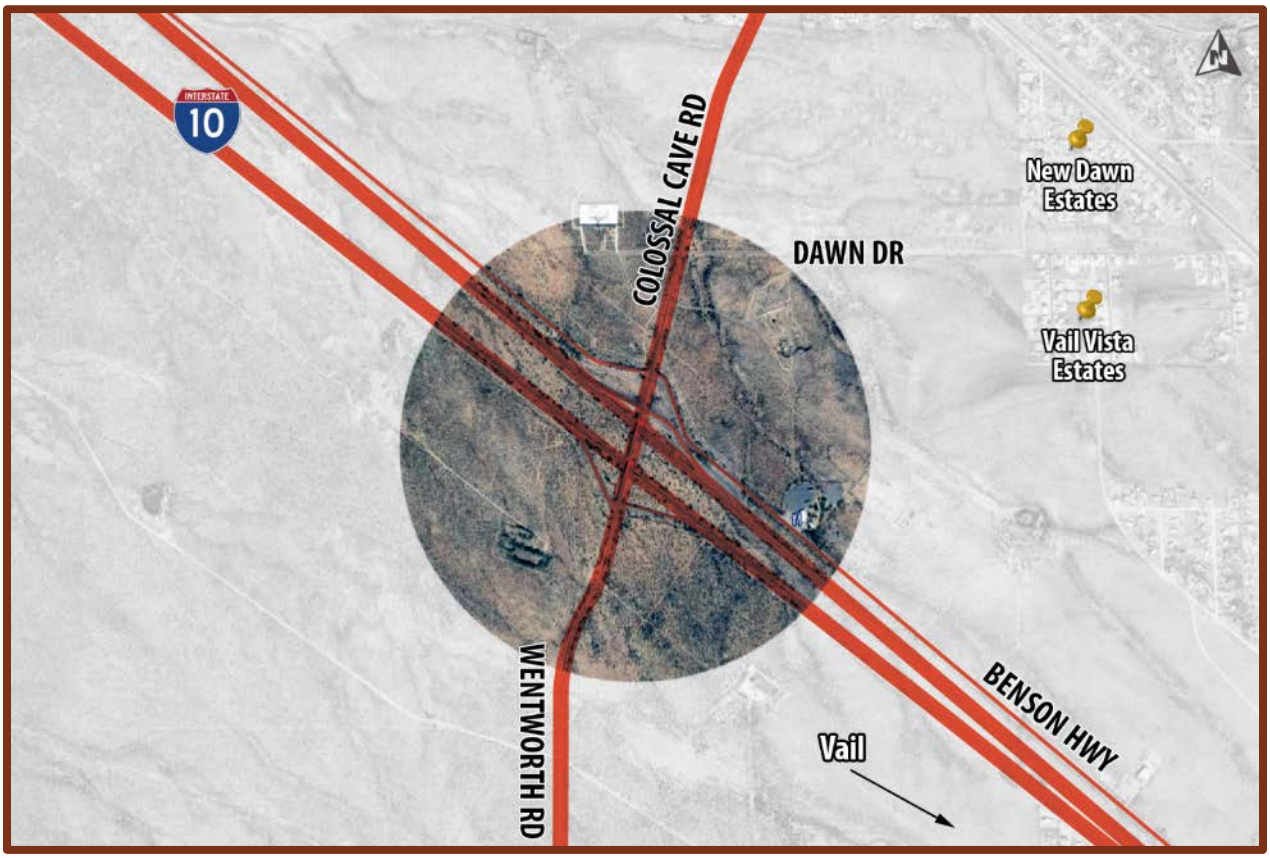


(Figure shows Connection Point location relative to adjacent traffic interchanges.)

I-10 at Wentworth Road

The connection point at Wentworth Road is the main access interchange to the Vail community along I-10. Figure 14 shows it is in a good location for a system interchange in open lands along I-10, but local access questions would need to be addressed. This location was recommended for further consideration as part of the analysis of the public corridor alternative.

Figure 14 - I-10 at Wentworth Road



2.5.1.2 Connection Points Removed from Further Study

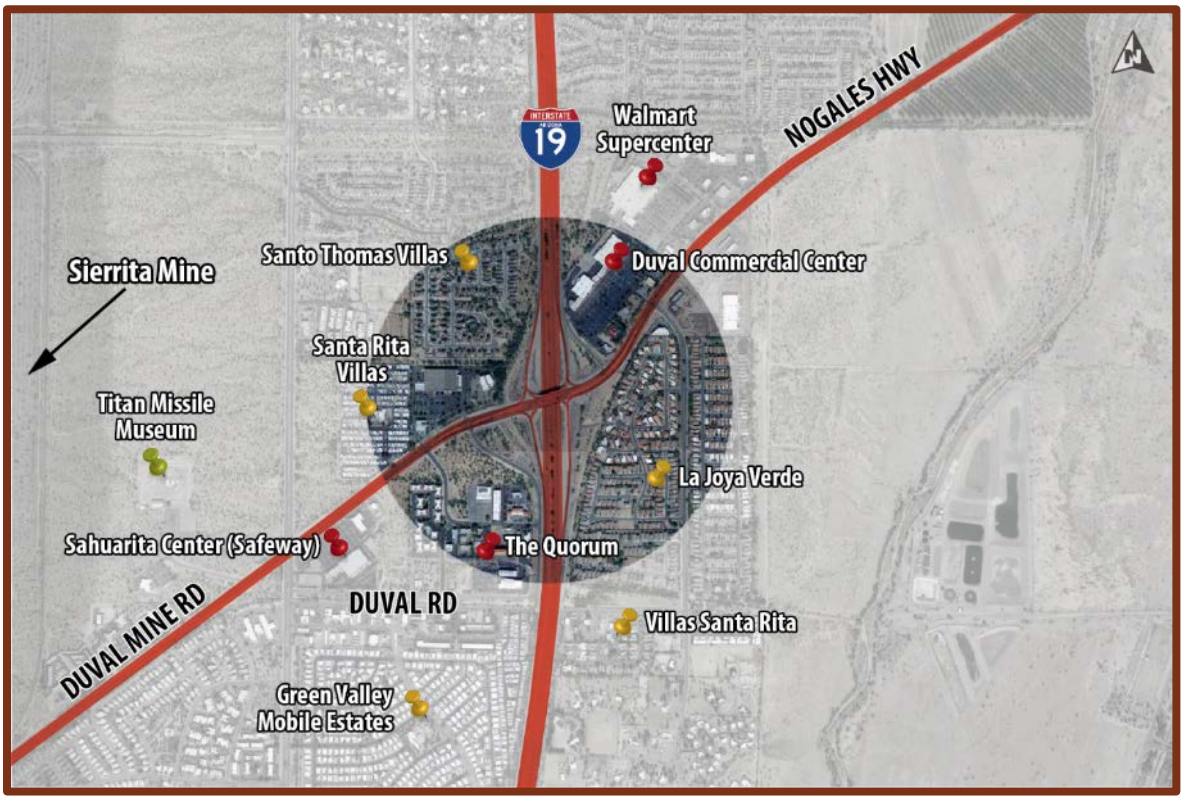
Each connection point was evaluated as to its ability to meet the requirements of the location to serve as a reasonable logical terminus for the Sonoran Corridor. That analysis informed the selection of the remaining connection points and, consequently, the remaining corridors to be studied.

The connection points that did not meet the engineering and operating requirements or which had potential severe impacts, included:

I-19 at Duval Mine Road

This connection point is an established interchange that provides access to commercial and residential activities immediately adjacent to I-19 (Figure 15). They include the Duval Commercial Center, Walmart Supercenter, and Sahuarita Center (Safeway), as well as the main access to the La Joya Verde and Santo Tomás and other residential communities. It also provides access to the Freeport-MacMoran Sierrita Mine complex and the Titan Missile Museum. Placement of a system interchange at this location would have very disruptive effects on the local business and residential developments requiring removal of homes and shopping centers and significant reconstruction of access to many locations served by the existing service interchange.

Figure 15 - I-19 at Duval Mine Road



I-19 at El Toro Road

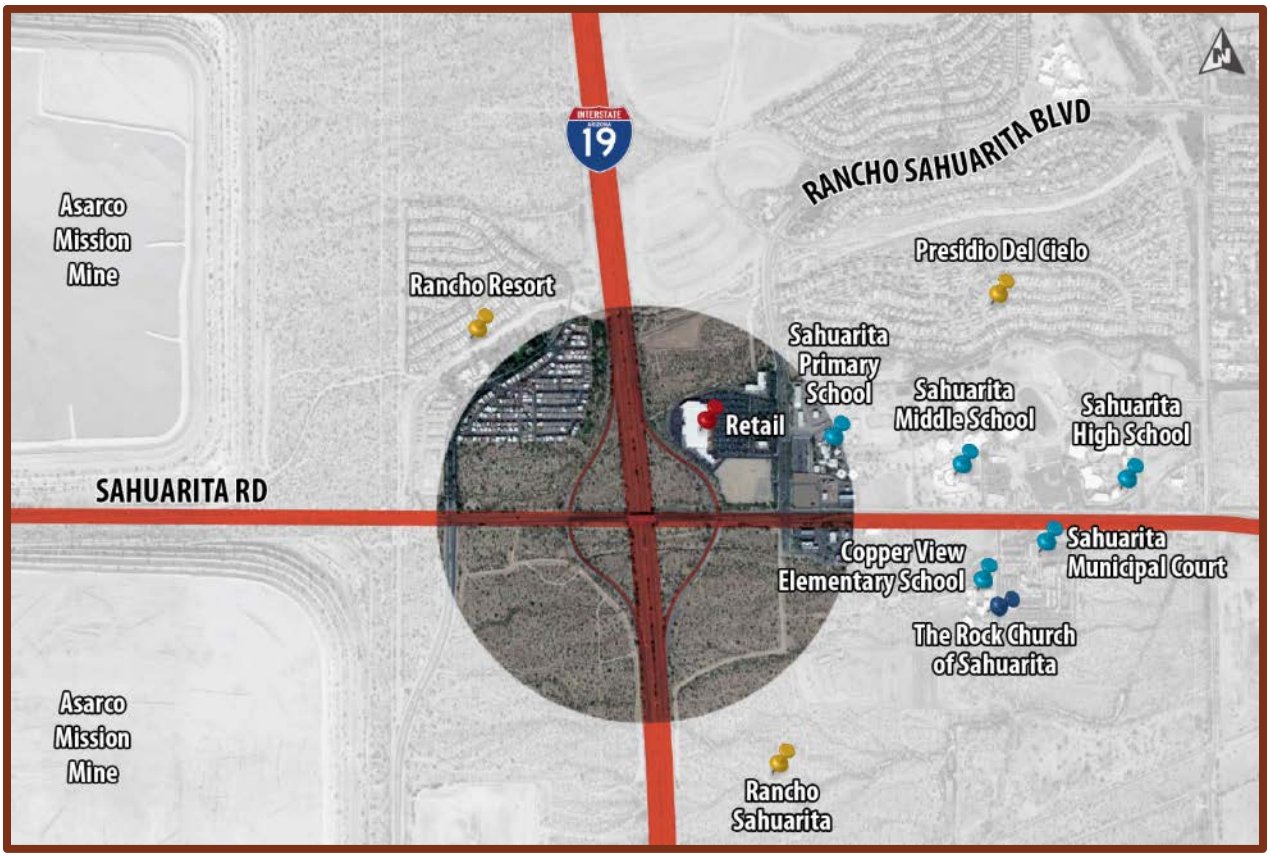
This connection point does not have an existing interchange (see Figure 16), but this location has been identified in a resolution by the Town of Sahuarita as the preferred site for a potential interchange for the Sonoran Corridor. The Town has identified a 300-foot right-of-way for the roadway. This proposed connection point does not meet the separation requirement according to the ADOT RDG for a system interchange due to its proximity to Sahuarita Road one mile to the north. It would be extremely difficult to relocate the Sahuarita Road interchange to allow even a reasonable separation from a possible future connection point at El Toro Road interchange. A variation on this connection point has been located south of El Toro Road at a location half way between Sahuarita and Duval Mine Roads. This El Toro connection point was modified and relocated to "El Toro Road South" in the Connection Points Retained for Further Study (Section 2.4.1.2) to connect at a point half way between Sahuarita Road and Duval Mine Road to better meet design requirements and avoid impacts.

Figure 16 - I-19 at El Toro Road

I-19 at Sahuarita Road

This connection point is the main interchange from I-19 into the Town of Sahuarita and provides access to the Town Hall complex, churches, schools, retail and other activities. It also provides secondary, though circuitous, access to the Asarco Mission Mine. A corridor alternative that was proposed during Scoping included a connection with Sahuarita Road is shown in Figure 17 . The Town of Sahuarita did not favor this connection point because of the potential impacts on the town.

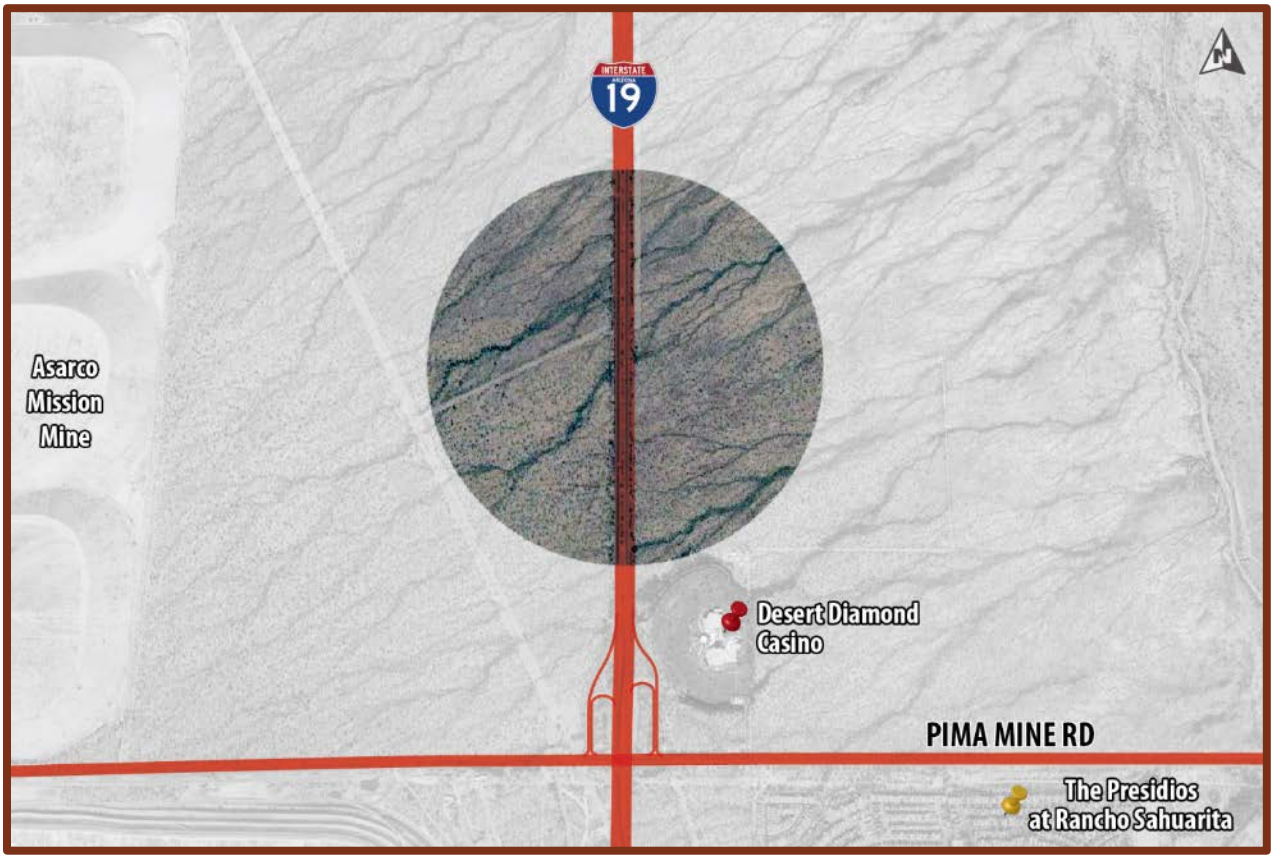
Figure 17 - I-19 at Sahuarita Road



I-19 at SXD South

As identified from previous work, the location shown for the Pima County connection point about ¾ mile north of Pima Mine Road does not meet separation requirements from the existing Pima Mine Road interchange and would have to be reconfigured or moved to a more compliant location. Also, no local private access could be taken from the new interchange which would limit access to the Desert Diamond Casino and residential developments south of Pima Mine Road as shown in Figure 18. The removal of the Pima Mine Road interchange with I-19 would eliminate critical access for several residential and business activities such as the Mission Mine and the Los Presidios at Rancho Sahuarita development.

Figure 18 - I-19 at Southern SXD Interchange

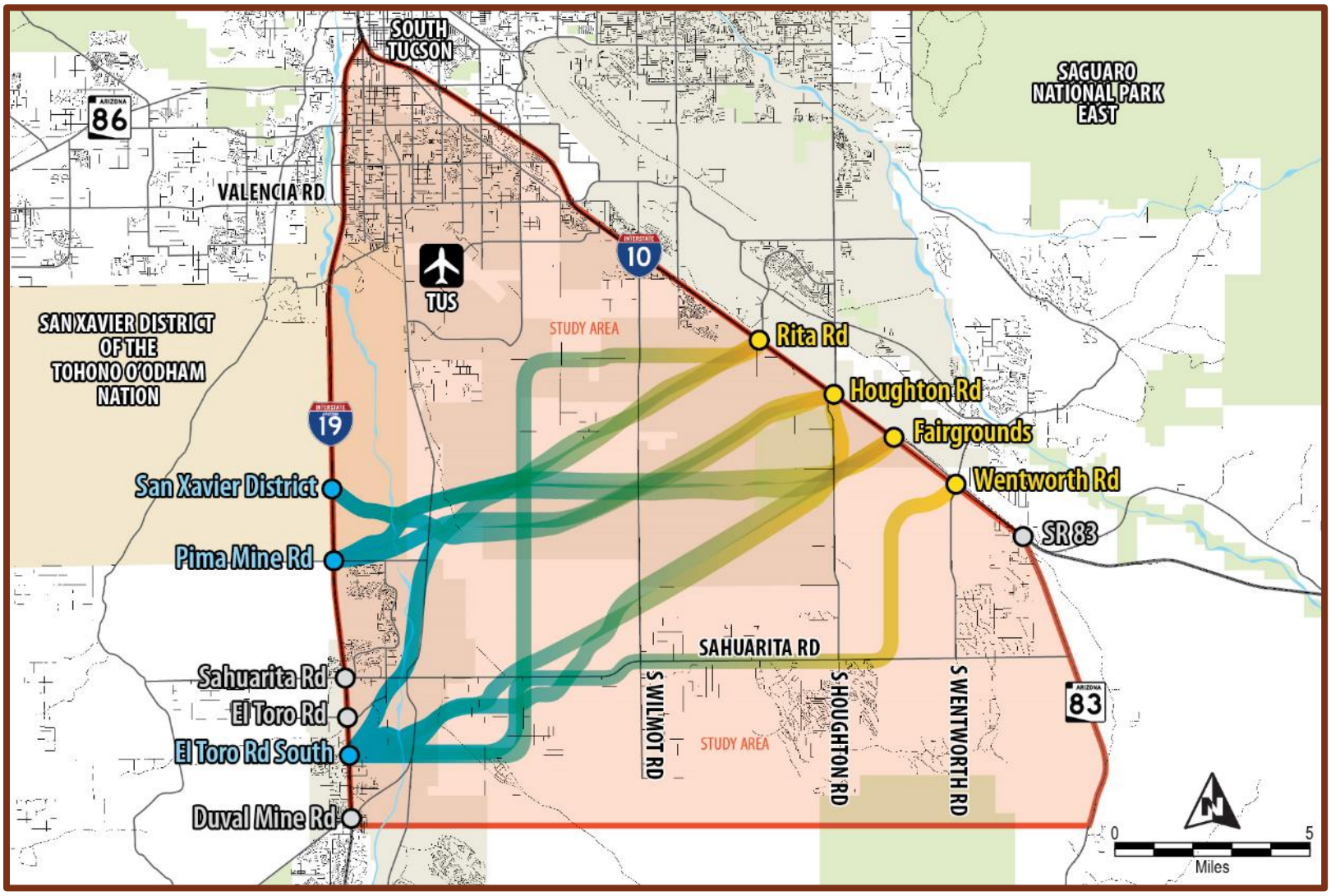


I-10 at SR 83

The current SR 83 interchange connects the state highway with I-10 in the community of Vail at this connection point as presented in Figure 19. The installation of a new system interchange at this location would have to address existing access and the potential impacts to the local community. The geometrics of the connection between the Sonoran Corridor, I-10 and SR 83 would require major revisions to the current I-10/SR 83 interchange as part of a Sonoran Corridor/I-10 system interchange, including a realignment of SR 83 to a new location either west on the Sonoran Corridor or east on I-10. This would have potentially major effects on the local community and/or sensitive environmental areas.

Figure 19 - I-10 at SR 83

Figure 20 – Refined Set of Corridor Alternatives



Note: Uncolored interchange locations indicate Connection Points eliminated. Colored locations are retained for further study.

2.6 OPTIMIZATION

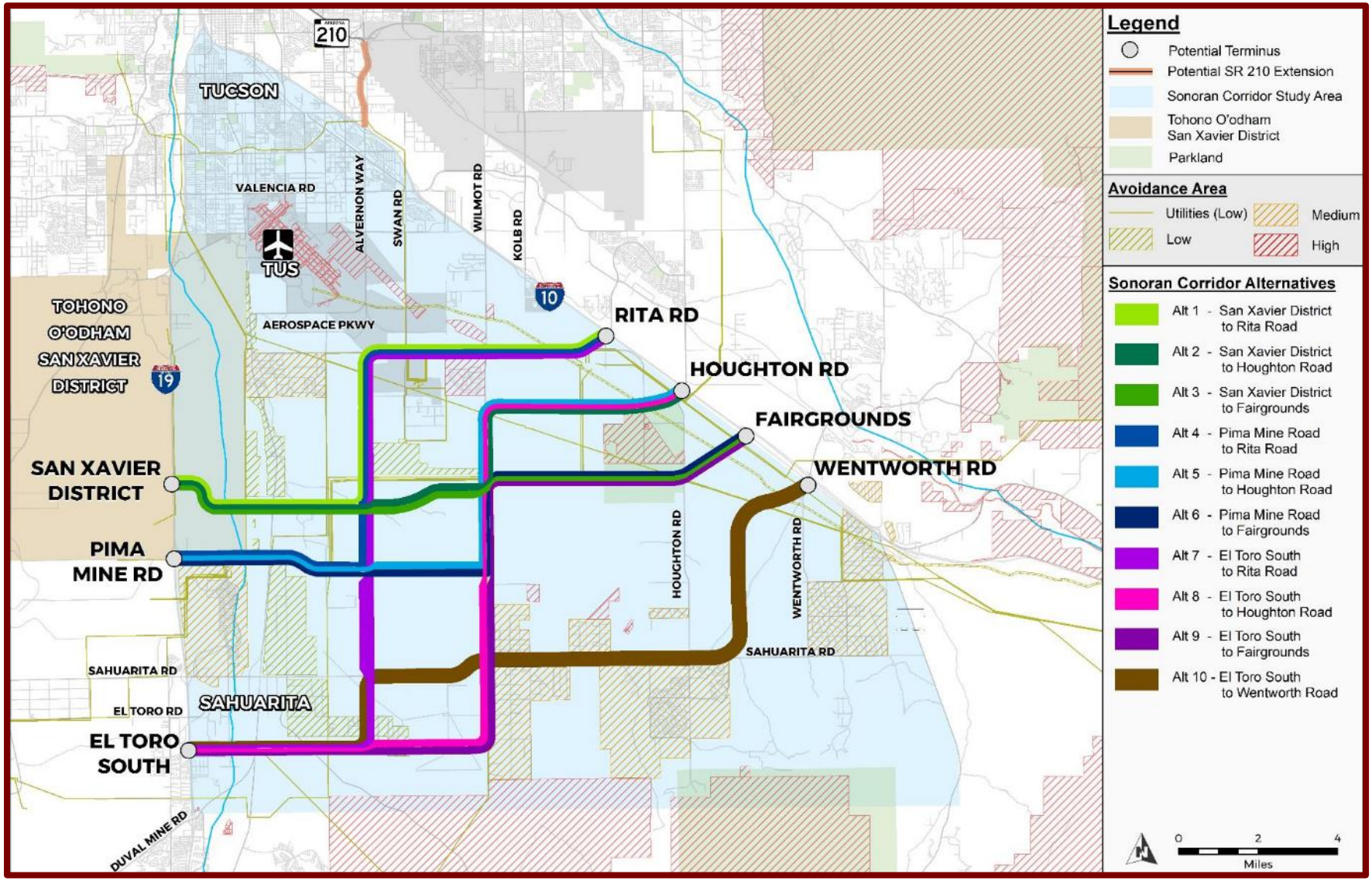
The Refined Set of Corridor Alternatives shown in Figure 20 was optimized to take advantage of existing and/or future designated transportation links in regional or local plans to ensure the proposed corridors not only provide a major transportation connection between I-10 and I-19, but also effectively support a future transportation network in the Sonoran Corridor study area. The objective of the optimization step was to position the corridor to provide a backbone element for the development of a future transportation network and ensure a logical integration of arterial roadways into the system as developments occur. The Optimized Set of Corridors in Figure 21 was reviewed by the public and agencies on September 26, 2018.

Each of the corridor alternatives identified in the Refined Set of Corridor Alternatives must comply with generally accepted engineering design practices and conform to planned functionality within the Study Area. Each of these corridors were optimized to provide the most appropriate routing and service consistent with their individual configurations emerging from the study analysis as well as the potential for supporting an underlying network of roadways. This required minor realignment to fit local conditions to increase the corridors' compatibility with local and regional plans.

- Consideration of existing and planned corridors: The Refined Set of Corridor Alternatives was adjusted to take advantage of current and future roadway corridors, where they exist or are proposed, to minimize encroachment on other land wherever possible.
- Consideration of potential future access points: In addition to the termini at I-10 and I-19, locations along the corridor will need to serve local access at major crossroads and must be positioned to readily accept connections to existing and proposed land uses.
- General engineering standards/requirements: Quantm identifies corridors based on engineering criteria, among other considerations, so the corridors conform to basic design principles. However, there is a need to verify and vet the viability of each corridor to ensure that it follows the appropriate road standards and practices and will serve the operational objectives of the study.

The basis for the optimization was to follow potential future roadway corridors where possible using engineering criteria in Quantm and the work accomplished by PAG, the City of Tucson, Town of Sahuarita and Pima County as plans for the area have been considered. As mentioned in Section 3.9.2, two new corridor alternatives (Figure 22) were added to Figure 21 as a result of public input. A Revised Optimized Set of Corridor Alternatives, which are shown in Figure 23, were then screened using the detailed criteria discussed in Section 4 as the means of establishing the Reasonable Range of Corridor Alternatives for analysis in the Tier 1 EIS.

Figure 21 - Optimized Set of Corridors for Public and Agency Review (Public Meeting 9- 26-2018)



2.7 Public Outreach – Optimized Corridor Alternatives

A public meeting was held on September 26th, 2018 to discuss the Need and Purpose, Evaluation Methodology, Comprehensive Set of Alternatives and the resulting Optimized Set of Corridor Alternatives. Comments were received for up to 30 days thereafter.

2.7.1 Summary of Comments Received at First Public Meeting on Alternatives

Eleven comment forms were returned to the study team at the public information meeting. There were also comments submitted through letters, email and the ADOT website, as well as through discussions with the project team during the public meeting. Those forums provided the following comments:

Preferred Corridor Alternatives

- The corridors I favor the most are the ones that connect to I-10 as far to the east as possible
- My preferred corridor is Alt 1, second choice would be Alt 7.
- Alt 1 will be a good route if needed to serve the NW areas of Rita Ranch and I-10.
- I choose Alt 1 and Alt 4 or Alt 7.
- All are feasible but depending on public allowance. Hopefully the best will be selected.
- I don't like any of them. The shortest distance between two points is a straight line.
- Alt 3 seems to avoid the greatest amount of development, and would be my preference at this stage.
- El Toro – Sahuarita Road – Wentworth. Duval Mine Road – Sahuarita Road.
- Pima Mine – Fairground exit is best.
- Prefer Alt 1
- El Toro to the Fairgrounds is the best route.
- I just want to say that the ones (alternatives) that are L-shaped don't make much sense for a freeway. People want to go the easiest, quickest route from Point A to Pont B, otherwise it will deter people and truckers from driving on it.
- I am 100 percent in favor of this!! Connect to I-10 at Houghton or Wentworth. Connect to I-19 in the Sahuarita area.
- Optimal route for economic development begins at I-19 north of Pima Mine Road and extends east to Wilmot Road.
- Build a parkway connecting I-19 and I-10 south of Pima Mine Road. Widen Old Vail Road.
- Connect new highway to Kolb Road and turn Kolb into a crosstown highway.
- Consider constructing underground corridors.
- I support the proposed corridor from I-10 near the airport to I-19 near or in Sahuarita.

Public Involvement Process

- Doesn't support the effort because public was not allowed to ask questions during presentation.

Note: The project team was available to answer study-related questions following the presentation.

Avoidance Areas

- Consider how options along Sahuarita Road or crossing it will negatively impact rural homestead area. Do not choose any of the candidates that include Sahuarita Road.
- I am very concerned about the sound walls along the freeway through Green Valley.

General Opposition

- Is there really a need for a different route…Please rethink.
- Fix existing roads first. Stop wasting money on decorated traffic interchanges.
- Complete I-10 construction from Tucson to Phoenix fist.
- Use funds to repair truck damage to existing highways. Make commercial trucks use the right lane only.
- I do not see freeway construction as a sustainable solution for Arizona in the long-run. Place a higher priority on improvements that emphasize pedestrians, bicycles, safety and transit.

General Support

- Considering moving to Green Valley and would support a proposed corridor linking I-10 to I-19.
- This plan will help ease traffic flows and decrease congestion near town.
- I believe the entire area could benefit with additional small freeways.
- Build it, FAST.
- Provide access controlled ramps from Sonoran Corridor to TIA terminal and parking.
- Yes! Please make this happen!
- Tucson needs to make it easier to get around the whole city, north and south side. This is a start!
- Sonoran Corridor would shorten commute to the airport and make Cochise County more accessible and help economic recovery.
- I believe this is a great idea. I believe it's time has come.
- This proposal would be a great benefit to the community.
- I fully support the new freeway if it's a real freeway and not a parkway with stoplights.

Impact Questions

- What will be the impact on residential development of Quail Creek? Will this interfere with Robson plans to add 5,000 more homes to the area?

Miscellaneous or Not Applicable Comments

- Where exactly is the location of the proposed corridor?
- Consider the possibility of a loop highway system.
- Concerned effort is to enable illegal immigration. Do we need the highway if we build the wall?

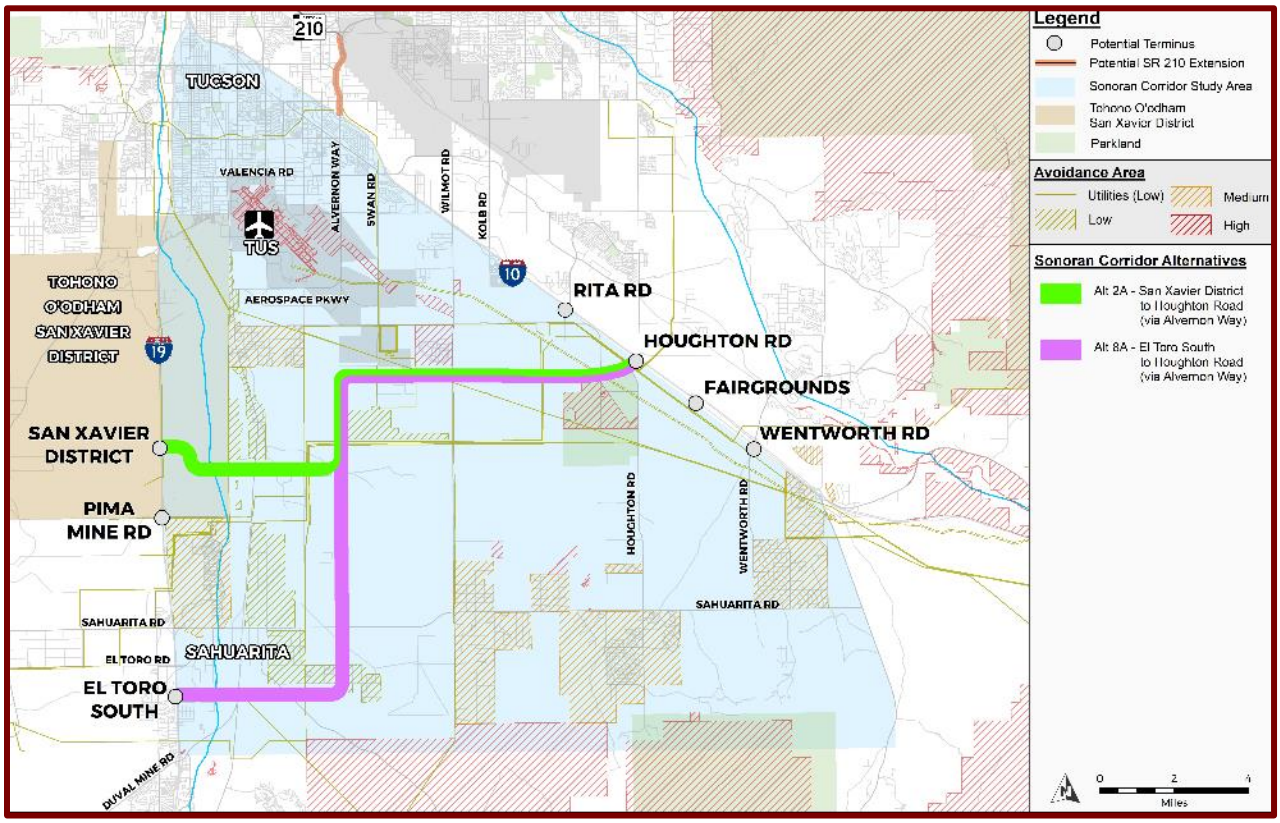
The comments received at the public meeting on September and the project responses are included in Appendix A – Response to Public Comments

2.7.2 Incorporating Public Input

As a result of public review of Figure 8 regarding the proposed corridor alternatives for the Sonoran Corridor, two additional corridor alternatives (Alternatives 2A and 8A)[6] were added for consideration as shown in Figure 22. Specifically, they included new routing for the alternatives that followed the Wilmot north-south alignment, Alternatives 2 and 8. New corridor routing options were added to run the corridors along an extension of Alvernon Way about 3 miles west of Wilmot. They are included in the revised Optimized Set of Corridor Alternatives map in Figure 23.

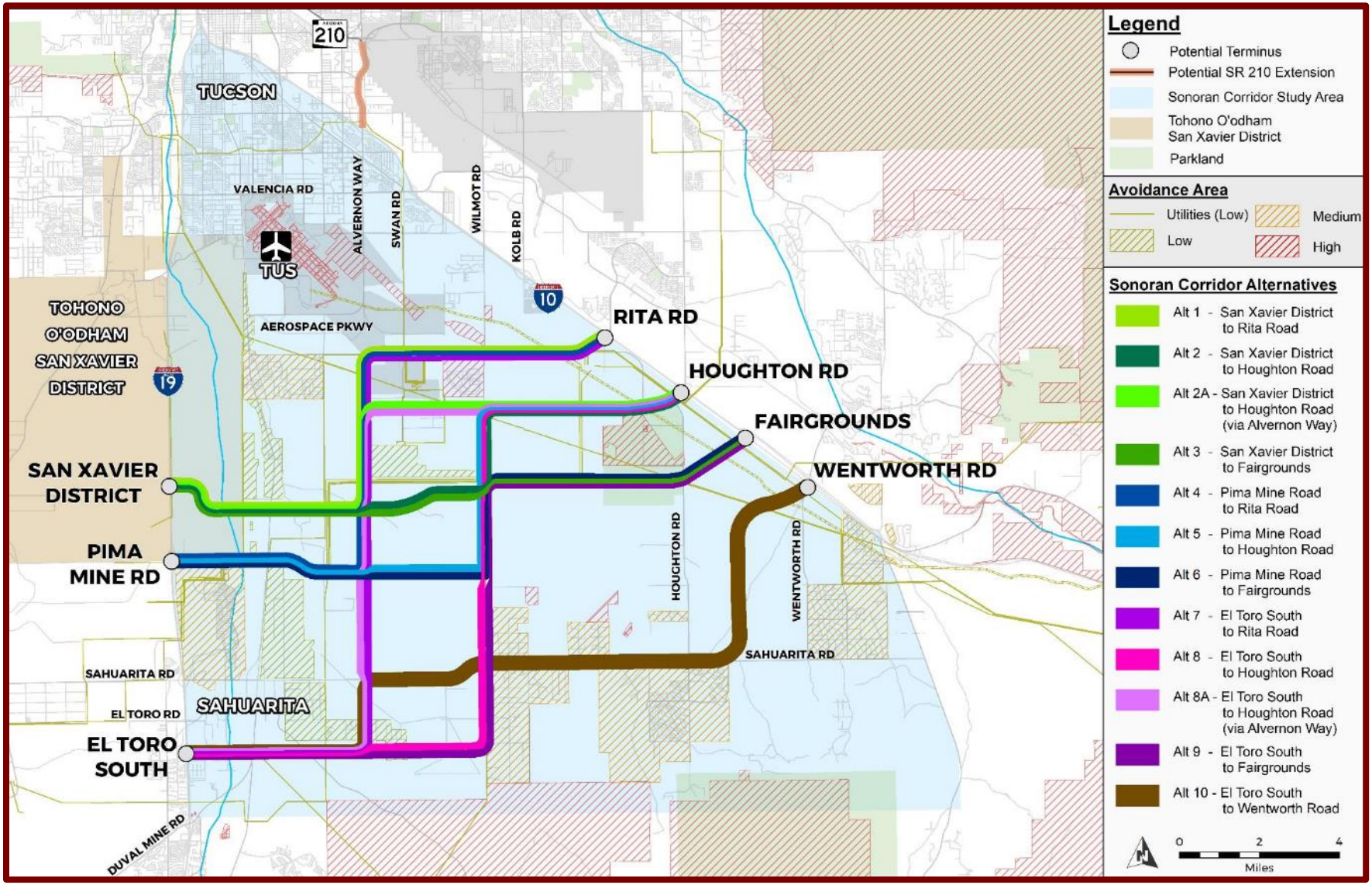
Public input indicated a strong preference to keep the corridor alternatives away from existing development as much as possible. The Reasonable Range of Corridor Alternatives minimizes the infringement upon existing residential communities and emphasizes service to the land uses that require a higher level of transportation access such as employment, industry and logistics centers.

Figure 22 – Alternatives Added in Response to Public Input



[6] There was no Alternative 5A because, based on the evaluation process, the Pima Mine Road options were less effective and posed major access challenges.

Figure 23 – Revised Optimized Set of Corridors for Screening Following Public Input

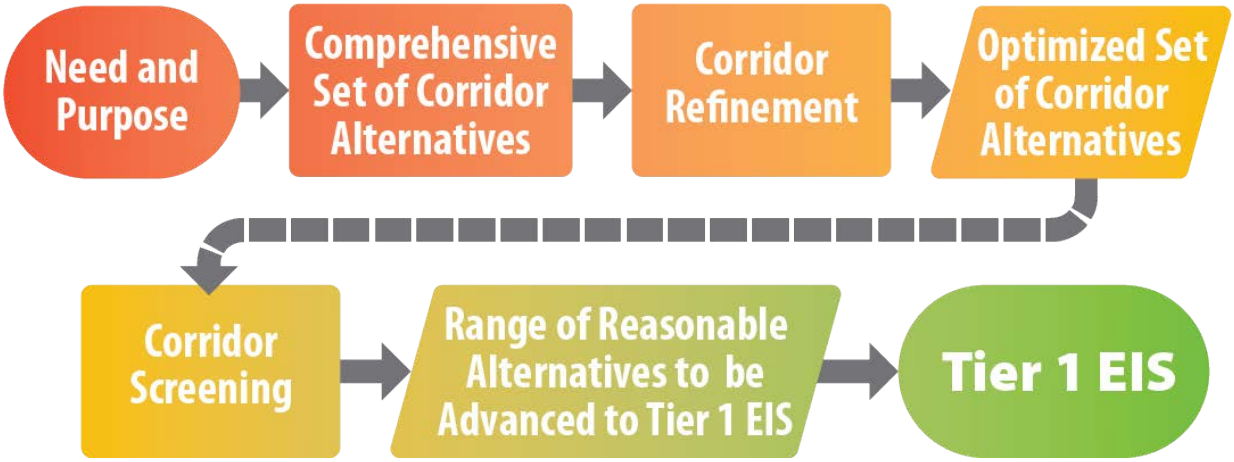


3 CORRIDOR SCREENING

3.1 EVALUATION METHODOLOGY

Once a comprehensive set of alternatives was identified, a Refinement step was applied to develop a Refined Set of Corridor Alternatives that were optimized as explained in Section 2.5 carried forward for a detailed screening. Subsequently, the corridor alternatives were screened using the Evaluation Methodology that is based largely on the identified Need and Purpose in Section 1.2. For the Sonoran Corridor Tier 1 EIS study, this screening process applied specific measures listed in Table 1 to the Optimized Set of Corridor Alternatives to ensure alternatives met the established Need and Purpose while not precluding other modes of transportation. Also, using the specified criteria allowed for a comparative evaluation to understand how each corridor alternative performed relative to the criteria, as well as to the other corridor alternatives. The result of this screening is the Reasonable Range of Corridor Alternatives identified in Section 3.7, that includes the option not to build the project (i.e., a No Build alternative), that will be analyzed in the Draft Tier 1 EIS. The *Corridor Evaluation Methodology Report* is available on ADOT's Sonoran corridor's webpage at https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/documents. The work flow is shown in Figure 24.

Figure 24 - Alternative Refinement and Selection Process



3.2 ADOPTED VS. ENHANCED SOCIO-ECONOMIC DATA

PAG adopted, in conjunction with the 2016 approval of the 2045 Regional Mobility and Accessibility Plan (RMAP), a set of socio-economic data reflecting anticipated 2045 conditions within the PAG region. The data were developed in 2014. Since then, there have been many changes that called for an upward revision of those data among the agencies responsible for managing growth in the study area. This was particularly true for the employment character of the study area recognizing an expectation of

substantial growth in the key employment segments, such as the technology and logistics sectors. The updated information has not been officially adopted by the Regional Council of PAG, but will be considered in the update to the RMAP that is currently underway and scheduled for adoption in 2020.

Given a need to show the effect of the proposed change based on an adopted plan, the Sonoran Corridor travel forecasting effort has produced results based on two sets of socio-economic data:

1) Adopted 2016 RMAP data
2) Enhanced employment data developed by the local jurisdictions in the study area for comparison purposes.

The two sets of socio-economic data affect the travel forecasting and employment projections of the study. The forecasts for both sets of data will be presented for comparison. While the effect of the employment data update is minor in terms of how the forecasting results affect the performance and ranking of the corridors, the objective is to show the corridor under both scenarios with an emphasis on the "worst case" condition for the detailed analysis in determining the Range of Reasonable Alternatives for study in the Tier 1 EIS. The decision on the corridors to be assessed in the Tier 1 EIS will, however, rely on the adopted data to ensure compliance with the process. As will be discussed more thoroughly in corridor screening in Section 3, the results are the same whether adopted or enhanced data are used.

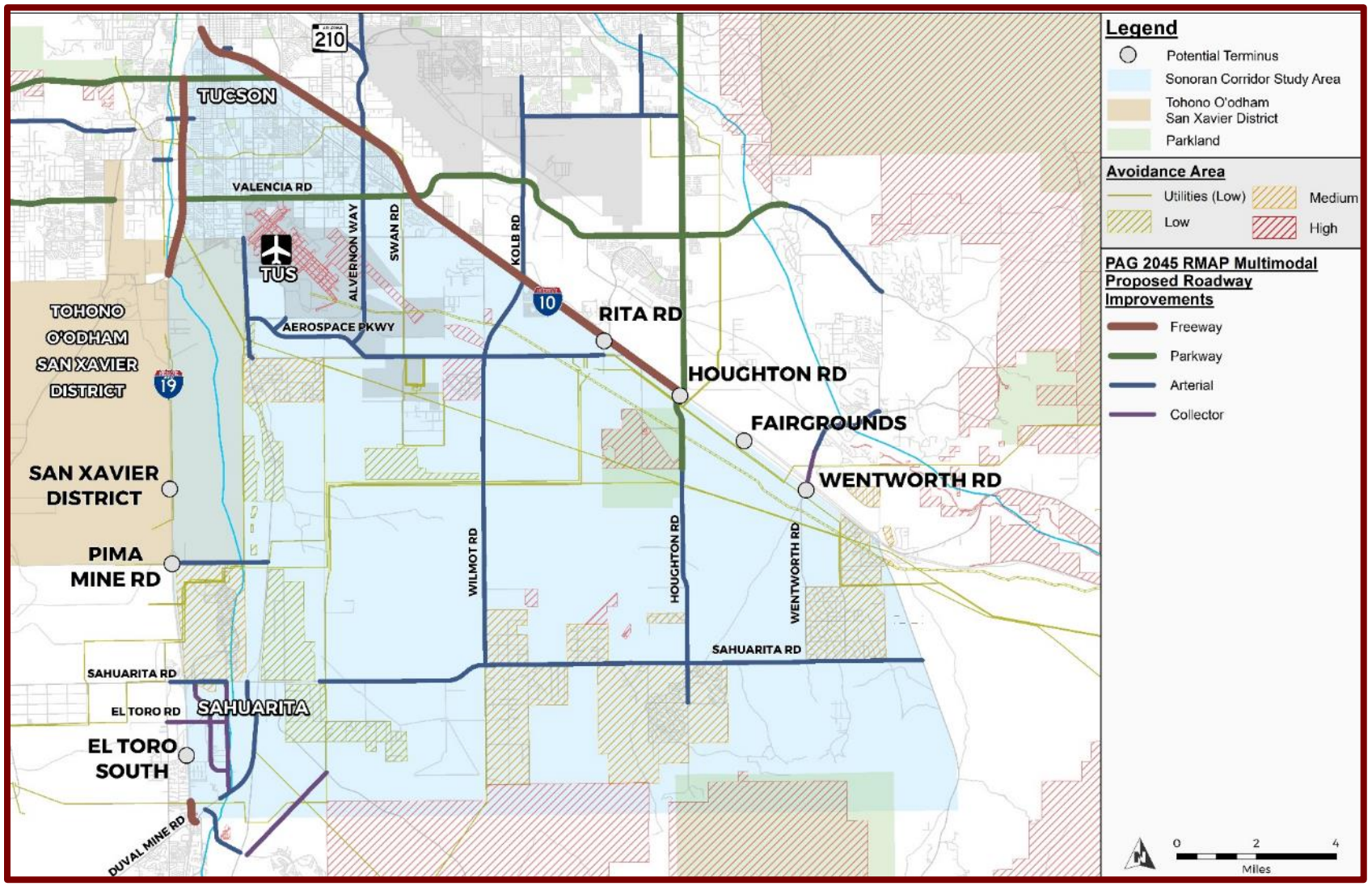
A comparison of the two versions of the travel forecasting output has been prepared to indicate if and where any substantive changes in travel demand manifest themselves and what, if any, conclusions should be drawn from those differences.

3.3 No-Build Alternative

In keeping with the discussion of the two sets of socio-economic data in Section 3.2, the definition of a No-Build Alternative that reflects the transportation network and growth in the absence of the Sonoran Corridor was also a factor in how the analysis was conducted. For purposes of the Sonoran Corridor Tier 1 EIS, the 2045 Regional Mobility and Accessibility Plan (RMAP) multimodal roadway network that was adopted in 2016 by PAG will serve as the No-Build Alternative and, where appropriate, was used as the base case against which corridor influences were measured.

There are few major improvements identified within the study area as shown in Figure 25. The major changes are improvements to I-10 East between I-19 and Kolb Road and I-19 between I-10 and San Xavier Road. One significant new roadway that is reflected in the plan is the link between Aerospace Parkway and I-10 along Old Vail Connection Road which has the potential to be part of a future Sonoran Corridor. Other important improvements in the study area include widening of Wilmot Road, Houghton Road and Sahuarita Road. There are few other existing roadways planned for widening or extension to enhance the limited network in the study area.

Figure 25 - 2016 Adopted RMAP with 2045 Multimodal Roadway Projects (No Build Alternative)



Source: Pima Association of Governments

3.4 Corridor Evaluation Categories and Screening Criteria

The performance of each alternative was assessed based on screening criteria that reflect the following evaluation categories. These categories were formulated based on input received during the Scoping process and previous planning studies, and are specifically designed to address the Need and Purpose as well as good planning and engineering practice.

3.4.1 Evaluation Categories

- Anticipated Growth – the alternative's ability to support planned or anticipated local development. This category responds to the Need and Purpose objective of accommodating future travel demand due to the forecasted growth.
- Mobility – contribution of the alternative to improving passenger and freight travel in the corridor. The criteria in this category address mobility for corridor residents, employees, visitors, manufacturers, growers, shippers, etc., consistent with the stated Need and Purpose objective to reduce congestion and improve the LOS projected for 2045.
- System Linkages – the alternative's ability to address the Need and Purpose objective for reducing travel times and cost by measuring the proximity of the corridor alternative to major destinations between the two Interstates.
- Economic Benefit – contribution of the corridor alternative to serving activity centers and jobs and fostering retention and expansion of commercial and industrial activity in the corridor through the strategic placement a major transportation corridor.
- Environment – effect of a project alternative on the environment, including the effect on sensitive species or habitats, cultural resources, and disadvantaged populations. This category constitutes an underlying precept of good planning, designed to measure the contribution of the alternative to reducing overall energy consumption (e.g., decreasing overall vehicle miles traveled, easing congestion, using less fuel), improving air quality, minimizing the effect on sensitive resources, etc.
- Implementation Feasibility – relative ease of implementation based on property acquisition, number and complexity of structures, construction challenges, public support, and negotiations associated with constructing the corridor.

These six categories were used in the CSR to evaluate alternatives.

3.4.2 Screening Criteria

Each category in Section 3.3.1 is composed of more detailed screening criteria that address that category directly. The screening criteria were used to assess the Optimized List of Corridor Alternatives in Figure 23 to eliminate those corridor alternatives that do not effectively meet the Need and Purpose, or that do not compete effectively against other corridor choices. Based on an independent assessment of each corridor alternative against each criterion, the sum of the ratings for the criteria within each category generated a total score for the corridor. This corridor score was a significant factor in drawing comparisons among the proposed corridor alternatives, and in deciding which of them will be included in the Reasonable Range of Corridor Alternatives to be carried for further analysis in the Tier 1 EIS.

The criteria in the screening process were applied to each Optimized Corridor Alternative assuming a width of approximately 2,000 feet for purposes of measuring relative conformity with performance criteria. These criteria and the corresponding measures for the screening evaluation are detailed in Table 1, Evaluation Criteria. In general, the evaluation criteria contrasted measures using low, medium, and high performance ratings, represented by "Harvey Balls", typically displayed as ○, ◐, and ●, respectively.

Harvey Balls are round ideograms used for visual communication of, usually, qualitative information. See Figure 26. They are commonly used in comparison tables to indicate the degree to which an alternative meets a particular criterion. In a comparison of products, information such as price or weight can be conveyed numerically. However, information such as "quality" or "performance" is often difficult to summarize in a quantitative manner to allow easy comparison. In this case, Harvey Balls are used. When the process includes both numerical and objective criteria, Harvey Balls are a way to present all results in a common language, while deemphasizing a numerical characterization of the outcome. In the individual criteria analyses, ratings are assigned as low, middle, and high (○, ◐, and ●, respectively) based on a natural breaks assessment of the numbers. In presenting the results for a full evaluation category, the results are further divided into quarter sections representing an averaging of the individual criteria ratings. The specific breakdown of the ○, ◐, and ●, ranges for each criterion was determined after the empirical data were collected or developed and, where appropriate, normalized (i.e., set to a common scale) to ensure a fair and logical comparison among the three levels.

Figure 26 – Harvey Balls Comparison

Low → Middle → High

Less desirable → More desirable

Measure of Performance

Table 1 – Evaluation Criteria

Category	Criteria	Measures	Scale	Source
G – Anticipated Growth	**Criterion G-1: Compatibility with Local Plans** - Effect of the alternative on existing or proposed plans within the corridor	Compatibility with adopted local and regional plans	● Compatible (C): the corridor is identified in the local plans and the project is consistent with the intent of the plans ◐ Compatible with Difficulties (D): the corridor is not entirely reflected in local plans but may not create significant complications ○ Incompatible (I): the corridor impacts an already built condition and is not reflected in local plans	County, city and town General Plans and Zoning maps and other corridor-specific data when available
	Criterion G-2: Public and Agency Support – Preference of the alternative by stakeholder agencies and public	Statements of support by local agencies and the public	● Supported (S): the corridor has the support of the public and agencies ◐ Ambivalent (A): reaction to the corridor is evenly mixed or neutral ○ Opposed (O): the corridor is not supported or preferred by members of the public or agencies	Input and feedback from project meetings, project website, news sources, and social media
	Criterion G-3: Compatibility of Corridor with Underlying Property Ownership – Level of negotiation required with independent agencies/ nations/companies	Compatibility with underlying land ownership	● Compatible (C): the corridor is compatible with existing property ownership ◐ Compatible with Encumbrances (E): portions of the corridor are incompatible with existing property ownership and/or all or part of the corridor is partially compatible with existing property ownership (e.g., allotted lands, operating uses, etc.) ○ Incompatible (I): the corridor is incompatible with existing property ownership (e.g., National Park, protected Tribal lands or wildlife areas, etc.)	General Plans and Zoning and Areas of Influence maps.
	Criterion G-4: Employment Served – Existing and future employment	Employment growth within 2 miles of corridor centerline	● Most employment ◐ Medium employment ○ Least employment	Data from adopted plans and local plans such as the Sonoran Corridor TAC information

Table 1 – Evaluation Criteria

Category	Criteria	Measures	Scale	Source
M—Mobility	**Criterion M-1: Travel Demand:** Annualized passenger trips	Travel demand forecast for corridor alternative	● Highest travel demand ◐ Medium travel demand ○ Lowest travel demand	Travel model
	Criterion M -2: Travel Demand – Annualized truck trips	Forecast percentage of truck travel in corridor	● Highest truck travel ◐ Medium track travel ○ Lowest truck travel	Truck forecast model
	Criterion M-3: Reduction of truck volume on Interstate facilities	Reduction of truck traffic at the I-19/I-10 interchange	● Highest reduction of trucks ◐ Medium reduction of trucks ○ Lowest reduction of trucks	Travel forecast for I-10 and I-19 from travel model
	Criterion M-4: Travel Time– Estimated travel time reductions.	Travel time in minutes between common corridor locations based on output from travel demand model	● Lowest travel time ◐ Medium travel time ○ Highest travel time	Travel Model calculation
	Criterion M-5: Congestion Reduction: How corridor improves traffic operations	Comparison of LOS on I-10, I-19, Valencia Rd, Nogales Highway and Sahuarita Rd with alternative and without	● Most congestion reduction ◐ Some congestion reduction ○ Least congestion reduction	Travel demand model and LOS calculations
	Criterion M-6: Improved access to TUS: Estimated trips from new corridor	Forecast of future travel demand to TUS with new corridor compared to airport travel demand without corridor	● Highest airport access ◐ Some airport access ○ Least airport access	Travel Model, TUS forecast
	Criterion M-7: Multimodal Connectivity: Promote bicycle, pedestrian and trail connectivity	Routes support locally adopted bicycle, pedestrian and trails plans and/or provide new multimodal transportation opportunities	● High level of multimodal connectivity ◐ No change in multimodal connectivity ○ Reduced multimodal connectivity	GIS maps or Google Earth and existing plans

Table 1 – Evaluation Criteria

Category	Criteria	Measures	Scale	Source
SL – System Linkages	**Criterion SL-1: Contribution to comprehensive transportation network and improved access**	Sum of miles on existing or future roadway network from nearest point on Sonoran Corridor alternative to airport and major residential and employment centers.	● Shortest total miles ◐ Average mileage ○ Greatest mileage	GIS maps or Google Earth
EB - Economic Benefits	**Criterion EB- 1: Access to jobs and revenue potential**	• Number of activity centers (existing and proposed) within 2 miles of the corridor • Number of jobs within 2 miles of corridor centerline	● Most activity centers ◐ Average activity centers ○ Least activity centers	PAG travel modeling data
E – Environmental	**Criterion E-1: Sensitive noise receptors**	Number of second level sensitive noise receptors within 2,000 feet of corridor centerline	● Least receptors ◐ Average receptors ○ Most receptors	GIS analysis of maps from Arizona Game and Fish Department (AGFD) or National Park Service or another appropriate source
	Criterion E-2: Residences potentially affected	Number of residences within the corridor	● Least residences ◐ Average residences ○ Most residences	GIS analysis of PAG modeling data
	Criterion E-3: Historic/cultural/ archaeological resources	Acreage of documented sensitive historic/cultural/ archaeological resources within the corridor; percent of sites more than 50% percent covered by alternative	● Fewest resources ◐ Average resources ○ Most resources	GIS applications to AZ State Museum and other Archaeological Databases

Table 1 – Evaluation Criteria

Category	Criteria	Measures	Scale	Source
E – Environmental	**Criterion E-4: Wetlands/floodplains/ rivers/ washes/arroyos**	Wetlands/100-year floodplains (in acres) and rivers/washes/arroyos (in linear feet) within the corridor	● Lowest total impact ◐ Medium total impact ○ Maximum total impact	Aerial measurement
	Criterion E-5: Wildlife corridors	Number of identified wildlife corridors crossed as shown in the Arizona Wildlife Linkages report prepared by Arizona Fish and Game Department	● Least affected corridors ◐ Some affected corridors ○ Most affected corridors	AGFD
	Criterion E-6: Biological resources which may be affected	Quantify biological resources within the corridor based on six-point scale using the Arizona Game and Fish Department "Species and Habitat Conservation Guide"	● Fewest resources ◐ Middle resources ○ Most resources	AGFD HabiMap
	Criterion E-7: Existing environmental justice populations	Minority and low-income population (number of people) within 1 mile of corridor centerline	● Lowest affected population ◐ Middle affected population ○ Highest affected population	Census data
	E-8: Greenfield sites – Emphasis on use of existing corridors	Acreage of corridor on undeveloped land vs. existing infrastructure	● Least affected greenfield area ◐ Some affected greenfield area ○ Most affected greenfield area	GIS analysis and transportation and utility network analyses

Table 1 – Evaluation Criteria

Category	Criteria	Measures	Scale	Source
IF - Implementation Feasibility	**Criterion IF-1: Ease of Implementation**	Qualitative evaluation of the relative costs of building the corridor including property acquisition, structures, construction challenges.	● Low (L): lower physical challenges/costs construction ◐ Moderate (M): moderate physical challenges/costs ○ High (H): Significant physical challenges/costs	Analysis of corridor character and special conditions to be addressed by construction effort
	Criterion IF-2: Property acquisition elements	Level of difficulty acquiring and negotiating for needed land to construct proposed corridor	● Low level of effort and difficulty of negotiating ownership/access to needed properties for construction ◐ Moderate level of effort and difficulty of negotiating ownership/access ○ High level of effort and difficulty of negotiating ownership/access	Review of institutional requirements to be addressed in acquiring or securing access to needed lands for the project

3.5 Corridor Evaluation Process and Screening Results

As noted in Table 1, the application of the screening criteria emphasized quantitative measures developed from a variety of sources in most evaluation categories. Some criteria were determined from discussions and responses with agency representatives and are qualitative in nature. The performance information for each criterion and, ultimately, for each category is presented using the Harvey Balls icons introduced in Section 3.4.2. While there is a quantitative underpinning of each result, this approach allows for an efficient visual overview of the screening process that is consistent with the preparation of the CSR as a precursor to a Tier 1 EIS. The input data, where appropriate, are presented in Appendix B – Enhanced and Adopted Data Input Tables.

The Evaluation Methodology identified six performance categories comprising 23 criteria. Each category was defined by a set of criteria pertinent to that category. All categories were rated equally, for purposes of the CSR, based on their component criteria. After the data were gathered for each criterion on each corridor, the performance with respect to that criterion was rated by comparing the results among all Optimized Corridors. A "natural breaks"[7] analysis was applied to rate each criterion to as low, middle and high compared to other corridors. Each individual criterion data table includes a note indicating the natural breaks ranges for that criterion. Ratings of low, middle and high refer to the comparative performance, not the actual number. Harvey Balls are used to show the results of the natural breaks analysis. Each corridor is given a ●, ◐ or ○ to indicate the result of the analysis for that criterion. In each of the criteria discussions that follow, the upper row of the accompanying table presents the qualitative or quantitative results of the analysis and the lower row the Harvey Ball interpretation of those results based on the natural breaks.

Harvey Balls are grounded in a numeric comparison, but provide a basis for a quick overview of the results without an emphasis on the numbers and an indication of priority. In general, a "low" or "○" rating is less desirable and a "high" or "●" rating is better in each criterion. Depending on the criterion, a low rating could reflect high or low numbers in the actual measurement. For example, a higher number of impacted water resources, the lower the rating because it reflects the potential for greater effects on the natural environment. Conversely, the higher the number of the travel forecast, the more effective the corridor is in meeting Need and Purpose to address travel and growth needs in the study area. All ratings reflect this type of assessment.

Once the data for all criteria and all corridors were collected, each category was rated based on the sum of the ratings of the criteria within that category. Finally, the corridors were rated based on the sum of the performance of all six evaluation categories.

More detail about each screening category and its component criteria is presented to aid in understanding the specifics of the evaluation process and what data were collected to address each

[7] The Jenks optimization method, also called the Jenks natural breaks classification method, is a data clustering method designed to determine the best arrangement of values into different classes. This is done by seeking to minimize each class's average deviation from the class mean, while maximizing each class's deviation from the means of the other groups. In other words, the method seeks to reduce the variance within classes and maximize the variance between classes.

measure in the process. A table of the analysis data by corridor alternative and the resulting Harvey Ball interpretation of the results are included after the description of each criterion. Table 24 and Table 25 show summaries of the results of the screening process for both Adopted and Enhanced data discussed in Section 3.2. The difference between the two tables is only visible in the criteria affected by the employment figures because they reflect the intensity of development which affects only the travel and land use measures.

3.5.1 Category G - Anticipated Growth

The individual criteria used to evaluate community acceptance and accessibility include compatibility with local plans, compatibility with underlying property ownership, and populations served.

G-1 - Compatibility with Local Plans

Compatibility with local plans is a general assessment of how well each route conforms to local transportation plans within the study area.

Each corridor alternative was evaluated for compatibility with local plans by reviewing municipal plans for the area, performing a count of affected property owners and a qualitative assessment based on existing or proposed transportation plans within a corridor as well as impacts on built conditions. The compatibility with local plans for each complete alternative route was classified as either *compatible*, *compatible with difficulties*, or *incompatible*. The higher the number, the more compatible the corridor is with the plans for that area. The results are shown in Table 2.

- ***Compatible (●)***—A corridor alternative route was compatible if it was identified in local plans consistent with the intent of the study or if the route was in an existing or planned major transportation corridor. Examples of compatible portions of a corridor could include following an existing or planned roadway that is in a long-range plan. A second consideration was whether an alternative violated the intended use of a transportation corridor.
- ***Compatible with difficulties (◑)***—A corridor alternative route was compatible with difficulties if it was not entirely reflected in local plans, would not create significant complications, or if some portions of the route would not be in an existing or planned major transportation route while some of the route would require substantial negotiation. Corridors that are routed through Arizona State Lands are not necessarily incompatible with the Sonoran Corridor, but require additional steps to become viable.
- ***Incompatible (○)***—A corridor alternative route was incompatible with local plans if it would impact a National Monuments, Parks or Forests, sensitive uses or historic/archaeological sites or if major portions of the route would be located outside existing or planned major transportation corridors. An alternative was also deemed incompatible if it violated the intended use of the corridor as a high-capacity and high-priority facility, such as in the case of a local roadway that would create access issues for local services and facilities.

Table 2 - G-1 – Compatibility with Local Plans

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion G-1: Compatibility with Local Plans	5	5	5	5	3	3	3	5	5	5	5	1
	Qualitative rating based on evaluation of local plans											
	●	●	●	●	◑	◑	◑	●	●	●	●	○

Note: Natural breaks are at low=1, Middle=3 and high=5

G-2 - Public and Agency Acceptance

This criterion measures the response from the public and agencies potentially affected by the proposed corridor. It is a qualitative assessment that relies heavily on the responses from public comments received during Scoping or the public meeting of September 26th, 2018 or agency discussions about the Optimized Corridors held throughout the development of the corridor alternatives. Corridors carrying the highest support are rated best and those that have less support are rated lower. In the case of the Sonoran Corridor, the routes that served local interests or fit into local plans were more acceptable to the affected agencies. Corridor locations where there are more people and activities received the highest acceptance ratings. Results are in Table 3. Higher numbers are indication of better performance.

Table 3 - G-2 – Public and Agency Acceptance

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion G-2: Public and Agency Support	5	3	3	3	1	1	1	3	3	3	3	1
	Qualitative assessment based on responses from agencies and public											
	●	◑	◑	◑	○	○	○	◑	◑	◑	◑	○

Note: Natural breaks are low=1, middle=3, high=5

G-3 – Compatibility with Underlying Property Ownership

Compatibility with underlying property ownership is an indication of how difficult the development of a corridor alternative would be in terms of acquiring or gaining access to the land required for construction or operation. The more compatible an alternative, the more easily needed rights-of-way could be obtained or used without substantial negotiation or undue cost. Table 4 shows the results for G3 and is based on number of ownership interests within the corridor as well as an assessment of easiest to most challenging acquisition or approval process. Having fewer owners implies an easier process, whereas more owners implies lengthier and perhaps more difficult negotiations. Further, if the corridor runs through Tribal lands or the ASLD land there is an additional layer of complexity introduced based on difference in their acquisition processes. The compatibility with underlying property ownership was classified as either *compatible*, *compatible with difficulties*, or *incompatible*. The higher the number, the lower the number of properties requiring negotiation.

- ***Compatible (●)***—An alternative route was compatible with existing property ownership if its development would require little to no negotiation with independent agencies, Tribal Nations, or companies. For example, Alternative 10 would be located completely within existing or planned public rights-of-way.

- ***Compatible with difficulties (◑)***—An alternative route was compatible with difficulties if a portion of the route would be incompatible with underlying property ownership while the remainder would be at least partially compatible, requiring a moderate level of negotiation with independent agencies, Tribes, or companies. For example, Alternative 4 is primarily located in public owned rights-of-way with a portion located on ASLD holdings.
- ***Incompatible (○)***—An alternative route was incompatible if major portions of the route were considered incompatible with underlying property ownership, requiring a substantial level of negotiation with independent agencies, nations, or companies. For example, though there are few property owners, a major portion of Alternative 1, 2, 2A, and 3 would be located within the SXD.

Table 4 - G-3 – Compatibility with Underlying Property Ownership

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion G-3: Compatibility with Underlying Property Ownership	4	6	9	3	7	8	6	7	9	6	6	5
	Number of underlying property owners											
	○	○	○	◑	○	○	◑	◑	◑	◑	◑	●

Note: Natural breaks for the ownership numbers are high=3-5, middle=6-7, low=8-9. These are further qualitatively modified based on type of property ownership to obtain the final rating.

G-4 - Employment Served

An employment measure based on existing job figures per acre for major employers within two miles of all potential corridor alternatives was applied in planned growth areas to determine areas with high, medium and low employment served. Known job numbers for entities such as Raytheon, Citi bank, etc. were acquired from an employment center mapping project recently completed in the area by PAG. The employment centers vary greatly in type, size and use. Total employment numbers for each business were divided by the acreage of each property (2.1 jobs / acre). Future employment centers were calculated by multiplying planned employment acreages by this ratio to determine total employment numbers within the study area. The more employees in the area the corridor serves, the better the rating as shown in Table 5.

Table 5 - G-4 – Employment Served

Criterion	Data	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion G-4: Employment Served	Adopt	75,448	40,089	41,659	25,255	79,657	44,505	28,951	91,118	53,546	57,329	28,951	26,827
		●	◑	◑	○	●	◑	○	●	◑	◑	○	○
	Number of employees within 2 miles of the proposed corridor												
	Enhanced	107,265	52,994	67,748	32,857	112,832	55,698	32,361	124,269	64,834	84,752	32,361	27,699
		●	◑	◑	○	●	◑	○	●	◑	◑	○	○

Note: Natural breaks: low=27,699 -32,857, middle=52,994 - 84,752, high=107,265 - 124,269 for enhanced and low=25,255 - 28,951, middle=40,089 - 57,329, high= 75,448 - 91,118 for adopted data

3.5.2 Category M - Mobility

The mobility category measures the effectiveness of each corridor to carry forecast vehicle activity, including trucks and multimodal. The results in the Mobility Category show the effect of the two employment forecasts for the study area. "Enhanced" are the modified data based on the development of updated information by the stakeholder agencies in the study area. "Adopted" uses the employment forecast prepared in the development of the 2016 RMAP.

M-1 – Daily Travel Demand on Sonoran Corridor

Forecast travel demand is an indication of how effectively the corridor can manage the demand for travel in the study area and aid in reducing demand or congestion in adjacent areas. To maintain consistency with local planning efforts, travel forecasts were completed using the PAG Travel Demand Model and its inputs. As noted in Section 3.2, all forecasts of overall travel demand and truck activity are based on two sets of employment data: 1) Enhanced employment data updated for this study and 2) Adopted PAG socio-economic inputs from the 2016 RMAP development for the 2045 forecast year.

The rating of ●, ◐ or ○ in Table 6 is arrived at by identifying statistical natural breaks in the results from the model runs which are a distance-weighted average of travel on the corridor segments. The resulting number is a measure of the demand for the corridor with the proposed routing. Higher numbers are an indication of better performance.

Table 6 - M-1 – 2045 Daily Travel Demand on Sonoran Corridor

Criterion	Dataset	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-1: Travel Demand: Daily trips on Sonoran Corridor	Adopted	20,254	21,624	20,357	13,323	23,277	22,994	17,284	24,029	20,648	21,656	17,061	13,925
		●	●	●	○	●	●	◑	●	●	●	◑	○
		Weighted average corridor travel demand by major corridor segment											
	Enhanced	29,448	23,380	27,824	33,875	31,151	23,801	17,686	30,177	20,242	26,080	16,496	13,618
		●	◑	●	●	●	◑	○	●	○	◑	○	○

Note: Natural breaks are low=13,618 – 20,242, middle=23,380 - 26,080, high=27,824 - 33,875 for enhanced and low=13,323 - 13,925, middle=17,061 - 17,284, high=20,254 - 24,029 for adopted data

M-2 – Daily Truck Trips on Sonoran Corridor

Truck and freight movement is an important component of the travel element of the Sonoran Corridor given the proximity to a major border crossing between the US and Mexico in Nogales about 60 miles south. Truck trips have been developed using the PAG travel demand model and applying an empirically generated factor that grows over time as travel demand increases. The ratings for each corridor in Table 7 are based on the relative truck numbers in each corridor alternative. As with M-1, the number of trucks indicates the extent to which the corridor serves the commercial purpose of the corridor.

Table 7 - M-2 – 2045 Daily Truck Trips on Sonoran Corridor

Criterion	Dataset	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-2: Travel Demand – Daily truck trips	Adopted	1,003	905	908	627	1,403	963	790	1,154	836	987	773	656
		◑	◑	◑	○	●	◑	○	●	◑	◑	○	○
	Enhanced	Weighted corridor truck travel forecast by major corridor segment											
		1,463	1,019	1,222	632	2,047	1,032	837	1,431	844	1,161	778	662
		◑	○	◑	○	●	○	○	◑	○	◑	○	○

Note: Natural breaks are low=632 - 1,032, middle=1,161 - 1,463, high=2,047 for enhanced and low=627 - 790, middle=836 - 1,003, high=1,154 - 1,403 for adopted

Criterion M-3: Reduction of Truck Volume on Interstate Facilities

The analysis of this criterion (reduction in truck traffic at the I-19/I-10 interchange) yielded incomplete results that did not provide for identifiable differentiation among the corridor alternatives. This measure will be analyzed during the Tier 1 EIS with a higher level of scrutiny to aid in better explaining changes in truck activity at and near the I-10/I-19 interchange. The intent of the criterion is to measure the ability of the Sonoran Corridor to shorten commercial travel to and from the east. Shorter travel times for commerce will improve efficiency in goods delivery and, potentially, save on freight costs.

M-4 – Travel Time

Travel time compares the time it takes to cover the distance between two common points using each of the corridor alternatives. Shorter travels times result in less cost associated with that trip. This is especially important for freight movement through the study area. The common points used for this assessment were El Toro South at I-19 and Wentworth Road at I-10 for north to east and west to south travel because they cover the full travel extent for the study area for all alternatives. The travel times were averaged for the two directions of travel for each alternative. The shorter the travel time, the higher the rating of the alternative shown in Table 8. The No-Build travel times are included for comparison.

Table 8 - M-4 – 2045 Travel Time (in minutes)

Criterion	Dataset	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-4: Travel Time in 2045	Adopted	21.8	21.1	21.5	19	19.9	19.2	16.7	21.1	21	20.3	18.8	16.7
		○	○	○	◑	◑	◑	●	○	○	○	◑	●
	Enhanced	Weighted travel time between common points											
		22.4	19.1	21.8	18.1	20.6	19.3	16.0	21.7	21.1	20.5	18.7	16.7
		○	◑	○	◑	○	◑	●	○	○	○	◑	●

Note: Natural breaks are high=13.8-16, middle=18.1 - 19.3, low=20.5 - 22.4 for enhanced and low=16.2 - 17.2, middle=17.9 - 19, high=20.3 - 21.5 for adopted

As a comparison, the No-Build travel times are projected to be 30.1 minutes Via Sahuarita Road and 38.3 minutes via I-19 and I-10.

M-5 – Congestion Reduction

Using the travel forecasts for 2045 from the PAG Travel Demand Model, an assessment was made based on distance-weighted volume to capacity ratios (V/C) that compared the effect of each corridor alternative on the performance of representative roadways in the No-Build condition. The roadways used for comparison included Sahuarita Road, Nogales Highway, Valencia Road, Wilmot Road, Houghton Road, I-10 and I-19 as shown in Figure 27 – No-Build Network Segments. The introduction of the Sonoran Corridor alternatives was the sole basis for measuring the change in V/C. The higher the reduction in V/C, the more highly rated the alternative in Table 9. As evidenced in the table, the result is consistent between the adopted and enhanced data runs.

Figure 27 – No-Build Network Segments Used to Compare LOS as a Congestion Measure

Table 9 - M-5 – Congestion Reduction (compared to No-Build)

Criterion	Dataset	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-5: Congestion Reduction	Adopted	0.024	0.027	0.038	0.028	0.024	0.017	0.020	0.054	0.031	0.061	0.031	0.041
		○	○	◑	○	○	○	○	●	◑	●	◑	◑
		Volume/Capacity reduction compared to No Build on roadways in Figure 31 within study area											
	Enhanced	0.025	0.028	0.042	0.029	0.024	0.023	0.020	0.059	0.034	0.065	0.029	0.039
		○	○	◑	○	○	○	○	●	◑	●	○	◑

Note: Natural breaks are low=0.02 - 0.029, middle=0.034 - 0.042, high=0.059 - 0.065 for enhanced and low=0.017 - 0.028, middle=0.031 - 0.041, high= 0.054 - 0.061 for adopted.

M-6 – Improved Access to Tucson International Airport (TUS)

Using the travel demand model, Table 10 shows a measure of the travel activity on the key roadway link that serves the airport terminal area. It is provided as the basis for comparison among the alternatives. The higher the travel demand on the airport access link with the introduction of the Sonoran Corridor, the more demand for airport access. The No-Build traffic volume indicates the demand in the absence of the Sonoran Corridor against which the corridor-influenced volumes are compared. The basis of this comparison is the No-Build alternative which shows a volume of 10,652 under the adopted data forecast and 25,534 under the enhanced data forecast.

Table 10 - M-6 – Improved Access to Tucson International Airport (TUS)

Criterion	Dataset	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-6: Improved access to TUS	Adopted	3,746	-1,107	5,710	-1,250	5,002	-744	-533	10,118	-411	8,290	-538	-116
		◑	○	◑	○	◑	○	○	●	○	●	○	○
		Change in travel demand at TUS compared to No Build											
	Enhanced	5,707	-618	4,402	-314	6,594	-463	-675	8,956	-606	6,440	-314	-68
		◑	○	◑	○	◑	○	○	●	○	◑	○	○

Note: Natural breaks are low= -675 to -68, middle=4,402 - 6,594, high=8,956 for enhanced and low= -1,250 to -116, middle=3,746 - 5,710, high=8,290 - 10,118 for adopted. Negative numbers reflect a reduction in travel demand compared to the Baseline alternative as a result of the Sonoran Corridor.

M-7 – Multimodal Connectivity

The results of M-7 presented in Table 11 assess each alternative for its ability to handle alternative mode demands within the corridor. This is a qualitative measure, but it is based on travel distance and directness, existing facility plans and future growth. Shorter, more urban alternatives (existing or planned) are more likely to attract public transit services and shorter connections are preferable for freight travel such as rail lines that could be accommodated within the corridor right-of-way. Utility lines can be in any corridor, but are most affected by where demand is anticipated. The upper data row represents a qualitative interpretation of the multimodal potential of the alternative from 1 to 5, with 1 less likely to support alternative modes and systems and 5 most likely.

Table 11 - M-7 – Multimodal Connectivity

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion M-7: Multimodal Connectivity	3	1	3	1	3	1	1	3	1	1	1	1
	Qualitative assessment of multimodal opportunities for each corridor											
	◑	○	◑	○	◑	○	○	◑	○	○	○	○

Note: Natural breaks are low=1, middle=3

3.5.3 Category SL - System Linkages

System linkages consists of a single measure that adds the straight-line distance from the center of 27 activity locations within or near the study area to the nearest point on the corridor alternative to measure how effectively the corridor serves the primary travel magnets in and near the study area. Lower distance totals are rated higher. The activity locations used in the measurement include existing and proposed centers and are listed below and shown in Figure 28:

- Sahuarita Town Center
- Sahuarita Town District
- Pima Farms Employment Campus
- Pima Farms Industrial Complex
- Sahuarita East Conceptual Area Plan (SECAP) Center 1
- SECAP Center 2
- Corona de Tucson
- Vail Commercial Center
- Houghton Town Center
- CITI Bank at UA Tech Park
- Port of Tucson
- Federal Prison Complex
- AZ State Prison Complex
- Raytheon
- Desert Diamond Casino
- Desert Diamond Casino (Sahuarita)
- San Xavier Mission
- TUS Terminal
- Kino Sports Complex
- Pima Air and Space Museum
- Davis-Monthan Air Force Base
- Pima Co Fairgrounds
- Southeast Employment and Logistics Center
- Aerospace Research Campus
- Verano Commercial Center
- UA Tech Park
- Target Distribution at UA Tech Park
- San Xavier Cooperative Farm

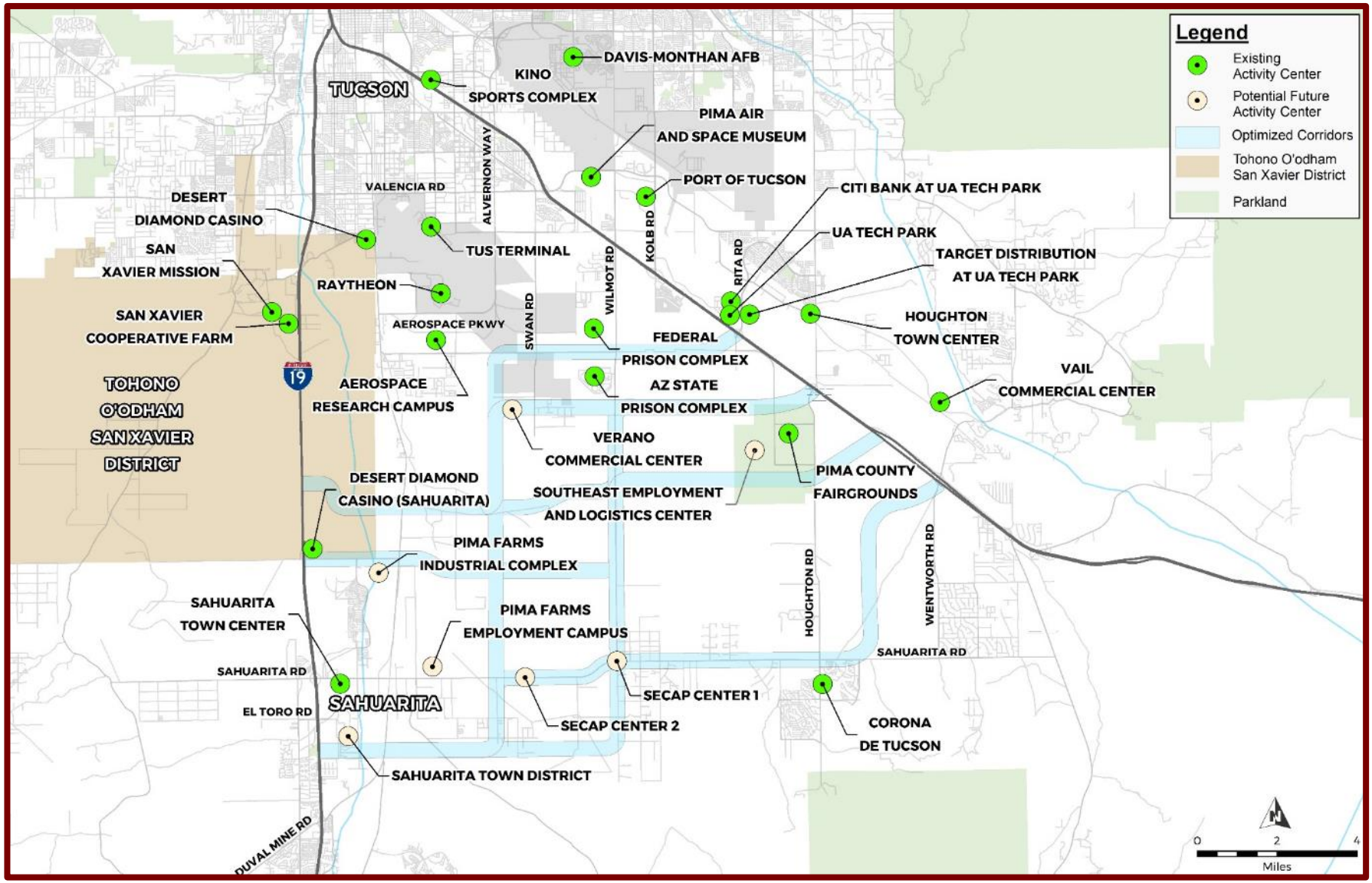
The sum of the linkage distances and ratings are shown in Table 12.

Table 12 - SL1 – System Linkages

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion SL-1: Contribution to network and access (in miles)	76.75	93.91	85.22	106.67	69.02	87.00	104.88	66.59	88.92	75.62	109.47	149.97
	Sum of distance from corridor to all activity centers above											
	●	◑	●	◑	●	●	◑	●	●	●	◑	○

Note: Natural breaks are high=66.59 - 88.92, middle=93.91 - 109.47, low=149.97

Figure 28 – Sonoran Corridor Activity Centers



3.5.4 Category EB – Economic Benefit

Economic benefit is similar to the system linkages measures except that it indicates which activity centers are within a two-mile direct influence envelope of the corridor alternatives. The proximity of the activity centers (shown in Figure 28) as the primary commercial, shopping, industrial, and residential gathering places in the study area provide an indication of how well each corridor contributes to the economic well-being of the area and the region. See Table 13. Higher numbers of centers within the envelope are rated higher in the table.

Table 13 - EB – Economic Benefits

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion EB- 1: Access to jobs and revenue potential	8	6	6.5	4	8	6	4	9	7.5	7.5	4	5
	Number of activity centers within 2 miles of corridor											
	●	◑	◑	○	●	◑	○	●	●	●	○	○

Note: Natural breaks are low=4 - 5, middle=6 - 6.5, high=7.5 - 9

3.5.5 Category E – Environmental

The environmental category evaluates each corridor for its effects on various criteria that describe the local natural and built environment. Each criterion addresses a discipline critical to the development of the Tier 1 EIS.

E-1 - Sensitive Noise Receptors

Noise receptors such as houses, churches, schools, etc. gauge the potential disruption an alternative could cause to adjacent residences and parks along the route. The higher the number of receptors, the more likely the service will have adverse noise effects on adjacent communities and face potential challenges to implementation.

Potential noise receptors were evaluated by determining the number of sensitive noise receptors located within 2,000 feet of each corridor (i.e., an additional 1,000 feet beyond the corridor boundary). Table 14 summarizes the total number of noise receptors in each alternative.

Table 14 - E-1 – Sensitive Noise Receptors

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-1: Sensitive noise receptors	13	5	78	3	1,320	1,313	1,306	228	370	589	378	1,027
	Number of sensitive noise receptors within 2,000 feet of corridor											
	●	●	●	●	○	○	○	●	◑	◑	◑	○

Note: Natural breaks are high=3 - 228, middle=370 - 589, low=1,027 - 1,320

E-2 – Residences Potentially Affected

Criterion E-2 refers to existing homes and zoned residential sites that could be impacted by a future corridor. The higher the number of possible effects, the lower the rating of the alternative. For purposes of the Sonoran Corridor CSR, all existing and future homes within the 2,000-foot corridor have been identified as a basis of comparison among all corridor alternatives and are shown in Table 15.

Table 15 - E-2 – Residences Potentially Affected

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-2: Residences potentially affected	5	2	52	0	469	465	459	68	185	81	193	546
	Number of residences potentially affected within 2,000 feet of corridor											
	●	●	●	●	○	○	○	●	◑	●	◑	○

Note: Natural breaks are high=0 - 81, middle=185 - 193, low=459 - 546

E-3 - Historic/Cultural/Archaeological Resources

The acreage of known cultural resources within each corridor alternative was determined using the Arizona State Museum's AZSITE database as well as information obtained from the Tohono O'odham Nation. The greater the number of sites near a route, the more challenges the alternative could face to development and the lower the rating. For this portion of the measure, the total acreage of historic, cultural, and archaeological resources within a route were summed by alternative. Table 16 summarizes the quantitative score of historic, cultural, and archaeological sites.

Table 16 - E-3 – Historic/Cultural/Archaeological Resources

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-3: historic/cultural/ archaeological resources	141	134	57	113	63	48	72	34	39	40	37	47
	Number of potentially impacted sites identified within corridor											
	○	○	◑	○	◑	●	◑	●	●	●	●	●

Note: Natural breaks are high=34 - 48, middle=57 - 72, low=113 - 141

E-4 – Wetlands/Floodplains/Rivers/Washes/Arroyos

The water resources of rivers, washes, and arroyos were measured to gauge the potential impact of each corridor alternative on environmentally sensitive areas. The higher the number of water resources impacted, the higher the likelihood of harmful environmental effects.

The surface water resources of rivers, washes, and arroyos were evaluated in this CSR, by quantifying the linear feet of water resources within each corridor. A linear foot measure was quantified using the most accurate GIS data at the time from the U.S. Geological Survey. The Tier 1 EIS will assess additional water effects such as hydrology and flood control factors for the alternatives carried into the detailed analysis. US Corps of Engineers has consistently noted that, ideally, the least environmentally damaging practical alternative (LEDPA) should be selected as long as it does not have other significant adverse environmental consequences to aid in the permitting process. Table 17 summarizes the quantitative score of water resources examined associated with each alternative. Lower numbers are rated higher.

Table 17 - E-4 – Wetlands/Floodplains/Rivers/Washes/Arroyos

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-4: wetlands/floodplains/ rivers washes/ arroyos	79,149	88,257	130,627	84,708	92,574	136,116	132,567	231,897	270,160	262,184	266,611	280,722
	Number of linear feet of potentially impacted water elements											
	●	●	◑	●	●	◑	◑	○	○	○	○	○

Note: Natural breaks are high=79,149 - 92,574, middle=130,627 - 136,116, low=231,897 - 280,722

E-5 – Wildlife Corridors

Wildlife corridors indicate the potential impact of each alternative on sensitive wildlife areas or movement between habitat blocks. The greater the number of wildlife corridors that intersect an alternative, the greater the potential for adverse effects on wildlife. Wildlife corridors within an alternative corridor were assessed based on information provided by the Arizona Wildlife Missing Linkages report prepared by the Arizona Game and Fish Department. The Linkages report identifies areas of "potential linkage zones" throughout the state that are deemed to be particularly sensitive to wildlife populations. For the CSR screening, the total number of potential linkage zones that fall within or intersect each alternative was used to determine the value of this criterion for each alternative. Table 18 summarizes the quantitative score of wildlife corridors associated with each alternative.

Table 18 - E-5 – Wildlife Corridors

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-5: wildlife corridors	3	3	3	5	3	3	3	1	1	1	1	1
	Number of wildlife corridors potentially affected											
	◑	◑	◑	●	◑	◑	◑	○	○	○	○	○

Note: Natural breaks are high=5, middle=3, low=1

E-6 – Biological Resources

The biological resources assessment was based upon the Species and Habitat Conservation Guide (SHCG) model published by the Arizona Game and Fish Department. This SHCG tool provided a broad regional assessment of conservation potential in the study area. In the SHCG, conservation potential is measured in six levels of intensity or sensitivity of resources. Table 19 summarizes the quantitative score of biological resources associated with each alternative. Lower numbers are better, and will result in a higher compatibility score. In general, alternative routes which are near rivers or washes and undisturbed areas have greater conservation potential due to the low amounts of existing development.

Table 19 - E-6 – Biological Resources

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-6: biological resources which may be affected	2.39	4.04	3.82	4.14	3.67	4.16	4.27	4.17	4.41	4.32	4.48	4.59
	Quantitative assessment of biological resources affected by corridor											
	●	◑	◑	○	◑	○	○	○	○	○	○	○

Note: Natural breaks are high=2.39, middle=3.67 - 4.04, low=4.14 - 4.59

E-7 – Existing Environmental Justice Populations

Environmental justice focuses on identifying and addressing disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens. As a basis for the analysis, the US Bureau of the Census 5-year American Community Survey data for Block Groups within 0.25-mile of each corridor were obtained and a sum of the total minority population within the block groups was determined. Minority populations, for purposes of this analysis, are defined as non-white racial designation, Hispanic origin or low income. Findings are shown in Table 20.

Table 20 - E-7 – Existing Environmental Justice Populations

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-7: Environmental Justice populations	27,383	18,902	18,902	12,142	40,274	31,793	25,033	39,285	35,538	35,539	28,778	31,605
	Environmental justice population potentially affected by corridor											
	◑	●	●	●	○	◑	◑	○	○	○	◑	◑

Note: Natural breaks are high=12,142 - 18,902, middle=25,033 - 31,793, low=35,548 - 40,274

E-8 – Greenfield Areas – Emphasis on Existing Transportation Corridors

Aerial photographs were used to delineate large portions of undeveloped lands within each corridor. Any portion of the corridor which was centered on an existing roadway or other existing linear infrastructure alignment such as a railroad or utility corridor was excluded to emphasize impact on undeveloped areas. The higher the number, the lower the rating of the corridor. The total acreage of undeveloped portions of each corridor alternative were tallied and included in Table 21. Each alternative was then evaluated qualitatively against the other alternatives and a score assigned.

Table 21 - E-8 – Greenfield Areas – Emphasis on Existing Transportation Corridors

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion E-8: Greenfield sites – Existing corridors	2,427	2,457	3,135	3,320	2,304	2,816	2,785	3,004	2,235	3,906	2,710	2,069
	Acreage of greenfield area potentially affected by corridor											
	●	●	◑	◑	●	◑	◑	◑	●	○	◑	●

Note: Natural breaks are high=2,069 - 2,457, middle=2,710 - 3,320, low=3,906

3.5.6 Category IF – Implementation Feasibility

This category combines the factors that determine the physical realities and complexities of building a Sonoran Corridor. Among the considerations are the length of the corridor, the number of structures (i.e., bridges, culverts, walls, etc.), earthwork needed, property acquisition or licensing costs and risks, etc. Each corridor accounts for several factors that allow them to be rated and compared in the screening process.

IF-1 – Construction Elements

The Construction Elements criterion indicates the potential difficulties associated with major construction. The easier or more feasible the construction, the less likely an alternative will face costly and unanticipated challenges to implementation.

Each corridor alternative was evaluated for implementation feasibility by making a high level qualitative assessment of the relative costs of developing and constructing the complete corridor alternative and the complexities of completing the full system construction effort. For this measure, implementation feasibility for each complete alternative alignment was classified as either ○, ◐, and ●, based on the anticipated requirements of the construction effort and an evaluation of any complicating factors. Lower numbers were rated higher. The number associated with the rating is a quantitative aggregate measure of various factors such as corridor length, number and complexity of structure needed,

earthwork quantities, right-of-way elements, etc. Table 22 shows the ratings of the corridors under this criterion.

Table 22 - IF-1 – Construction Elements

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion IF-1: Construction Elements	420	424	639	479	827	804	895	456	587	495	604	1425
	Comparative qualitative measure of construction effort based on length, structures, earthwork, etc.											
	●	●	●	●	◑	◑	◑	●	●	●	●	○

Note: Natural breaks are high=420 - 639, middle=804 - 895, low=1,425

IF-2 – Property Acquisition/Licensing/Access

This measure is intended to gauge added difficulties due to factors such as property acquisition, public support/opposition to construction, and the level of negotiations anticipated with independent entities through which the proposed corridor would run. It is a quantitative and qualitative assessment of the effects of the path of the corridor that must be accounted for in securing the land to building it. For example, building part of a corridor on the TON San Xavier District allottee lands potentially would require a more complex process and series of approvals compared to purchasing property from a private property owner who can sell land directly or for which other avenues of negotiation could be available. Likewise, access to lands under the control of the ASLD requires a different process subject to several decisions about timing and cost, as required by the State Constitution.

Similarly, the question of maintaining access to properties and the potential cost of reestablishing access at locations that would be impacted by the corridor is considered qualitatively in this criterion. For example, if the corridor were located on Pima Mine Road, access to residential development south of Pima Mine Road near I-19 or access to the Desert Diamond Casino would necessitate substantial additional improvements not directly related to the construction of the Sonoran Corridor itself. Similar issues arise at the Houghton Road connection point near I-10.

Table 23 shows the consideration of property access as a factor in comparing the twelve Optimized Corridors.

Table 23 - IF-2 – Property Access Considerations

Criterion	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
Criterion IF-2: Property Access Considerations	3.604	3.161	3.547	3.212	3.903	3.511	3.566	3.799	3.714	3.75	3.75	3.58
	Quantitative measure of property access challenges for construction of corridor											
	◑	○	◑	○	●	◑	◑	●	●	●	●	◑

Note: Natural breaks are high=3.714 - 3.903, middle=3.511 - 3.604, low=3.161 - 3.212

3.6 SUMMARY OF SCREENING RESULTS

Based on the information presented in Section 3.5, the ratings and rankings of the criteria and categories for each corridor alternative have been complied into single tables using adopted and enhanced land use data in Table 24 and Table 25, respectively.

Table 24 - Summary of Category Results from Section 3.5 with Adopted Land Use Data

Category	Criteria	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Criterion G-1: Compatibility with Local Plans	●	●	●	●	◑	◑	◑	●	●	●	●	○
	Criterion G-2: Public and Agency Support	●	◑	◑	◑	○	○	○	◑	◑	◑	◑	○
	Criterion G-3: Compatibility of Corridor with Underlying Property Ownership	○	○	○	◑	○	○	◑	◑	◑	◑	◑	●
	Criterion G-4: Employment Served	●	◑	◑	○	●	◑	○	●	◑	◑	○	○
	Category Score	◕	◑	◑	◑	◑	◔	◔	◕	◕	◕	◑	◔
M – Mobility	Criterion M-1: Travel Demand: Daily passenger trips	●	●	●	○	●	●	◑	●	●	●	◑	○
	Criterion M -2: Travel Demand – Daily truck trips	◑	◑	◑	○	●	◑	○	●	◑	◑	○	○
	Criterion M-3: Reduction of truck volume on Interstate facilities	○	○	○	○	○	○	○	○	○	○	○	○
	Criterion M-4: Travel Time	○	○	○	◑	◑	◑	●	○	○	○	◑	●
	Criterion M-5: Congestion Reduction	○	○	◑	○	○	○	○	●	◑	●	◑	◑
	Criterion M-6: Improved access to TUS	◑	○	◑	○	◑	○	○	●	○	●	○	○
	Criterion M-7: Multimodal Connectivity	◑	○	◑	○	◑	○	○	◑	○	○	○	○
	Category Score	◔	◔	◑	○	◑	◔	◔	◕	◔	◑	◔	◔
SL – System Linkages	Criterion SL-1: Contribution to network and access	●	◑	●	◑	●	●	◑	●	◑	●	◑	○
	Category Score	●	◑	●	◑	●	◑	◑	●	◑	●	◑	○
EB - Economic Benefits	Criterion EB- 1: Access to jobs and revenue potential	●	◑	◑	○	●	◑	○	●	●	●	○	○
	Category Score	●	◑	◑	○	●	◑	○	●	●	●	○	○
E – Environmental	Criterion E-1: Sensitive noise receptors	●	●	●	●	○	○	○	●	◑	◑	◑	○
	Criterion E-2: residences potentially affected	●	●	●	●	○	○	○	●	◑	●	◑	○
	Criterion E-3: historic/cultural/ archaeological resources	○	○	◑	○	◑	●	◑	●	●	●	●	●
	Criterion E-4: wetlands/floodplains/ rivers/ washes/arroyos	●	●	◑	●	●	◑	◑	○	○	○	○	○
	Criterion E-5: wildlife corridors	◑	◑	◑	●	◑	◑	◑	○	○	○	○	○
	Criterion E-6: biological resources which may be affected	●	◑	◑	○	◑	○	○	○	○	○	○	○
	Criterion E-7: existing environmental justice populations	◑	●	●	●	○	◑	◑	○	○	○	◑	◑
	Criterion E-8: Greenfield sites – emphasis on use of existing corridors	●	●	◑	◑	●	◑	◑	◑	●	○	◑	●
	Category Score	◕	◕	◕	◕	◑	◑	◔	◑	◑	◔	◑	◔
IF - Implementation Feasibility	Criterion IF-1: Construction Elements	●	●	●	●	◑	◑	◑	●	●	●	●	○
	Criterion IF-2: Property Acquisition/Access Considerations	◑	○	◑	○	●	◑	◑	●	●	●	●	◑
	Category Score	◕	◑	◕	◑	◕	◑	◑	●	●	●	●	◔

Table 25 - Summary of Category Results from Section 3.5 with Enhanced Land Use Data

Category	Criteria	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Criterion G-1: Compatibility with Local Plans	●	●	●	●	◑	◑	◑	●	●	●	●	○
	Criterion G-2: Public and Agency Support	●	◑	◑	◑	○	○	○	◑	◑	◑	◑	○
	Criterion G-3: Compatibility of Corridor with Underlying Property Ownership	○	○	○	◑	○	○	◑	◑	◑	◑	◑	●
	Criterion G-4: Employment Served	●	◑	◑	○	●	◑	○	●	◑	◑	○	○
	Category Score	◕	◑	◑	◑	◑	◔	◔	◕	◕	◕	◑	◔
M – Mobility	Criterion M-1: Travel Demand: Daily vehicle trips	●	◑	●	●	●	◑	○	●	◑	◑	○	○
	Criterion M-2: Travel Demand – Daily truck trips	◑	○	◑	○	●	○	○	◑	○	◑	○	○
	Criterion M-3: Reduction of truck volume on Interstate facilities	○	○	○	○	○	○	○	○	○	○	○	○
	Criterion M-4: Travel Time	○	◑	○	◑	○	◑	●	○	○	○	◑	●
	Criterion M-5: Congestion Reduction	○	○	◑	○	○	○	○	●	◑	●	○	◑
	Criterion M-6: Improved access to TUS	◑	○	◑	○	◑	○	○	●	○	◑	○	○
	Criterion M-7: Multimodal Connectivity	◑	○	◑	○	◑	○	○	◑	○	○	○	○
	Category Score	◔	◔	◑	◔	◑	◔	◔	◑	◔	◔	○	◔
SL – System Linkages	Criterion SL-1: Contribution to network and access	●	◑	●	◑	●	●	◑	●	◑	●	◑	○
	Category Score	●	◑	●	◑	●	●	◑	●	◑	●	◑	○
EB - Economic Benefits	Criterion EB-1: Access to jobs and revenue potential	●	◑	◑	○	●	◑	○	●	●	●	○	○
	Category Score	●	◑	◑	○	●	◑	○	●	●	●	○	○
E – Environmental	Criterion E-1: Sensitive noise receptors	●	●	●	●	○	○	○	●	◑	◑	◑	○
	Criterion E-2: residences potentially affected	●	●	●	●	○	○	○	●	◑	●	◑	○
	Criterion E-3: historic/cultural/archaeological resources	○	○	◑	○	◑	●	◑	●	●	●	●	●
	Criterion E-4: wetlands/floodplains/rivers/washes/arroyos	●	●	◑	●	●	◑	◑	○	○	○	○	○
	Criterion E-5: wildlife corridors	◑	◑	◑	●	◑	◑	◑	○	○	○	○	○
	Criterion E-6: biological resources which may be affected	●	◑	◑	○	◑	○	○	○	○	○	○	○
	Criterion E-7: existing environmental justice populations	◑	●	●	●	○	◑	◑	○	○	○	◑	◑
	Criterion E-8: Greenfield sites – emphasis on use of existing corridors	●	●	◑	◑	●	◑	◑	◑	●	○	◑	●
	Category Score	◕	◕	◕	◕	◑	◑	◔	◑	◑	◔	◑	◔
IF - Implementation Feasibility	Criterion IF-1: Construction Elements	●	●	●	●	◑	◑	◑	●	●	●	●	○
	Criterion IF-2: Property Acquisition/Access Considerations	◑	○	◑	○	●	◑	◑	●	●	●	●	◑
	Category Score	◕	◑	◕	◑	◕	◑	◑	●	●	●	●	◔

3.7 Summary Tables of Corridor Evaluation

Table 26 - Summary of Screening Results for Adopted Data

Category		Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Category Score	◕	◑	◑	◑	◑	◔	◔	◕	◕	◕	◑	◔
M – Mobility	Category Score	◔	◔	◑	○	◑	◔	◔	◕	◔	◑	◔	◔
SL – System Linkages	Category Score	●	◑	●	◑	●	◑	◑	●	◑	●	◑	○
EB - Economic Benefits	Category Score	●	◑	◑	○	●	◑	○	●	●	●	○	○
E – Environmental	Category Score	◕	◕	◕	◕	◑	◑	◔	◑	◑	◔	◑	◔
IF - Implementation Feasibility	Category Score	◕	◑	◕	◑	◕	◑	◑	●	●	●	●	◔
Total Corridor Rating	Total Score	●	○	◑	○	◑	○	○	●	◑	●	○	○

Table 27 - Summary of Screening Results for Enhanced Data

Category		Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Category Score	◕	◑	◑	◑	◑	◔	◔	◕	◕	◕	◑	◔
M – Mobility	Category Score	◔	◔	◑	◔	◑	◔	◔	◑	◔	◔	○	◔
SL – System Linkages	Category Score	●	◑	●	◑	●	●	◑	●	◑	●	◑	○
EB - Economic Benefits	Category Score	●	◑	◑	○	●	◑	○	●	●	●	○	○
E – Environmental	Category Score	◕	◕	◕	◕	◑	◑	◔	◑	◑	◔	◑	◔
IF - Implementation Feasibility	Category Score	◕	◑	◕	◑	◕	◑	◑	●	●	●	●	◔
Total Corridor Rating	Total Score	●	○	◑	○	●	○	○	●	◑	●	○	○

3.8 Recommended Reasonable Range of Corridor Alternatives for the Tier 1 EIS

The results of the analysis from the screening criteria in Table 1 show that some corridors clearly perform better than others. The highest performing corridor alternatives are recommended for the analysis in the Draft Tier 1 EIS. Other corridors may perform well under the screening criteria, but there are difficulties that complicate their feasibility too significantly to be carried further into the analysis. An important conclusion is that the alternatives located in the northerly portion of the study area are the ones that best serve the Need and Purpose and rate the highest among the alternatives studied. This is due to the presence of numerous existing and future activities in the area.

In addition, a complicating factor for any of the corridors was their connection to I-10 or I-19. Most locations that did not allow for a reasonable connection at either end were eliminated during the Refinement process, but others were carried because they offered the potential to overcome the challenges discussed in Section 2.4. In general, connection points that did not have development on the study area side of the Interstate highway could more easily accommodate a system interchange because there are few obstacles to the connection of the Sonoran Corridor. The connection points carried forward also meet the separation requirements of ADOT and can maintain reasonable local access if it is already in place.

The recommended Reasonable Range of Corridor Alternatives to be carried forward into the draft Tier 1 EIS is shown in Figure 29 includes the following:

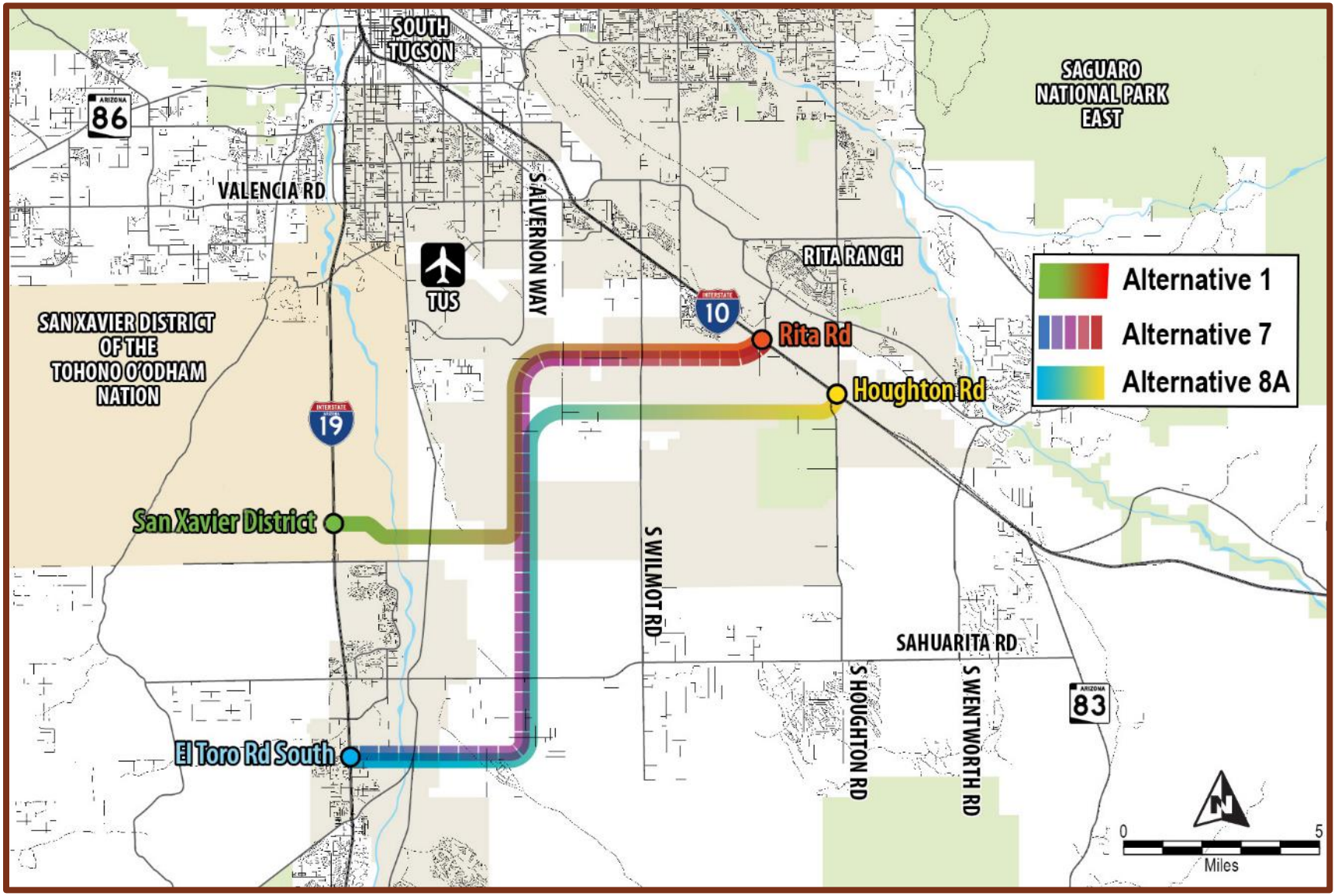
- Alternative 1: SXD Compromise location (based on the SXD North connection point) to Rita Road
- Alternative 7: El Toro South to Rita Road
- Alternative 8A: El Toro South to Houghton Road via Alvernon Way

The analyses completed made clear that northerly corridors perform better than southerly corridors because they provide better access to critical activities in and near the study area, improve LOS for existing roadways in the study area, shorten commercial travel for trucking and goods movement, provide better access to TUS and avoid many of the critical environmental issues of the other alternatives. A north-south segment following an Alvernon Way alignment performs better than a Wilmot Road alignment because it provides more direct access to activity centers in and near the study area and the environmental effects faced along Wilmot Road. That leaves all recommended alternatives following an Alvernon Way alignment for the north-south portion of the project.

The connections to I-19 are at El Toro South and the SXD Compromise (SXD North) connection points. On I-10, they are at Rita Road and Houghton Road. All corridor alternatives located on the SXD will require the approval of the affected allottees, the SXD, the TON, and the BIA is an important thing to note.

The corridor linking the Pima Mine Road and Rita Road Interstate connection points (Alternative 4) also performed well, but upon closer assessment, it was clear that local access limitations of Pima Mine Road would make it difficult to function as a new corridor and maintain critical access to existing facilities and residences.

Figure 29 – Recommended Reasonable Range of Alternatives



3.8.1 Summary of Corridors Recommended for Further Study

The description of the three recommended Reasonable Range of Corridor Alternatives follows. Each corridor is identified by its alternative number and its connection points at I-19 and I-10:

Alternative 1: SXD to Rita Road – This corridor alternative is recommended to be studied further because it effectively meets the Need and Purpose at a high level. It is closest to many activity centers within or adjacent to the study area and is relatively short compared to the other alternatives which helps in the movement of goods between Southern Arizona and points east. More broadly, this alternative improves the LOS for all vehicles on existing roadways in the study area. Alternative 1 also provides more direct access to TUS and avoids most major environmental impacts. A main challenge with this corridor is its location within the SXD-TON where there are many known sensitive cultural resource locations that must be evaluated which could have the potential of limiting options for the corridor now and in Tier 2 studies, if selected.

Alternative 7: El Toro South to Rita Road – This corridor alternative is recommended to be studied further because it effectively meets the Need and Purpose. By traveling farther north along the Alvernon Way alignment and using Old Vail Highway as the access to I-10 where it connects at Rita Road, it improves service to the primary growth areas and the airport, which is evident in the higher travel forecast numbers and improved LOS on existing study area roadways, including truck traffic which would benefit from a shorter east-west connection between I-19 and I-10. In addition to being close to many activity centers in or adjacent to the study area like Alternative 1, and it serves the growing Town of Sahuarita by opening access to future planned areas and avoids major environmentally sensitivity resources. The interchange at Rita Road requires local access be preserved, but all existing local access needs are to the north and east of I-10. There are no significant obstacles to building a system interchange to the southwest of I-10 and a modified system interchange would accommodate travel for the freeways as well as the local area. Also, El Toro South was identified as a favorable connection point location because it has the potential of addressing the Town of Sahuarita's desire for a corridor connection within the Town limits and was more compatible with Interstate interchange separation requirements than the El Toro Road location originally proposed.

Alternative 8A: El Toro South to Houghton Road (Alvernon Way option) – This is a modified version of Alternative 8 that resulted from the September 26, 2018 public meeting. The difference is the north-south segment that follows a route along the Alvernon Way alignment. Although there is currently no paved roadway for much of the Alvernon Way segment, which requires some greenfield development, this corridor avoids many of the drainage course environmental challenges of the Wilmot Road corridor. This corridor alternative is recommended for further evaluation because it effectively meets the Need and Purpose. It improves access to and services TUS and other major activities located in the northerly reaches of the study area and offers an efficient commercial traffic east-west alternative that also helps to reduce LOS on existing study area roadway. Like Alternative 7, it also maintains the benefits of service to the Town of Sahuarita and future growth areas. The I-10 system interchange requires considerations for the design of the system interchange at Houghton Road, but as noted, can be resolved with modifications to the existing roadway network.

3.8.2 Summary of Corridors Eliminated from Further Study

The following is a discussion of each of the remaining corridors and the rationale behind their elimination. Each corridor is identified by its alternative number and its connection points at I-19 and I-10:

Alternative 2: SXD to Houghton Road (Wilmot option) – Although this corridor is nearer to the northerly portion of the study area where many of the activity centers are located and performs better than corridors farther south, it did not rise to the level of the recommended corridors. Corridors with a north-south segment along Alvernon Way were favored over those corridors with a Wilmot Road alignment because they do not have potential for more pronounced environmental effects.

Alternative 2A: SXD to Houghton Road (Alvernon option) – As an alternative to the Houghton Road corridor described just above, placing the north-south segment along the Alvernon Way route avoids many of the drainage course environmental challenges of the Wilmot Road corridor and improves access and services TUS and other major activities located in the northerly reaches of the study area. While this alternative improves performance over Alternative 2 under the screening criteria, it does not perform at the level of the three recommended alternatives because it does not provide the service to the growth areas and system linkages offered by the recommended alternatives.

Alternative 3: SXD to Fairgrounds – Geographically, this was an attractive corridor alternative in that it offers a relatively direct connection between the two Interstates. However, because of its southerly location, it does not effectively provide access to activity centers in or adjacent to the study area when compared to corridors being carried forward for further evaluation. Also, the corridor has the potential to cross many sensitive features such as archaeological sites, habitat areas and drainage courses in the alluvial fans east of the Santa Cruz River that host important cultural or biological resources.

Alternative 4: Pima Mine Road to Rita Road – Based on the analysis completed, this alternative meets the Need and Purpose effectively and performed well. More broadly, the problem with corridor alternatives that connect at Pima Mine Road on I-19 is it that they all have the potential to require relocation of a large number of residences compared to other corridor alternatives, as well as local access challenges that would have to be addressed. While access to the Asarco Mission Mine could be maintained even with the introduction of a system interchange on I-19, access to the residential areas south of Pima Mine Road would be eliminated and would need to be reestablished with a grade-separated system of roadways. The access to the existing Desert Diamond Casino would also need to be completely reconfigured to comply with interstate design standards and afford a functional entry to the facility.

Alternative 5: Pima Mine Road to Houghton Road – This alternative has similar deficiencies to those described for the Alternative 4. It performs adequately because the Houghton Road connection to I-10 is reasonably close to activity centers, but the many local access and environmental issues still challenge its viability compared to other alternatives.

Alternative 6: Pima Mine Road to Fairgrounds – This alternative suffers from the same issues of Alternatives 4 and 5. Furthermore, its connection point at the Fairgrounds location on I-10 pulls it further from many of the activity centers in or adjacent to the study area to the north.

Alternative 8: El Toro South to Houghton Road (Wilmot option) – The original link between El Toro South and Houghton Road began at the southerly end in the Town of Sahuarita and relied on the existing Wilmot Road alignment as a means of traveling the north-south distance in the proposed corridor connecting I-19 and I-10. Wilmot is an existing road and, generally, not heavily developed allowing for a wider corridor roadway to be constructed with relative ease. This corridor alternative performs well, but was not recommended for further evaluation because those corridors having a north-south alignment along Alvernon Way were more favorable in comparison with corridors traveling the Wilmot segment. Alternatives 1, 7, and 8A all have a north-south alignment along Alvernon Way.

Alternative 9: El Toro South to Fairgrounds – The Fairgrounds connection at I-10 is devoid of obstacles and meets the necessary requirements of Interstate design, but like Alternative 3, it did not perform well. It is further from existing and planned activities that could be served by a future corridor in comparison with alternatives being considered for further evaluation.

Alternative 10: El Toro South to Wentworth Road – This is the southernmost corridor in the study area. It performs poorly compared to all other alternatives in its inability to accommodate future travel demand and afford better access to the existing and planned activities to the north. Also, its southerly location exposes it to both more housing (existing and proposed) and substantially more sensitive locations related to washes and drainage features in the area.

3.9 Public Outreach - Reasonable Range of Alternatives

A second public meeting was held on March 7, 2019 to review the results of the screening process and the recommendation for the Reasonable Range of Alternatives to be studied in the Tier 1 EIS. Over 115 comments were received at the public meeting and through emails and comments forms between March 7th and April 22nd.

3.9.1 Summary of comments received at Second Public Meeting on Alternatives

There were some major categories of response among the comments received from the public during the public meeting and the comment period that followed through April 22nd summarized as follows:

Prefer 'No-Build" Option

- This road is unnecessary
- Will bring highway noise and negatively affect property values
- Citizens voted against this in 2015
- Damage to neighborhoods and wildlife
- Environmentally bad
- Waste of tax dollars. Fix existing freeways
- Negative effect on air quality
- We have enough roads
- Threatens quiet rural setting

- Not needed for airport access or Raytheon workers
- Loss of property for residents
- Have enough roads
- Existing roads not being maintained

Prefer Alternative Corridor 1

- Would not impact as many property owners
- Most direct route, closer to the airport
- Shorter, less costly route
- Reduces the negative effect on quality of life
- Most logical and economical option
- Goes through less private property than other options still considered
- It would have the least effect on traffic during the build
- Doesn't significantly affect Sahuarita neighborhoods
- Alternative 1 seems like the best best option, with option 7 being worst
- San Xavier District is best option because of open land. Reduces cost and construction time
- Less populated corridor

Prefer Alternative 7

- Starts as far south on I-19 as possible
- Avoids Houghton Road

Oppose Alternative 7

- Would degrade property values
- Too many people will lose their homes
- Alt 7 makes no sense! Why go through residential!?
- Alternative 1 seems like the best best option, with option 7 being worst

Prefer Alternative 8A

- Best remaining alternative to relieve I-10 traffic on southeast side of Tucson
- Avoids metro Tucson and allows for future growth
- Could be the southern portion of a loop around Tucson
- Would attract additional development
- Would improve Houghton Road
- Doesn't add to congestion at Rita Road

Oppose Alternative 8A

- Alternative 8A as this would run straight though our neighborhood and ruin our peaceful life without the traffic.
- Goes through a fully occupied neighborhood
- Families moved to the El Toro Road area for a better life

Hybrid or Alternative Options

- Houghton with connection along Sahuarita Road
- Houghton to San Xavier
- Go farther east to State Route 83
- Use funds to build a crosstown Tucson freeway
- Go diagonally from Houghton to El Toro Road
- Use funds to fix Tucson streets and bridges
- Don't build near prison complexes
- Build a loop around Tucson
- Use Sahuarita Road to avoid impacts to homes

General Comments/Questions

- Did the Town of Sahuarita review the proposal?
- Name the corridor the "Sonorridor"

3.9.2 Incorporating Agency and Public Input

All the alternatives within the Sonoran Corridor study area proposed by the public have been evaluated in the CSR process and will not be addressed beyond the Reasonable Range of Corridor Alternatives. However, the comments related to how communities could be affected by a new corridor suggest ensuring a level of flexibility in how the final corridor is defined in Tier 2 studies going forward. While the 2000-foot width of the alternatives allows for some adaptation of the refined roadway alignment, in some cases, the impact on residential communities warrants additional flexibility if an alignment can be routed to minimize property impacts without incurring more severe environmental damage.

4 FINAL CSR AND NEXT STEPS

4.1 FINAL CSR

Following review of this draft document, the Final CSR has been updated to address changes resulting from comments of recommendations from the public or agencies as noted in Section 3.8, above. The Final CSR is posted on the ADOT study website at https://www.azdot.gov/planning/transportation-studies/sonoran-corridor-tier-1-environmental-impact-statement/documents.

4.2 DRAFT TIER 1 EIS WITH A PREFERRED ALTERNATIVE

Once the Reasonable Range of Corridors Alternatives has been identified, the assessment of the social, economic, and environmental impacts of those corridors alternatives will be disclosed in the Draft Tier 1 EIS document. The Draft Tier 1 EIS will analyze the environmental impacts of the remaining corridors, in comparison with the No-Build Alternative, at a higher level of detail and identify a preferred alternative.

The process for completing the Draft Tier 1 EIS includes preparation of an Administrative Draft EIS to be reviewed by FHWA, ADOT, and Cooperating agencies. Once the Administrative Draft EIS is approved by FHWA for public review, the Draft Tier 1 EIS will be filed with the US Environmental Protection Agency (EPA) and a Notice of Availability (NOA) will be published in the Federal Register. This will open the Draft Tier 1 EIS to Participating agencies and the public for review and comment for a minimum of 45 calendar days.

4.3 CONSIDERATIONS FOR TIER 1 EIS

4.3.1 Continuing Technical Analysis

Upon completion of the CSR, several ongoing issues are noted for further investigation or consideration during the more detailed Tier 1 EIS analysis, described as follows and organized around the CSR screening criteria.

4.3.1.1 Population and Employment Growth

The Tier 1 EIS will provide a more detailed assessment of existing and planned land uses, and the compatibility of the alternatives under consideration with local and regional planning. The PAG travel forecasting model utilized for the traffic analysis reflects demographic and land use projections as of 2015. The Tier 1 EIS will investigate the possible impacts associated with changing growth patterns based on the enhanced employment dataset used for comparison in the CSR. This could affect the evaluation of indirect and cumulative impacts in the Tier 1 EIS that could result from the proposed project.

4.3.1.2 Congestion and Travel Times Related to Truck Travel

Analysis of the effect of a future Sonoran Corridor on truck travel through the study area is an important consideration in the Need and Purpose for the project. This aspect of the environmental

study requires additional analysis to expand upon the work completed to date in the CSR. An alternative forecasting tool will be applied to compare and better assess truck activity and its effect on congestion in and around the study area.

4.3.1.3 Direct Impacts on Sensitive Environmental Resources

The environmental component of the alternatives analysis was focused on the potential for direct impacts (i.e., through anticipated right-of-way requirements) on geographic-specific sensitive resources. The Tier 1 EIS will further examine potential environmental impacts that could result from the construction and operation of the proposed project. The EIS will address a broader range of natural and human resources, as well as the potential for indirect and cumulative impacts.

4.3.1.4 Consideration of Emerging Technologies

As indicated in prior studies, the intent of the Sonoran Corridor is to open a connection between I-19 and I-10 south of TUS. Although it is unknown when the corridor would be constructed, or the technological trends that will prevail at that time, contingencies and adaptiveness for inevitable travel changes should be considered where possible. Emerging technology trends, such as autonomous/connected vehicles and truck platooning or clustering might impact traffic volumes, travel times, average speeds, and safety – which could impact the corridor footprint or defer more imminent capacity improvements. Over time, statewide and regional travel demand models would need to be recalibrated to account for these travel trends.

4.3.2 Draft Tier 1 EIS Public Comment Period and Public Hearings

In conjunction with the release of the Draft Tier 1 EIS, there will be a minimum 45-day public review comment period. Within the first three weeks of the comment period, public hearings will be held at which interested parties will be encouraged to voice their comments, concerns and suggestions to a hearing officer regarding the information contained in the EIS. The information collected from the public hearings and the comment period will be addressed, as appropriate, in the preparation of the Final Tier 1 EIS and included as an appendix in that document.

4.4 COMBINED FINAL TIER 1 EIS/ROD

As of now, FHWA is proposing to combine the Final Tier 1 EIS with the Record of Decision (ROD). Section 1319(b) of the Moving Ahead for Progress in the 21st Century Act, or MAP-21, directs FHWA to the maximum extent practicable to combine the Final EIS and ROD into a single document unless:

- The Final EIS makes substantial changes to the proposed action that are relevant to environmental or safety concerns; or
- There are significant new circumstances or information relevant to environmental concerns that bear on the proposed action or the impacts of the proposed action.

The applicable requirements for both a Final EIS and ROD must be met for issuance of a combined Final EIS/ROD. Also, there should not be any unresolved issues and all substantial comments on the Draft Tier 1 EIS must be addressed. Once FHWA feels that all issues and substantial comments have been addressed, a legal sufficiency review of the combined Tier 1 EIS/ROD document will occur. After legal

sufficiency is obtained, FHWA will issue a combined FEIS/ROD that will be filed with the EPA. Subsequently, a NOA will be placed in the Federal Register concluding the NEPA process.

In conclusion, FHWA and ADOT intend to do the following in the combined Final Tier 1 EIS/ROD document:

- Identify a Selected Alternative (Build or No Build);
- Present the basis for the decision;
- Describe the corridor alternatives considered; and
- Provide strategies to avoid, minimize, and mitigate for environmental impacts.

APPENDIX A – PUBLIC COMMENTS AND RESPONSES

The comments below represent either individual comments or groupings of similar comments. Each comment and response is followed by a set of questions to determine how the comment pertains to the study, whether or not the comment requires the scope of the study to be modified, and if so, how.

Response to Public Comments

Received at or as a result of the September 26, 2018 meeting

Comment 1

I am very concerned about the sound walls along the freeway through Green Valley.	
Response: A corridor alternative, if selected, is not likely to be in the Green Valley area. Traffic noise impact of a project is modeled based on surrounding land uses, proximity of facility to sensitive receptors, traffic counts, and vehicle mix. Consideration of noise mitigation would depend on several factors: 1) modeled impacts exceeding a determined threshold, 2) ability of a sound wall to reduce noise impacts on affected receptors (residences in this case) by a specified amount; 3) cost of a sound wall per benefited receptor not exceeding a determined threshold; and 4) the affected community's preference regarding building a sound wall.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 2 (5 comments)

• The corridors I favor the most are the ones that connect to I-10 as far to the east as possible. • My preferred corridor is Alt 1, second choice would be Alt 7. • Alt 1 will be a good route if needed to serve the NW areas of Rita Ranch and I-10. • I choose Alt 1 and Alt 4 or Alt 7. • All are feasible but depending on public allowance. Hopefully the best will be selected.	
Response: Thank you for your comments. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study in the Tier 1 EIS.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A It will be part of the development of the Tier 1 EIS.

Comment 3

I don't like any of them. The shortest distance between two points is a straight line.	
Response: The corridor alternatives have been optimized along existing roadways or survey section lines, to recognize the eventuality of future development in the area and the need for a functional transportation network anchored by a Sonoran Corridor. The No-Build Alternative will also be considered as part of this study.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Corridor alternatives were developed by a multi-disciplined team of planners and engineers with public input.	How account for comment throughout the study process? N/A

Comment 4

Alt 3 seems to avoid the greatest amount of development, and would be my preference at this stage.	
Response: Thank you for your comment. The corridor alternatives were developed taking into consideration existing features and facilities to be avoided and elements that should be served as well as possible. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 5

El Toro – Sahuarita Road – Wentworth. Duval Mine Road – Sahuarita Road	
Response: Thank you for your comment. Duval Mine Road was evaluated early on as a possible terminus at I-19 but was not included in the corridor alternatives to be further analyzes because of the severe impacts it would have on the community at and near the I-19 traffic interchange. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Reason given for not considering Duval Mine Road corridor alternative	How account for comment throughout the study process? N/A

Comment 6 (3 comments)

• Pima Mine – Fairground exit is best. • Prefer Alt 1. • Prefer Alt 10.
Response: Thank you for your comments. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.

Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Received after September 26 meeting

Comment 7

Doesn't support the effort because public was not allowed to ask questions during presentation.	
Response: The meeting was planned and advertised as an informational presentation preceded and followed by opportunities to interact with the project team, including asking questions.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why or why not modify scope? Comment is not transportation-related	How account for comment throughout the study process? Consider structure of meetings to ensure public understands the availability of project staff to answer questions.

Comment 8

Consider how options along Sahuarita Road or crossing it will negatively impact rural homestead area. Do not choose any of the candidates that include Sahuarita Road.	
Response: Thank you for your comment. Corridor Alternatives 1 through 9 were developed through methods and resources available to the multi-disciplined study team and agreed upon by project stakeholders. Corridor Alternative 10, along and across Sahuarita Road, was presented along with the other alternatives in response to public input. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 9

El Toro to the Fairgrounds is the best route.	
Response: Thank you for your comment. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 10

I just want to say that the ones [alternatives] that are L-shaped don't make much sense for a freeway. People want to go the easiest, quickest route from Point A to Point B, otherwise it will deter people and truckers from driving on it.	
Response: The corridor alternatives shown are not final freeway alignments, but represent 2,000-foot-wide corridors within which a future facility could be designed. They align with existing roadways	

and/or survey section lines to recognize the eventuality of future development and the need for a functional transportation network anchored by a Sonoran Corridor, but allow flexibility in final design.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why not modify scope? Response explains rationale behind optimized corridors	How account for comment throughout the study process? N/A

Comment 11

Is there really a need for a different route…Please rethink.	
Response: The need for additional transportation infrastructure within the study area was established and documented as part of the study. The problems and issues are: • Projected population and employment in the study area are predicted to increase travel demand within a transportation network that needs expansion and improvement. • Lack of a direct connection between Interstate 19 (I 19) and Interstate 10 (I-10) and activity centers including the Tucson International Airport (TUS) and employers to the south of TUS. • Much of the existing transportation network within the study area is expected to operate at an unacceptable level of service (LOS) by 2045.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 12

I am 100 percent in favor of this!! Connect to I-10 at Houghton or Wentworth. Connect to I-19 in the Sahuarita area.	
Response: Thank you for your comment. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 13

Consider the possibility of a loop highway system.	
Response: Thank you for your comment. The need for and purpose of the proposed project is to provide a transportation link between I-10 and I-19 south of TUS. A loop system, depending on its configuration, would introduce a third terminus. It could contribute to regional connectivity and link additional activity centers, and might be considered as part of this or a future related project.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Need and Purpose are satisfied by connecting two logical termini, one each on I-10 and I-19.	How account for comment throughout the study process? N/A

Comment 14

Where exactly is the location of the proposed corridor?	
Response: A specific corridor alternative has not been selected yet. The corridor alternatives have all been developed within an established study area bounded by I-19 on the west, I-10 on the north and east (along with State Route 83), and extending approximately two miles south of Sahuarita Road. Please refer to the study area map provided on the project website through the following link: https://azdot.gov/docs/default-source/transportation-studies/soncor-location-map-091718.pdf?sfvrsn=2	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 15

Optimal route for economic development begins at I-19 north of Pima Mine Road and extends east to Wilmot Road.	
Response: Thank you for your comment. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 16

Considering moving to Green Valley and would support a proposed corridor linking I-10 to I-19.	
Response: Thank you for your comment.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 17

Build a parkway connecting I-19 and I-10 south of Pima Mine Road. Widen Old Vail Road.	
Response: Thank you for your comment. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes/No	Modify study scope to include comment context? No
Why not modify scope? Widening Old Vail Road would not provide sufficient capacity to satisfy the Need and Purpose	How account for comment throughout the study process? N/A

Comment 18

What will be the impact on residential development of Quail Creek? Will this interfere with Robson plans to add 5,000 more homes to the area?	
Response: None of the corridor alternatives developed would directly impact proposed development of Quail Creek. The proposed El Toro South terminus, the southernmost of the study termini on I 19, is located north of the Quail Creek area.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Area in question is outside the study area	How account for comment throughout the study process? N/A

Comment 19

This plan will help ease traffic flows and decrease congestion near town.	
Response: Thank you for your comment.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 20

Fix existing roads first. Stop wasting money on decorated traffic interchanges.	
Response: This comment does not appear to pertain to the Sonoran Corridor study.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Comment is not relevant to the identification of a Sonoran Corridor	How account for comment throughout the study process? N/A

Comment 21

I believe the entire area could benefit with additional small freeways.	
Response: Thank you for your comment.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 22

Complete I-10 construction from Tucson to Phoenix first.	
Response: This comment does not appear to pertain to the Sonoran Corridor study.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Comment is not relevant to placement of a Sonoran Corridor	How account for comment throughout the study process? N/A

Comment 23

Build it, FAST.	
Response: Thank you for your comment.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? Comment is not relevant to placement of a Sonoran Corridor.	How account for comment throughout the study process? N/A

Comment 24

Provide access-controlled ramps from Sonoran Corridor to TIA terminal and parking.	
Response: One of the criteria for the proposed corridor is how it would improve service to the Tucson International Airport. All corridors will be evaluated in terms of their ability to improve access to the airport.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 25

I am concerned [that this] effort is to enable illegal immigration. Do we need the highway if we build the wall?	
Response: The need for additional transportation infrastructure within the study area was established and documented as part of the study. The problems and issues are: • Projected population and employment in the study area are predicted to increase travel demand within a transportation network that needs expansion and improvement. • Lack of a direct connection between Interstate 19 (I 19) and Interstate 10 (I-10) and activity centers including the Tucson International Airport (TUS) and employers to the south of TUS. • Much of the existing transportation network within the study area is expected to operate at an unacceptable level of service (LOS) by 2045.	
Within current scope of the study? No	Modify study scope to include comment context? N/A
Why or why not modify scope? Comment is not relevant to placement of a Sonoran Corridor.	How account for comment throughout the study process? N/A

Comment 26

Connect new highway to Kolb Road and turn Kolb into a crosstown highway.	
Response: The "I-10 East Project" study along I-10 between I-19 and Kolb Road is considering the best way to improve I-10 and provide for a connection along Alvernon Way/Aviation Parkway into downtown Tucson.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why not modify scope? Response explains this comment is being addressed in another study	How account for comment throughout the study process? N/A

Comment 27 (5 comments)

• Yes! Please make this happen! • Tucson needs to make it easier to get around the whole city, north and south side. This is a start! • Sonoran Corridor would shorten commute to the airport and make Cochise County more accessible and help economic recovery. • I believe this is a great idea. I believe its time has come. • This proposal would be a great benefit to the community.
Response: Thank you for your comments.

Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 28

Consider constructing underground corridors.	
Response: Currently no funding exists for constructing this project. Placing the corridors underground could triple the cost of this unfunded project.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why not modify scope? Corridor alternatives were developed by a multi-disciplined professional team. Underground construction was determined infeasible.	How account for comment throughout the study process? N/A

Comment 29

I do not see freeway construction as a sustainable solution for Arizona in the long-run. Place a higher priority on improvements that emphasize pedestrians, bicycles, safety and transit.	
Response: In general, within an urban setting, these alternative forms of transportation are growing significantly in response to concerns about the environment and costs. A major consideration for the Sonoran Corridor is providing an efficient route for truck traffic carrying goods between Arizona, other states, and Mexico. Alternative mode access is also a provision within the concept for this project.	
Within current scope of the study? No	Modify study scope to include comment context? No
Why or why not modify scope? Response explains project need for a high-capacity facility.	How account for comment throughout the study process? N/A

Comment 30

I support the proposed corridor from I-10 near the airport to I-19 near or in Sahuarita.	
Response: Thank you for your comment. Many factors, including public input, are being considered in the selection of corridor alternatives being advanced for further study.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A

Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Comment 31

I fully support the new freeway as long as it's a real freeway and not a parkway with stoplights.	
Response: Thank you for your comment.	
Within current scope of the study? Yes	Modify study scope to include comment context? N/A
Why or why not modify scope? N/A	How account for comment throughout the study process? N/A

Received at or as a result of the March 7, 2019 meeting

Comment Category 1

Prefer 'No-Build" Option (23 comments) • This road is unnecessary • Will bring highway noise and negatively affect property values • Citizens voted against this in 2015 • Damage to neighborhoods and wildlife • Environmentally bad • Waste of tax dollars. Fix existing freeways • Negative effect on air quality • We have enough roads • Threatens quiet rural setting • Not needed for airport access or Raytheon workers • Loss of property for residents	
Response: Corridor alternatives were selected based on their ability to meet the established Need and Purpose. Potential impacts to the environment will be documented at a Tier 1 (corridor) level. The No-Build Alternative will be part of the Tier 1 EIS as the study proceeds, and the concerns noted will be addressed for the three remaining Corridor alternatives.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why or why not modify scope? Already part of the study	How account for comment throughout the study process? Compare potential impacts of constructing and operating a highway facility within the Corridor alternatives to potential impacts of the No-Build alternative. Acknowledge level of public support for this alternative.

Comment Category 2

Prefer Alternative Corridor #1 (12 comments) • Would not impact as many property owners • Most direct route, closer to the airport • Shorter, less costly route • Negative effect on quality of life • Most logical and economical option • Goes through less private property than other options still considered

• Doesn't significantly affect Sahuarita neighborhoods	
Response: The No-Build alternative will be studied in the Tier 1 EIS, along with potential impacts (at a Tier 1 level) for Corridor Alternatives 1, 7, and 8A.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why or why not modify scope? Scope currently includes Tier 1 analysis of potential impacts, including land use, transportation, and displacement/relocation.	How account for comment throughout the study process? Compare potential impacts of constructing and operating a highway facility within the Corridor Alternative #1 to potential impacts of the other selected Corridor alternatives and of the No-Build alternative. Acknowledge level of public support for this alternative.

Comment Category 3

Oppose Corridor Alternative #7 (Five comments) • Negative effect on quality of life near El Toro Road • Would degrade property values • Too many people will lose their homes	
Response: • The location of the I-19 terminus for Corridor Alternative #1 was partly determined by its distance from both the Sahuarita Road and Duval Mine Road traffic interchanges. • The value of a specific property depends on its proximity to and the associated benefits or drawbacks resulting from the new transportation facility. • Corridor alternatives analyzed at a Tier 1 level are significantly wider than the future transportation facility; the number of affected residences would be far fewer than what is covered by the 2,000-foot-wide study corridor.	
Within current scope of the study? Yes, at a Tier 1 level	Modify study scope to include comment context? No
Why or why not modify scope? Concerns expressed in comments cannot be precisely determined in Tier 1.	How account for comment throughout the study process? Defer precise impact analysis to project-level NEPA analysis.

Comment Category 4

Prefer Alternative #7 (Three comments) • Starts as far south on I-19 as possible • Avoids Houghton Road	
Response: Alternative 7 will be studied in the Tier 1 EIS along with Alternatives 1 and 8A and the No-Build Alternative.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why or why not modify scope? Already part of the study	How account for comment throughout the study process? Part of the environmental review process

Comment Category 5

Prefer Alternative #8A (20 comments) • Avoids metro Tucson and allows for future growth • Could be the southern portion of a loop around Tucson • Would attract additional development • Would improve Houghton Road • Doesn't add to congestion at Rita Road	
Response: Thank you for your comments.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why or why not modify scope? Already part of the study	How account for comment throughout the study process? Part of the environmental review process Acknowledge level of public support for this alternative.

Comment Category 6

Oppose Alternative #8A (Four comments) • Goes through a fully occupied neighborhood • Families moved to the El Toro Road area for a better life	
Response: Alternative 8A will be studied in the Tier 1 EIS along with Alternatives 1 and 7 and the No-Build Alternative. Impacts to affected communities would need to be mitigated, if warranted, once a specific alignment was determined and subjected to Tier 2 analyses.	
Within current scope of the study? Yes	Modify study scope to include comment context? No
Why or why not modify scope? Already part of the study	How account for comment throughout the study process? Defer precise impact analysis to project-level NEPA analysis

Comment Category 7

Hybrid options (15 comments) • Houghton with connection along Sahuarita Road • Houghton to San Xavier • Go farther east to State Route 83 • Use funds to build a crosstown Tucson freeway • Go diagonally from Houghton to El Toro Road • Use funds to fix Tucson streets and bridges • Don't build near prison complexes • Build a loop around Tucson • Use Sahuarita Road to avoid impacts to homes	
Response: The alternative corridors proposed were previously analyzed or were eliminated during the Corridor Selection process based on infeasibility or performance deficiencies.	
Within current scope of the study? No; previously analyzed	Modify study scope to include comment context? No
Why or why not modify scope? Previously analyzed and eliminated	How account for comment throughout the study process? Comment already addressed

Comment Category 8

General Comments/Questions (20 comments) • Did the Town of Sahuarita review the proposal? • Call it the "Sonorridor" (15 comments on this)	
Response: • The Town of Sahuarita has been a part of the study process since the beginning, and have provided comments during the study's development and analysis stages • Comment dismissed. Naming a future transportation facility is premature at this point. If constructed, the facility would be located along one of the corridors being studied, but would not be the corridor itself. The No-Build Alternative could be selected. To assign a name at the study stage would be predecisional.	
Within current scope of the study? Yes, part of Agency Coordination	Modify study scope to include comment context? No
Why or why not modify scope? Already accounted for in the process	How account for comment throughout the study process? Already addressed

APPENDIX B – CORRIDOR ALTERNATIVES ANALYSIS RESULTS

Table A-1 - Adopted Data Table

Category	Criteria	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Criterion G-1: Compatibility with Local Plans (rating value)	5	5	5	5	3	3	3	5	5	5	5	1
	Criterion G-2: Public and Agency Support (rating value)	5	3	3	3	1	1	1	3	3	3	3	1
	Criterion G-3: Compatibility of Corridor with Underlying Property Ownership	4	6	6	3	7	8	6	7	9	9	6	5
	Criterion G-4: Employment Served	75,448	40,089	41,659	25,255	79,657	44,505	28,951	91,118	53,546	57,329	28,951	26,827
M – Mobility	Criterion M-1: Travel Demand: Daily vehicle trips	20,254	21,624	20,357	13,323	23277	22,994	17,284	24,029	20,648	21,656	17,061	13925
	Criterion M -2: Travel Demand – Daily truck trips	1,003	905	908	627	1,403	963	790	1,154	836	987	773	656
	Criterion M-3: Reduction of truck volume on Interstate facilities	0	0	0	0	0	0	0	0	0	0	0	0
	Criterion M-4: Travel Time	21.8	21.1	21.5	19	19.9	19.2	16.7	21.1	21	20.3	18.8	16.7
	Criterion M-5: Congestion Reduction	0.024	0.027	0.038	0.028	0.024	0.017	0.020	0.054	0.031	0.061	0.031	0.041
	Criterion M-6: Improved access to TUS (compared to No Build)	3,746	-1,107	5,710	-1,250	5,002	-744	-533	10,118	-411	8,290	-538	-116
	Criterion M-7: Multimodal Connectivity	3	1	3	1	3	1	1	1	1	1	1	1
SL – System Linkages	Criterion SL-1: Contribution to network and access	76.75	93.91	85.22	106.67	69.02	87	104.88	66.59	88.92	75.62	109.47	149.97
EB - Economic Benefits	Criterion EB- 1: Access to jobs and revenue potential	8	6	6.5	4	8	6	4	9	7.5	7.5	4	5
E – Environmental	Criterion E-1: Sensitive noise receptors	13	5	78	3	1,320	1,313	1,306	228	370	589	378	1,027
	Criterion E-2: residences potentially affected	5	2	52	0	469	465	459	68	185	81	193	546
	Criterion E-3: historic/cultural/ archaeological resources	141	134	57	113	63	48	72	34	39	40	37	47
	Criterion E-4: wetlands/floodplains/ rivers/ washes/arroyos	79,149	88,257	130,627	84,709	92,574	136,116	132,567	231,897	270,160	262,184	266,611	280,722
	Criterion E-5: wildlife corridors (rating value)	3	3	3	5	3	3	3	1	1	1	1	1
	Criterion E-6: biological resources which may be affected	2.39	4.04	3.82	4.14	3.67	4.16	4.27	4.17	4.41	4.32	4.48	4.59
	Criterion E-7: existing environmental justice populations	27,383	18,902	18,902	12,142	40,274	31,793	25,033	39,285	35,538	35,539	28,778	31,605
	Criterion E-8: Greenfield sites – emphasis on use of existing corridors	2,427	2,457	3,135	3,320	2,304	2,816	2,785	3,004	2,235	3,906	2,710	2,069
IF - Implementation Feasibility	Criterion IF-1: Construction Elements	420	424	639	479	827	804	895	456	587	495	604	1,425
	Criterion IF-2: Property Acquisition/Access Considerations (rating value)	3.604	3.161	3.547	3.212	3.903	3.511	3.566	3.799	3.714	3.75	3.75	3.58

Table A-2 - Enhanced Data Input Table

Category	Criteria	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 8A	Alt 9	Alt 10
G - Growth and Community Acceptance	Criterion G-1: Compatibility with Local Plans (rating value)	5	5	5	5	3	3	3	5	5	5	5	1
	Criterion G-2: Public and Agency Support (rating value)	5	3	3	3	1	1	1	3	3	3	3	1
	Criterion G-3: Compatibility of Corridor with Underlying Property Ownership	4	6	9	3	7	8	6	7	9	6	6	5
	Criterion G-4: Employment Served	107,265	52,994	67,748	32,857	112,832	55,698	32,361	124,269	64,834	84,752	32,361	27,699
M – Mobility	Criterion M-1: Travel Demand: Daily vehicle trips	29,448	23,380	27,824	33,875	31,151	23,801	17,686	30,177	20,242	26,080	16,496	13,618
	Criterion M -2: Travel Demand – Daily PM truck trips	1,463	1,019	1,222	632	2,047	1,032	837	1,431	844	1,161	778	662
	Criterion M-3: Reduction of truck volume on Interstate facilities	0	0	0	0	0	0	0	0	0	0	0	0
	Criterion M-4: Travel Time	22.4	19.1	21.8	18.1	20.6	19.3	16	21.7	21.1	20.5	18.7	16.7
	Criterion M-5: Congestion Reduction	0.025	0.028	0.042	0.029	0.024	0.023	0.020	0.059	0.034	0.065	0.029	0.039
	Criterion M-6: Improved access to TUS	5,707	-618	4,402	-314	6,594	-463	-675	8,956	-606	6,440	-314	-68
	Criterion M-7: Multimodal Connectivity	3	1	3	1	3	1	1	3	1	1	1	1
SL – System Linkages	Criterion SL-1: Contribution to network and access	76.75	93.91	85.22	106.67	69.02	87	104.88	66.59	88.92	75.62	109.47	149.97
EB - Economic Benefits	Criterion EB- 1: Access to jobs and revenue potential	8	6	6.5	4	8	6	4	9	7.5	7.5	4	5
E – Environmental	Criterion E-1: Sensitive noise receptors	13	5	78	3	1,320	1,313	1,306	228	370	589	378	1,027
	Criterion E-2: residences potentially affected	5	2	52	0	469	465	459	68	185	81	193	546
	Criterion E-3: historic/cultural/ archaeological resources	141	134	57	113	63	48	72	34	39	40	37	47
	Criterion E-4: wetlands/floodplains/ rivers/ washes/arroyos	79,149	88,257	130,627	84,709	92,574	136,116	132,567	231,897	270,160	262,184	266,611	280,722
	Criterion E-5: wildlife corridors (rating value)	3	3	3	3	3	3	3	1	1	1	1	1
	Criterion E-6: biological resources which may be affected	2.39	4.04	3.82	4.14	3.67	4.16	4.27	4.17	4.41	4.32	4.48	4.59
	Criterion E-7: existing environmental justice populations	27,383	18,902	18,902	12,142	40,274	31,793	25,033	39,285	35,538	35,539	28,778	31,605
	Criterion E-8: Greenfield sites – emphasis on use of existing corridors	2,427	2,457	3,135	3,320	2,304	2,816	2,785	3,004	2,235	3,906	2,710	2,069
IF - Implementation Feasibility	Criterion IF-1: Construction Elements	420	424	639	479	827	804	895	456	587	495	604	1425
	Criterion IF-2: Property Acquisition/Access Considerations (rating value)	3.604	3.161	3.547	3.212	3.903	3.511	3.566	3.799	3.714	3.75	3.75	3.58

APPENDIX C – QUANTM ANALYSIS PROCESS

Quantm

Quantm is a computer model that facilitates the identification of corridor alignments by considering engineering and environmental factors encountered between specified end points (termini). In this case, the termini are the connections to I-10 and I-19. Quantm maps potential routes for a proposed transportation facility based on engineering design criteria as well as sensitive environmental and cultural resources, land uses, and topographical constraints judged on the impact a transportation corridor would have on them. This approach identifies a broad complement of corridors that can be narrowed, through engineering and planning analysis, to those that are most likely to be productive in terms of the Need and Purpose for the project.

Quantm can also be used to validate or optimize potential corridor alternatives (routes proposed during scoping, those from prior studies, and technical analysis outputs) by refining these potential corridors to ensure they meet the minimum engineering and environmental design criteria. For example, corridor alternatives may be moved slightly to overlay existing roadways/rights-of-way, avoid defined constraints, or better respond to engineering requirements.

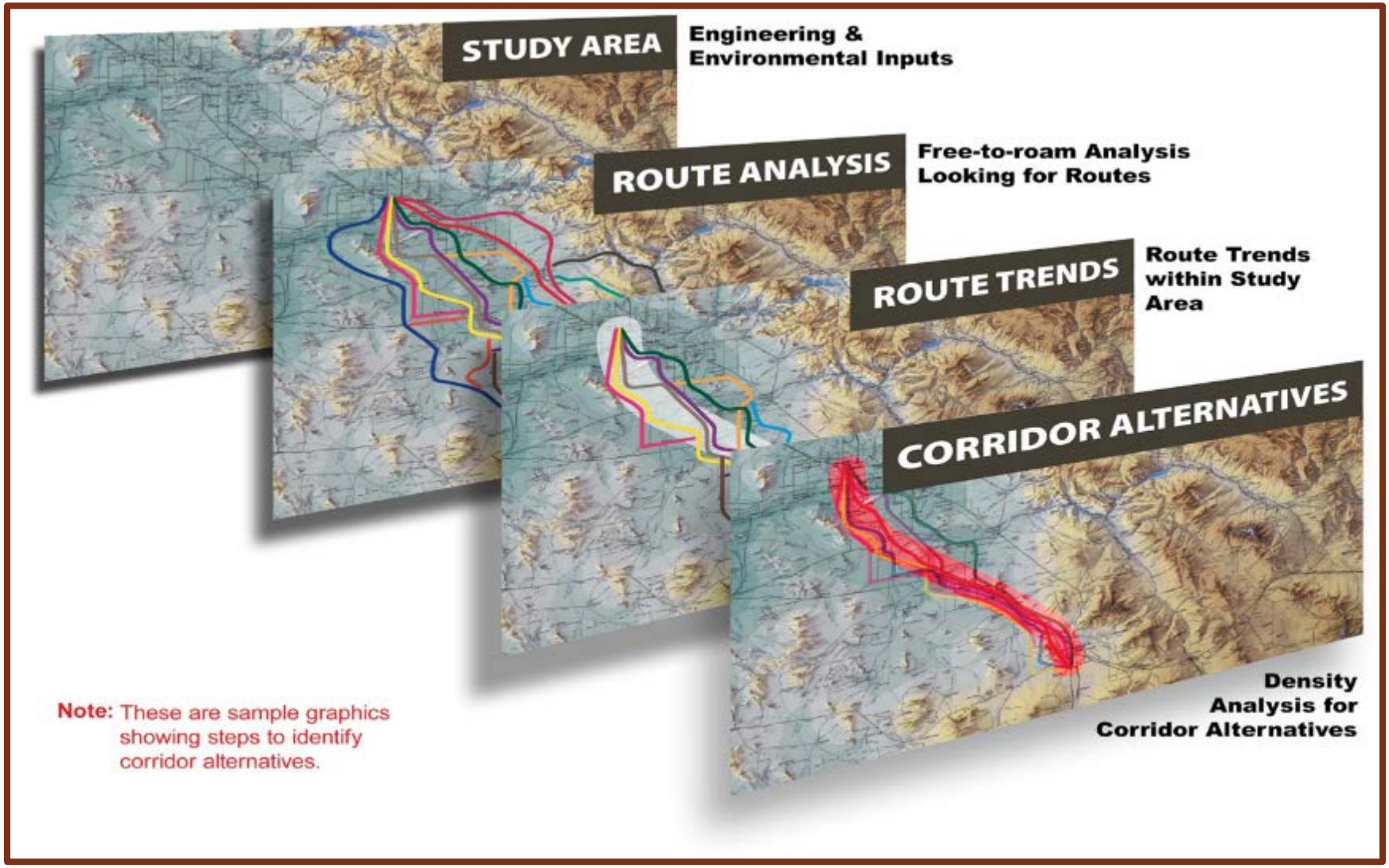
Figure D1 shows a summary of the technical analysis steps in Quantm, followed by a more detailed discussion in the subsequent sections:

- Collect and enter engineering and environmental inputs
- Run model for a free-to-roam (i.e., not geographically constrained) analysis, looking for all potential routes between termini identified on I-10 and I-19.
- Evaluate model outputs to identify route trends within the Sonoran Corridor Study Area
- Conduct density analysis of route trends (i.e., observe areas where modeled routes tend to converge and/or overlap) to identify potential corridor alternatives.

Quantm Inputs

The initial step of the technical analysis involves collecting and entering engineering and environmental inputs into the model. The engineering inputs are based on the design criteria for a proposed interstate freeway facility, with considerations for future multimodal elements (e.g., ability to maintain appropriate grades for rail). Environmental inputs can include identified protected resources, sensitive land uses, and topographical information.

Figure D1 - Quantm Technical Analysis Steps



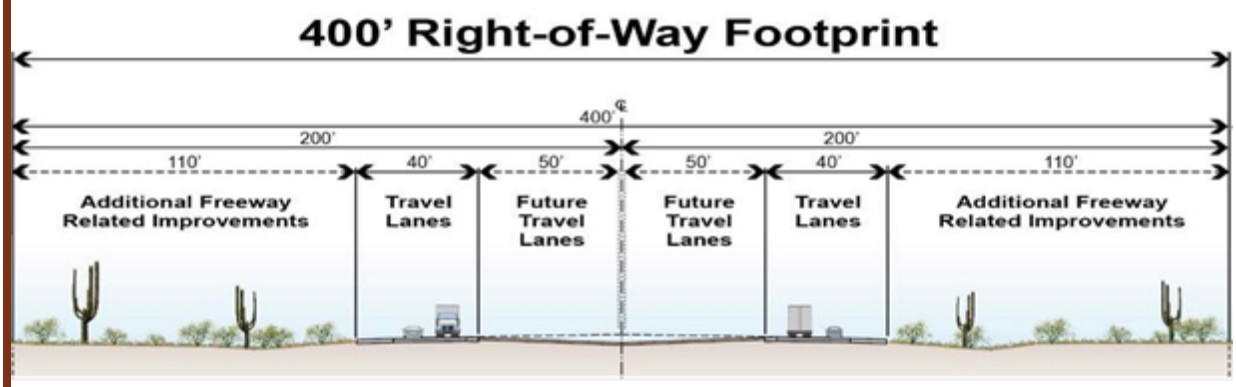
Corridor Template and Design Assumptions

The input to the Quantm model requires the features and expectations for the proposed facility be defined sufficiently for the program to compare the many possible corridors within the study area. Among the features is the actual corridor character to be proposed. Though this is a Tier 1 EIS and assesses alternatives based on a 2000-foot corridor width, for purposes of obtaining realistic comparisons, model input descriptions have been adapted in the application of Quantm.

CORRIDOR TEMPLATE

The Sonoran Corridor will provide a high-level routing or a 2000-foot corridor, not a specific alignment. For purposes of planning, however, a 400-foot corridor template that accommodates a roadway and enough room for other uses was applied to ensure each alternative can provide for the needs of the corridor. The template is shown in Figure D2.

Figure D2 - Corridor Template



Note: 400-foot right-of-way footprint for the Sonoran Corridor could be located anywhere within the 2000-foot corridor alternative. Additionally, in areas collocated with existing facilities with lower anticipated traffic volumes or parallel constraints, the footprint may be less than 400 feet wide. Widths on either side of freeway corridor may vary. Engineering inputs for grade would allow the alternative to integrate other parallel transportation or linear uses in the future, such as freight rail, passenger rail, and/or a utility corridor.

HIGHWAY DESIGN SPEED AND GRADE AND OTHER DESIGN CONSIDERATIONS

Given the federal designation for the corridor in the FAST Act, the corridor is assumed to be able to accommodate vehicle travel at speeds of 70 mph. Horizontal and vertical geometry is planned to conform to 70 mph requirements. A maximum grade of 3% has been applied to ensure a broad accommodation of multimodal options within the corridor.

The engineering input assumptions also address minimum turning radii/curves, grade/slope requirements, right-of-way (ROW) needs, etc. for a four-lane interstate freeway. At this stage of the technical analysis, a 400-foot ROW footprint was used to account for the maximum horizontal width required for a proposed interstate freeway facility. In areas of constrained ROW or where a wider footprint may not be needed because of topography or other restrictions, a determination will be made as to the appropriate treatment of the corridor. The inputs for a proposed interstate freeway facility

would not preclude a multimodal transportation or other linear facility (i.e., rail and/or utility) within the corridor, if needed.

System Design Considerations

The connection points provide context to the corridor. A key objective is to link I-10 and I-19 south of the TUS with a new facility. For that to happen, it is important to place the potential connection points where they can legitimately meet the required standards of design and operation, but also serve the Need and Purpose of the project. This means identifying locations that can accommodate a full system interchange, even if replacing an existing service interchange, but without infringing upon adjacent service interchanges (i.e., two-mile system interchange separation), preserving access to local residences, businesses or facilities and which can minimize impacts to the environment, be supported by local interests and provide a high level of transportation service to the region. System design requirements establish parameters for placing the interstate connection points.

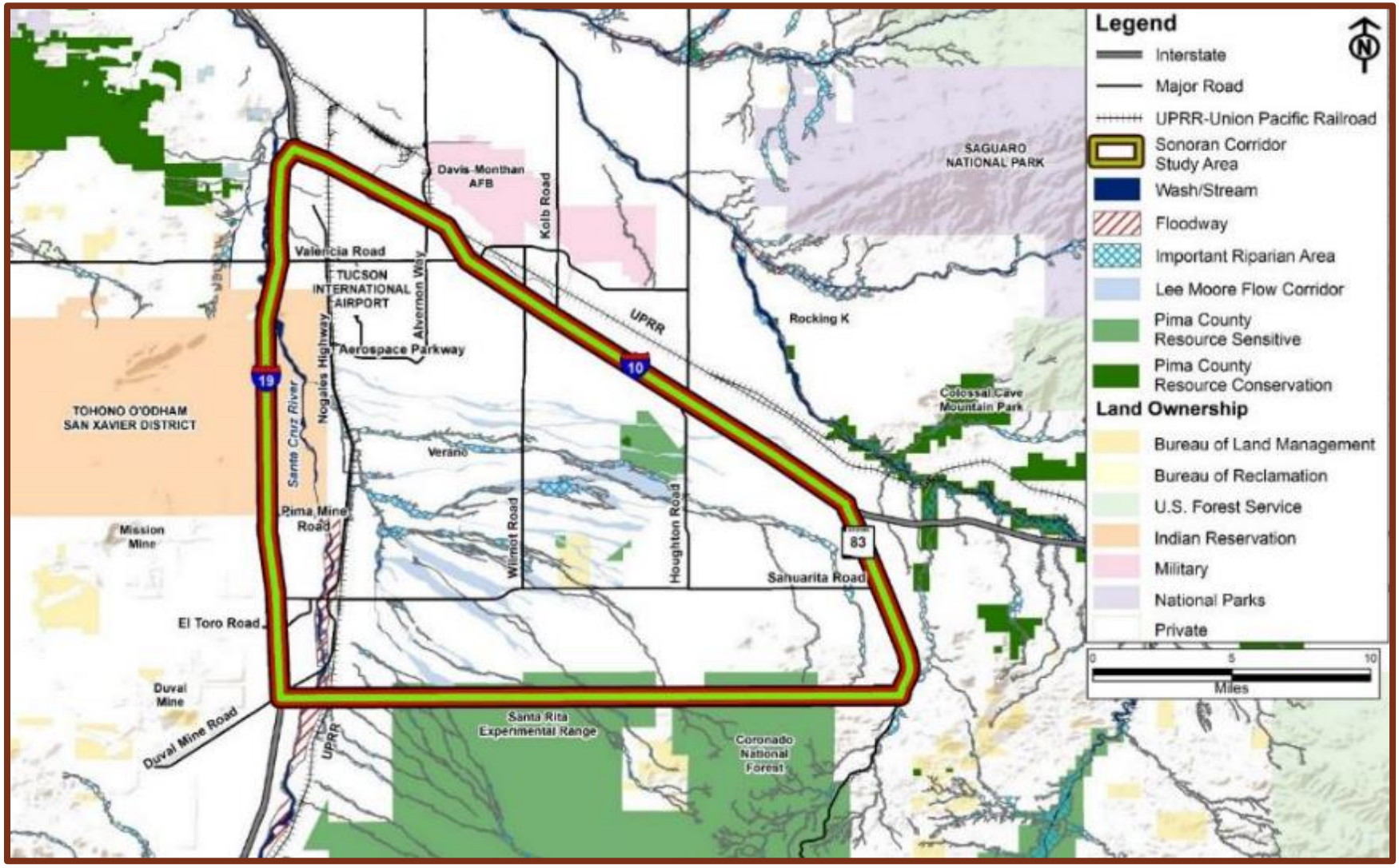
Connection Points (Logical Termini)

The connection points are described above in Section 2.1, but are another key input to Quantm as it links the proposed corridor to the existing transportation system. The termini should meet certain basic engineering guidelines to ensure long-term, effective and safe operations for the new corridor as well as existing highways. This is a critical input into the Quantm model because it defines beginning and ending points for each corridor alternative.

Constraints

Figure D3 illustrates some of the environmental inputs for this stage of the analysis that were collected from various sources. These sensitive areas are considered potential avoidance areas in the technical analysis. Information for sensitive environmental resources and land use data were gathered from prior studies and a high-level survey of resources in the study area. Additional information was provided by agencies, the San Xavier District of the Tohono O'odham Nation, and the public during the scoping period.

Figure D3 – Constraint Map Used to Define the Environmental Character of the Study Area



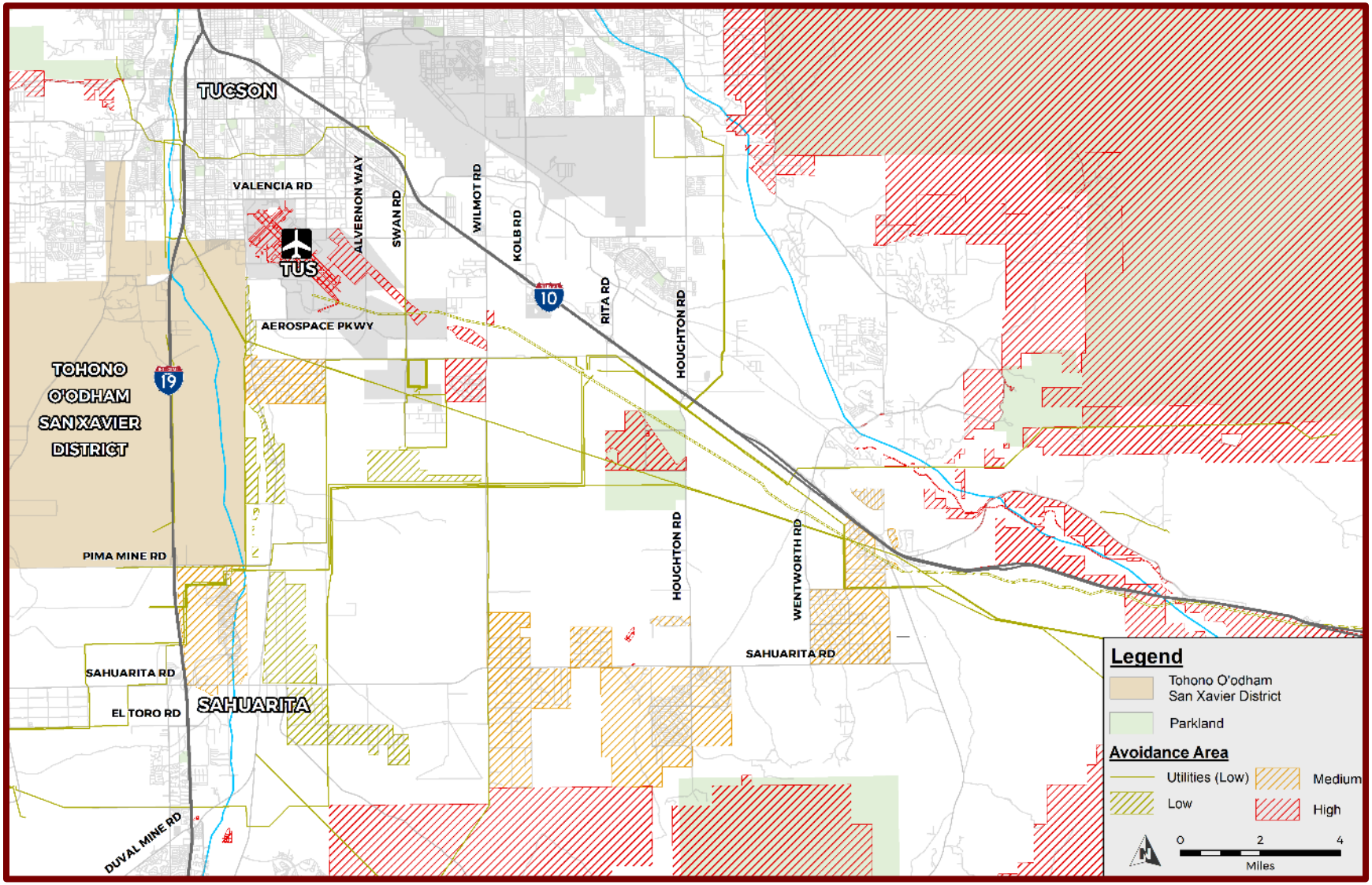
Quantm Process

Based on the inputs described in Section 2.2.3.1, the Quantm model will generate as many alternatives as required by the study. In the Sonoran Corridor, the number of corridors generated was limited to 25 per connection pair as a first step. The results were refined to further reduce the alternatives to be investigated further.

"Free-to-Roam Analysis" - Looking for Corridors

With the engineering design criteria, termini and environmental avoidance areas established, the model is allowed to "roam" freely, i.e., not constrained by geographical boundaries, as it generates potential corridor routing that responds to the inputs. The model considers engineering inputs such as slope and curvature requirements when traversing the existing topographic terrain layers. It generates 2,000-foot wide corridors within which a specific alignment that meets the prescribed design criteria for the Sonoran Corridor, a potential interstate freeway facility, can later be accommodated. Simultaneously, also based on inputs, the model avoids or minimizes effects on environmentally sensitive resources, such as historic and archaeological sites or habitat areas, when mapping out potential corridors. Figure shows some of the considerations included in the analysis. Using these input parameters, this technical analysis filters out corridors with potentially serious physical and environmental constraints, while also maximizing possible corridor alternatives.

Figure D4 - Study Area Constraints (Avoidance Areas) in Quantm



Corridor Trends within the Study Area

As programmed, the free-to-roam analysis generated 25 potential corridors for each connection pair between I-10 and I-19 (Figure D5). From those, the most reasonable options based on the engineering and environmental inputs were selected for further analysis. The next step identified potential corridor trends, or groupings of corridor routes, that generally follow a common or similar path. These common-path options will be used to identify potential corridor alternatives that were included in the Comprehensive Set of Alternatives. The trends analysis is shown graphically in Figure D6.

Density Analysis for Potential Corridor Alternatives

To assist in determining the most dominant route trends or groupings, the modeled corridors were imported from Quantm into a Geographic Information Systems (GIS) software platform to undergo a density analysis that more clearly distinguished the most common paths traced by the corridors. The results of this process were used to map the prevalent routing trends from Quantm (as shown in Figure D7) and add them to the set of corridor alternatives drawn from previous studies and agency and public input gathered during Scoping.

Avoidances and Attractions

Within the study area, there are many restrictions and opportunities that influenced the identification of viable corridor alternatives studied. Restrictions included sensitive resources such as cultural, archaeological, natural or historic resources that should be avoided. Existing and proposed land uses also represented a possible basis for altering a corridor route. At the same time, there were specific features the corridor will serve to provide the greatest benefit based on the Need and Purpose. A viable corridor alternative is one that effectively minimizes impacts and maximizes benefits recognizing that at a Tier 1 level of analysis with a 2000' wide corridor, there is substantial flexibility in shaping specific alignments in later phases of analysis.

Figure D5 - Free-to-Roam Graphic Showing 600 Possible Corridor Paths among All Endpoint Pairings

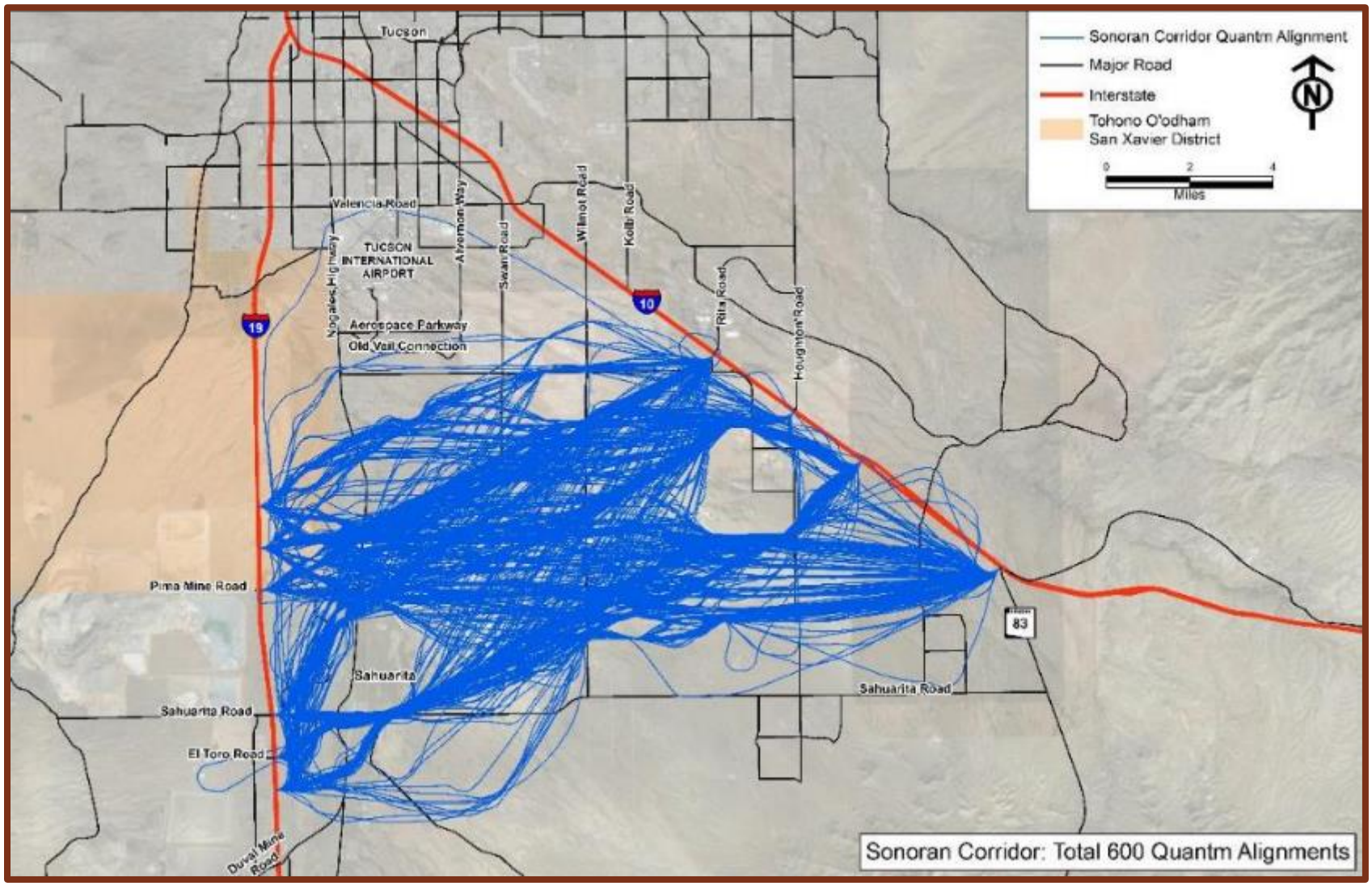


Figure D6 - Corridor Trends Graphic (Sample Connection Pair between SXD and Fairgrounds)

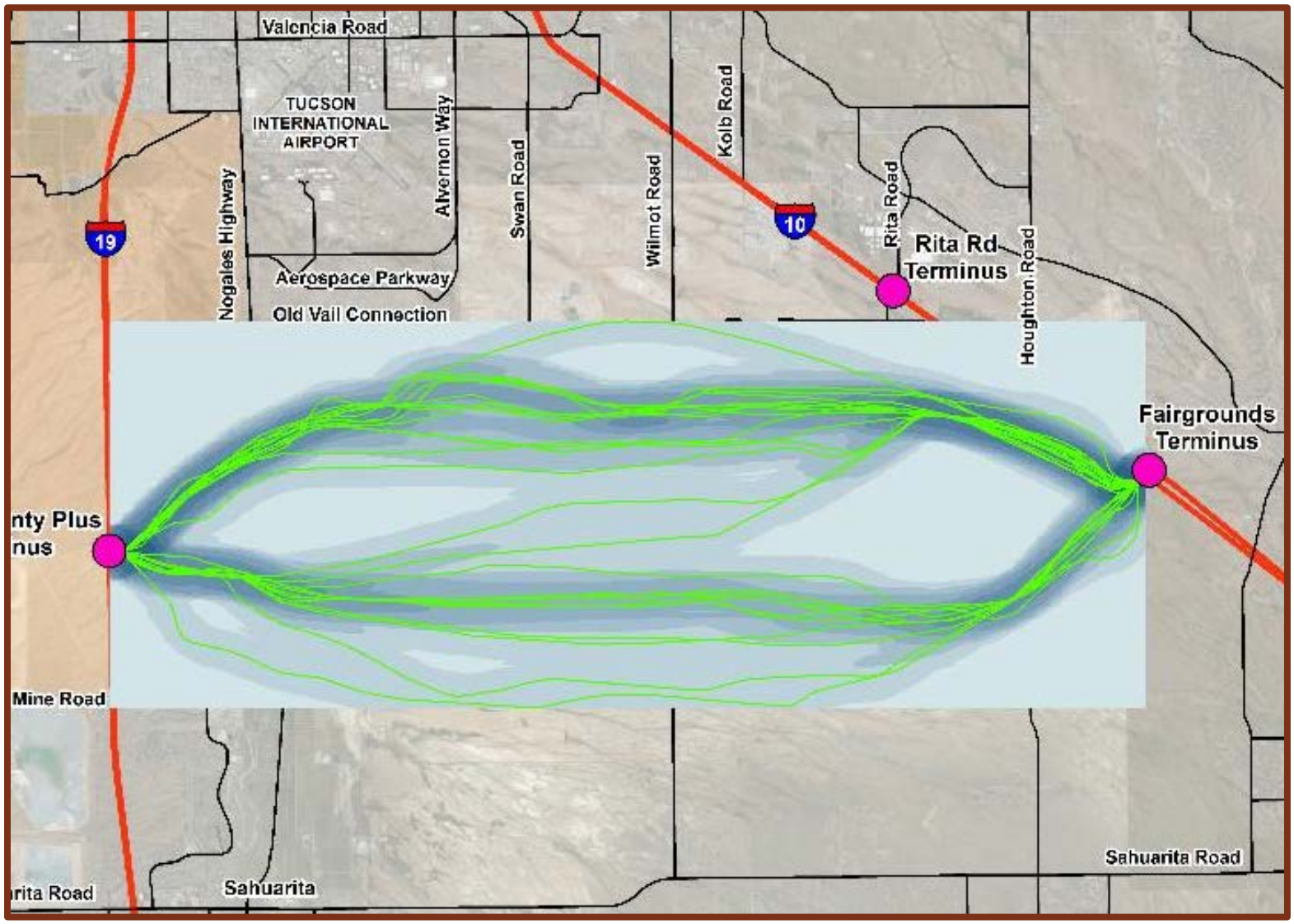


Figure D7 - Density Analysis (Sample Connection Pair between SXD and Fairgrounds)

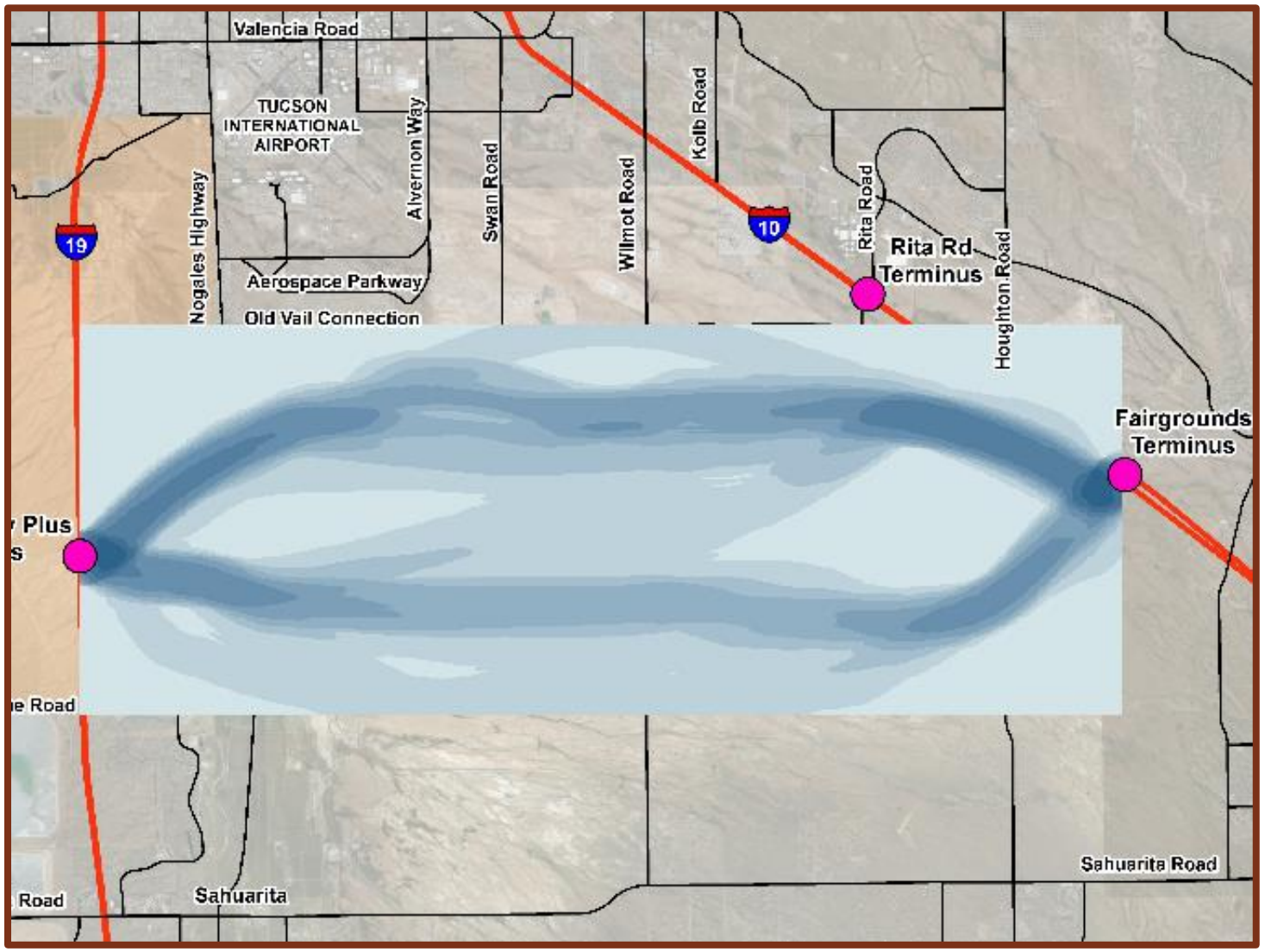
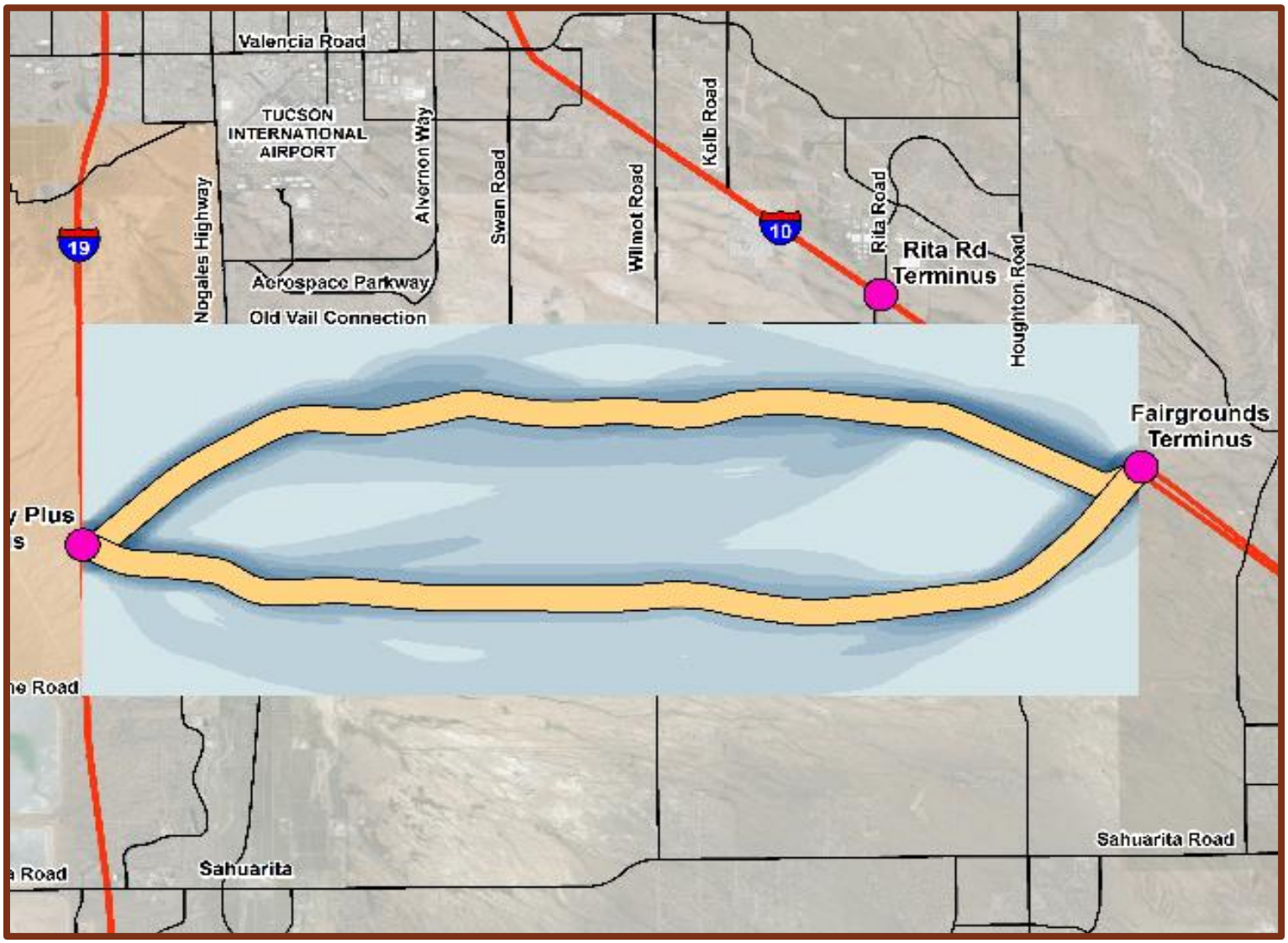


Figure D8 - Identification of Specific 2000' Corridor Paths Based on Density Analysis



Avoidances

The study area is heavily affected by drainage courses which typically host a preponderance of sensitive habitat areas. The study area is also subject to the influence of the historic Native American populations and practices which were identified as locations to be avoided or protected (in varying levels of sensitivity). Physical impediments in the form of state and federal prisons or County fairgrounds provided additional structure to where corridors could be placed. In addition to all these types of limitations, pertinent regulations and design criteria further guided the identification of corridor routes for analysis.

Attractions -Waystations

The objectives identified in the Need and Purpose show links to various activities (e.g., TUS and employment centers) as an important reason for the proposed corridor. To meet the Need and Purpose, these activities should be accessible from the proposed corridor to obtain the most benefit from its placement. Desirable "waystations" included features such as employment centers and TUS. Other locations were identified as corridor options were defined to "shape" the corridors per project needs. In some cases, waystations provided specific guidance for the corridors to conform to and support development of a proposed highway network in the study area.

Corridors developed using the above-described process are shown in Figure D9.

Figure D9 - Alternatives Developed Using Quantm