

# I-19 CORRIDOR PROFILE STUDY

## NOGALES TO JUNCTION I-10

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### Draft Working Paper 3: Corridor Vision

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# 1 INTRODUCTION

Interstate 19 (I-19) is a major corridor for intrastate and international commerce between Mexico and the United States. It is one of nine Arizona Department of Transportation (ADOT) defined corridors that play a key role in the understanding the overall health of the statewide transportation system. The statewide plan, *What Moves You Arizona*, and the *Planning to Programming Linkage (P2P)* have begun developing a framework to integrate the planning and programming process in a transparent, defensible, logical, and reproducible way. The I-19 Corridor Profile Study is one piece that will begin to connect strategic decisions to on-the-ground improvements.

## 1.1 Corridor Study Purpose

This series of corridor profile studies will examine significant state corridors and compare performance to goals using performance measures identified in the P2P process. The purpose of these studies will be to identify the gap between measured performance and stated goals and to perform a comparative analysis both within the I-19 corridor and with other statewide significant corridors. This effort will result in the prioritization of solutions that will improve the overall performance of the I-19 corridor. The process by which this corridor profile study will achieve the desired results will focus on the following process areas:

- Inventory past recommendations for improvements that have been completed or are in progress;
- Provide an overall assessment of the existing health of the corridor, based on system performance measures;
- Recommend a range of solution sets to help improve the overall performance;
- Determine how proposed corridor improvements will be prioritized based on a risk-based decision process; and
- Complete a P2P ranking of proposed improvements and recommend strategic initiatives.

This Working Paper focuses on the Corridor Vision.

## 1.2 Corridor Study Objectives

The I-19 Corridor Profile Study will define solution sets and improvements that can be evaluated and ranked to determine which investments offer the greatest benefit to the corridor. Corridor benefits will be documented by three investment types including preservation, modernization, and expansion. The main objective of this study will be to identify potential actions that will increase the performance of the I-19 corridor to acceptable levels. These actions or projects will be analyzed based on risk potential, life-cycle costs, and cost-benefits to produce a prioritized list of projects that help achieve corridor goals. The following goals have been identified as the outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals;
- Match solutions with deficiencies in measured performance; and
- Prioritize improvements that efficiently preserve, modernize, and expand transportation infrastructure.



### 1.3 Study Location and Corridor Segments

The I-19 Corridor is a multi-modal corridor located in southern Arizona that serves international, regional, and local traffic and commerce demand between the United States and Mexico. I-19 spans approximately 63 miles from the international border near Nogales, Arizona at milepost 0.00 north to the junction with Interstate 10 (I-10) at milepost 63.69 in Tucson, Arizona as illustrated in **Figure 1**.

Figure 1 The I-19 Corridor is divided into six planning segments for analysis and evaluation. These planning segments allow the corridor to be analyzed at a detailed level so that location-specific needs can be readily identified and compared to other segments on this or other corridors. Segmentation by similar characteristics will allow the analysis to highlight anomalies or instances of poor performance within the context of each segment. The corridor is segmented at logical breaks where context changes such as terrain, ADT, or roadway typical section indicate. Additional segment breaks may occur at major intersections or junctions, where the corridor transitions from rural to urban environments, and at jurisdictional changes. The breaks are selected to match maintenance segments as closely as possible, although multiple maintenance sections may be included in each planning segment. Planning segments for the I-19 Corridor are defined in **Table 1**, and illustrated on **Figure 1**.

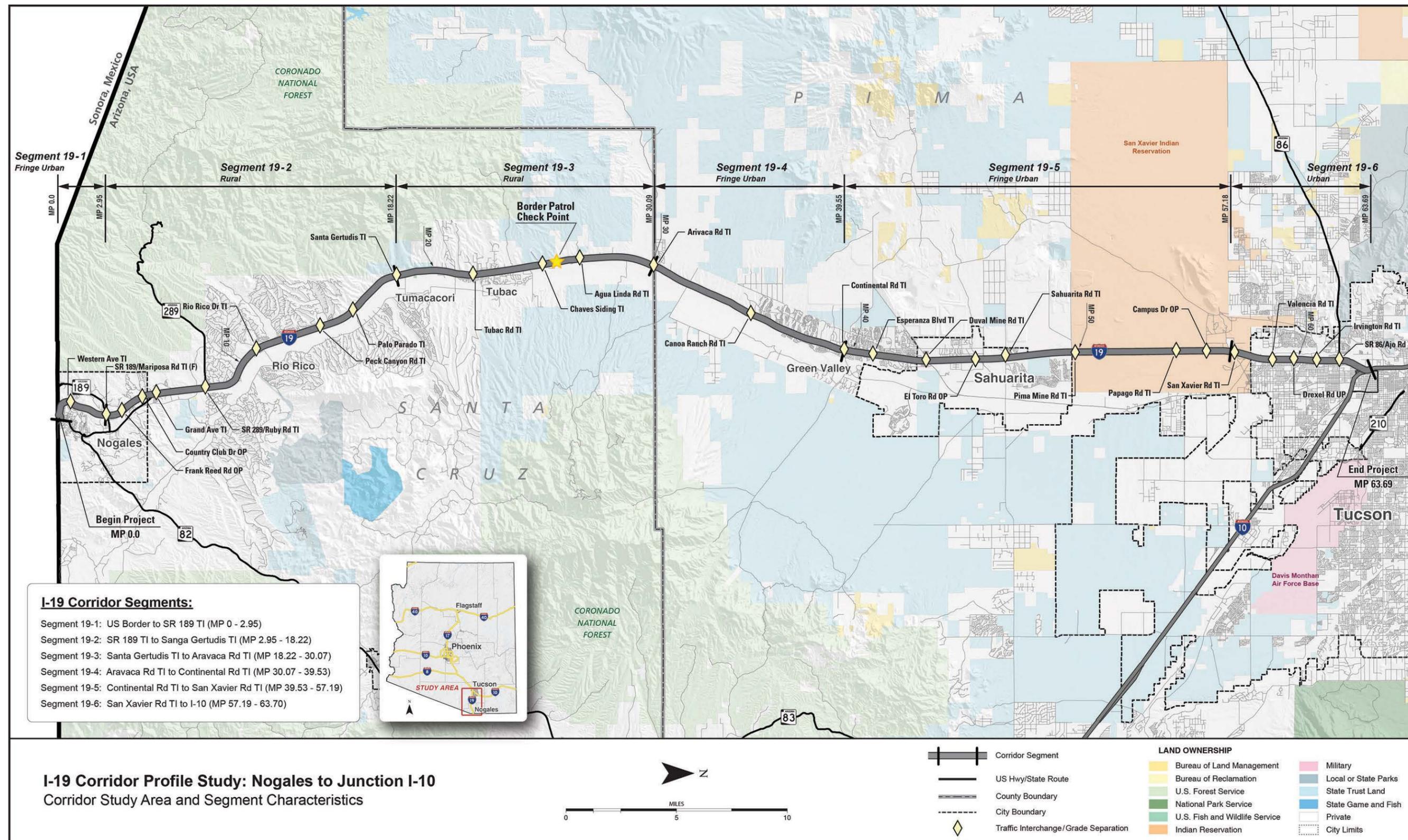
The planning segments were created to define a consistent method of grouping data and to define a level of granularity appropriate for supporting long range corridor-level priority decisions. In order to measure and compare planning segments to each other and to the system as a whole, the root data set is normalized to represent each planning segment. The data is utilized either as point source information, e.g., specific location of an accident, or by length, e.g., a series of maintenance sections with a specific pavement condition. For this and other length related values, the root data is weighted by length, summed, and then divided by the total segment length to achieve a normalized planning segment value.

**Table 1: I-19 Corridor Segments**

Seg	Segment Name	Begin Milepost	End Milepost	Surface Width (NB)	Thru Lanes (NB)	Length (mi)	ADT (2010)	Facility Type	Terrain
1	US Border to SR 189 TI	0.00	2.95	24'-36'	2	2.95	10,000-15,000	Fringe Urban	Rolling
2	SR 189 TI to Santa Gertudis TI (Rock Corral Rd)	2.95	18.24	24'-36'	2	15.29	22,000-34,000	Rural	Level
3	Santa Gertudis TI to Arivaca Rd TI	18.24	30.09	24'	2	11.85	17,000-18,000	Rural	Level
4	Arivaca Rd TI to Continental Rd TI	30.09	39.55	24'	2	9.46	20,000-23,000	Fringe Urban	Level
5	Continental Rd TI to San Xavier Rd TI	39.55	57.18	24'-36'	2	17.63	29,000-40,000	Fringe Urban	Level
6	San Xavier Rd TI to I-10	57.18	63.69	24'-48'	2-3	6.51	59,000-82,000	Urban	Level



Figure 1: I-19 Corridor Study Area and Segment Characteristics



## 2 CORRIDOR VISION OVERVIEW

The I-19 Corridor Vision provides an overview of the corridor’s function and a general description of its operational health relative to identified performance and goals. It sets the stage for the needs assessment and other upcoming phases of this Corridor Profile Study.

The Corridor Vision describes the operational context, including general traffic characteristics, major destinations, and stakeholders. It includes an overview of performance by performance area. The primary focus of the Corridor Vision is to identify objectives and goals for future investments. The objectives and goals have been designed to direct investments to those areas needing improvements in order to bring performance within the desired range, especially where current performance is lacking.

### 2.1 General Characteristics of I-19

The I-19 Corridor functions as a significant international and regional route, connecting the border City of Nogales to Tucson in southern Arizona. It is primarily a four-lane access controlled Interstate facility with a divided median. The terrain is generally flat with some rolling, or hilly, sections on the south end. Volumes are generally moderate to the south ranging from 11,000 – 22,000, increasing in the Tucson area up to 82,000.

The corridor serves as a major truck route due to the border crossing, bringing manufactured goods and produce north from Mexico and has been designated by ADOT as a critical link in Arizona’s Primary Freight Network and the CANAMEX Trade Corridor. The connection to I-10 gives those products access to distribution points throughout the country. Total truck volumes are about 8%-14% of the total vehicle flow, with over 5,000 trucks per day on I-19 in the Tucson area.

There are approximately 60 miles of frontage roads, mostly on the southern two-thirds of the corridor. Frontage roads, cross roads, and freeway ramps are not included in this analysis. I- 19 will eventually connect to the proposed I-11 corridor transporting freight and other traffic throughout Arizona.

#### 2.1.1 Commercial Truck Traffic

Approximately 40% of privately owned vehicles and 75% of all truck crossings occur at Nogales border crossings. The cargo value at the border crossing exceeds \$13 billion, carried by over 300,000 northbound trucks in 2010. (Arizona-Sonora Border Master Plan, ADOT, February 2013)

The Mariposa Land Port of Entry (LPOE) in Nogales is on SR 189, which enters the I-19 Corridor via the Mariposa Road Traffic Interchange at milepost 2.95. This LPOE also serves as the principal gateway of the CANAMEX Trade Corridor, a key NAFTA connector. Significant growth in commercial truck traffic is anticipated as a result of improvements at the LPOE that relieve congestion at the actual border crossing. The resulting increase in traffic would create additional congestion at the junction with I-19. Major reconstruction is planned for the I-19 / Mariposa Rd. TI to address these issues.

Projected truck traffic volumes in the AZTDM2 used for this study show at least double the number of trucks from 2010 to 2035, with the percent trucks in the traffic mix increasing from 16%-

18% to 23%-24% of the total flow. According to some estimates, these projected truck volumes may underestimate truck volume growth rates due to potential future increases in traffic at the border crossing. It will be necessary to continually monitor traffic at these locations so that the corridor plan may be updated to adequately reflect future needs.

See *Arizona’s Key Commerce Corridors*, ADOT, March 2014 and *Arizona-Sonora Border Master Plan*, ADOT, February 2013 for more information about cross-border truck traffic, its economic effects, highway and traffic impacts, and future plans.

A second effect of the increased traffic may be to bring additional trucks northbound that must exit at the I-19 / Ruby Road TI to access warehouse and distribution services. Performance at the interchange will need to be monitored to adequately plan for projected volumes.

A Border Patrol checkpoint near Tubac, primarily focused on the illegal drug trade, illegal immigration, and terrorism deterrence is the largest checkpoint in the state and can create traffic slowdowns on the highway. The slowdowns are documented in the Travel Time and Planning Time Indexes reported in Working Paper #2: Corridor Performance.



#### 2.1.2 Commuting

Interstate 19 serves as a commuter route from communities south of Tucson to employment centers in the metropolitan area. With over 369,000 jobs in Tucson (US Census 2010), the City itself is a major traffic generator and receiver of local and regional trips. Resulting traffic volumes on the northern segments of the corridor, already pushing capacity limits with about 82,000 vehicles per day is projected to grow to over 100,000 vehicles per day by 2035. Efficient travel for commuting traffic must be maintained in order to fulfill the corridor’s role in support of the State’s economic vitality.

#### 2.1.3 Recreational Travel and Tourism

The corridor serves as a tourism and travel route between Arizona and Mexico. Recreational opportunities along the corridor include:

- Coronado National Forest – 1,783,639 acres of multiple use opportunities throughout southeastern Arizona.
- Tubac - Home to the Art Colony of Tubac.
- Presidio State Historic Park – Presidio established 1752 at Tubac.
- Santa Cruz River - a top spot for Arizona birding.
- Saguaro National Park - near Tucson, over 700,000 annual visitors.

## 2.1.4 Multimodal Opportunities

### Pima County and Tucson

The Pima Association of Governments (PAG) manages federal transportation dollars apportioned to the Tucson region, including funding for regional transit improvements. Regional transit is also supported by a Regional Transportation Authority's funded through a ½ cent transaction privilege tax. (Short Range Transit Plan, PAG, 2013)

PAG operates a variety of services, designed as an integrated and seamless transit concept. Services include:

- Sun Tran
- Sun Express
- Sun Van
- Sun Shuttle
- Sun Shuttle Dial-a-Ride



Riders use an integrated fare payment system to access different services without the need to purchase additional full fare passes. The services provide an important link connecting the Tucson Metropolitan area to surrounding rural and suburban communities.

The current Sun Tran system provides over 20 million passenger trips annually utilizing a fleet of 253 buses on 27 local routes and 17 express routes serving the majority of the City of Tucson as well as South Tucson, Marana, unincorporated Pima County and Oro Valley. Sun Tran's 253 bus fleet runs 365 days a year to meet the transportation needs of customers.

Dial-a-Ride services extend to Oro Valley and Green Valley/Sahuarita. The Town of Oro Valley funds, manages and operates Sun Shuttle Dial-a-Ride senior services as well as general public services in Oro Valley.

### Nogales and Santa Cruz County

Although there is interest in transit services from Nogales along the I-19 corridor to Rio Rico and Tubac, with connections to Tucson, no public agency has been identified to operate a transit system in the area. (Unified Nogales South Santa Cruz County Transportation Plan 2010)

## 2.1.5 Land Use, Ownership & Jurisdictions

The I-19 corridor serves a variety of land uses and jurisdictions. The corridor begins in the City of Nogales on the south end at the border with Mexico. Segments 1 and 2 are fringe urban (See **Table 1**) in nature, dominated by commercial, industrial, and transportation industry uses.

The north end is anchored by the City of Tucson, and transitions from fringe urban in segment 5 to urban uses and heavier traffic in segment 6. The outlying areas include residential subdivisions with a variety of lot sizes, dispersed residences, and light commercial development.

The Tohono O'odham Nation, San Xavier District abuts the corridor south of Tucson and operates two Desert Diamond Casino locations near Valencia Road/Nogales Highway and at I-19/Pima Mine Rd. in Sahuarita.

The corridor between the two cities is predominantly rural in nature, with several retirement and bedroom communities. The rural towns of Rio Rico, Tumacacori, Tubac, and Amado are in Santa Cruz County. The communities of Green Valley and Sahuarita, in Pima County, orient more toward Tucson, with many people commuting to employment in the City.

The Coronado National Forest, while not immediately adjacent to the corridor, is a major entity in the region, providing a large array of dispersed recreational opportunities.



### 2.1.6 Population Growth

Pima County will grow from just over one million residents in 2015 to 1.3 million by 2035, with over half the county's residents in Tucson. Overall, the county will see moderate growth during the period, with faster growth in some outlying areas such as Sahuarita. The urbanized zone will grow toward the south, with accompanying urban-style traffic. Santa Cruz County is also projected to receive moderate population growth during the period. See **Figure 2**.

**Table 2: Current and Future Population**

Current and Future Population				
Area	2015	2035	Annual Growth Rate	Total Growth
<b>Santa Cruz County</b>	<b>50,903</b>	<b>67,923</b>	<b>1.45%</b>	<b>33.4%</b>
Nogales	22,348	29,821	1.45%	33.4%
Patagonia	978	1,305	1.45%	33.4%
Rio Rico CDP	20,370	27,181	1.45%	33.4%
Sonoita CDP	879	1,173	1.45%	33.4%
Tubac CDP	1,279	1,707	1.45%	33.4%
Balance of County	27,576	36,797	1.45%	33.4%
<b>Pima County</b>	<b>1,022,079</b>	<b>1,312,101</b>	<b>1.26%</b>	<b>28.4%</b>
Marana	41,019	68,859	2.62%	67.9%
Oro Valley	42,259	52,072	1.05%	23.2%
Sahuarita	28,483	48,527	2.70%	70.4%
South Tucson	5,670	5,544	-0.11%	-2.2%
Tucson	537,129	683,038	1.21%	27.2%
Balance of County	367,519	454,061	1.06%	23.5%

source: <https://population.az.gov/population-projections>

### 2.2 Project Stakeholders

Key stakeholders identified for this study include the Pima Association of Governments (PAG), the Southeast Arizona Council of Governments (SEAGO), ADOT Tucson District, and other ADOT departments. The stakeholders serve as the sounding board for the project team, and provide guidance on local data sources, issues, and challenges. The Corridor Vision was a critical milestone that benefited from stakeholder input.

ADOT hosted a meeting at its Tucson office in early December 2014 to review the results of the baseline system performance analysis from Task 2 and to gather information from stakeholders about the corridor, its function, and goals to be included in the corridor vision. PAG hosted a second meeting on January 14, 2015 attended by ADOT and consultant staff to gather additional

input from stakeholders. All stakeholder input has been included as appropriate in this report. Some items related to needs and priorities are deferred for consideration later in the process.

**Table 3: Project Stakeholders**

Project Stakeholders
Arizona Department of Transportation, Tucson District
City of Nogales
City of Tucson Ward 1 Department of Transportation
Fresh Produce Association of the Americas
Greater Nogales Santa Cruz County Port Authority
Pascua Yaqui Tribe
Pima Association of Governments (PAG) Transportation Planning Subcommittee Economic Vitality Advisory Committee
Pima County Department of Transportation Strategic Planning
Regional Transportation Authority/Mainstreet Program
Santa Cruz County
Southeast Arizona Council of Governments (SEAGO)
Tohono O'odham
Town of Sahuarita
Tucson Hispanic Chamber

A summary of comments and discussion items at stakeholder meetings is included in **Table 4** on the next page. These discussion items added significant value to the corridor vision. While the additional data collection and analysis requested by some participants are useful and important for future corridor planning, additional data points are not possible within the scope of this corridor profile that is dependent on uniform and broad data sets that are applicable to all corridors in the program. However, intense local interest in the future of the corridor, and the desires of agencies representing jurisdictions on the corridor, should be kept "on the table" as more specific plans are developed to address future improvements. The project team is grateful for the input and the desire to improve transportation in the corridor and for local communities. Written meeting notes and comments are included in **Appendix B**.

**Table 4: Summary of Stakeholder Input**

Summary of Stakeholder Input	
Comment	Response
<b>TRUCKS</b>	
Above all, the future I-19 corridor should be attractive to truck/freight haulers.	<p>This Corridor Vision and the I-19 Corridor Profile recognize the role of I-19 as a major truck and commerce route. The International Border Crossing at Nogales is one of the largest crossing points on the border. The truck volume projections included in this report show significant growth during the planning period. Growth projections included from other sources sometimes exceed this report's numbers, which are based on a combination of historical growth and economic/land use estimates inherent to the statewide travel demand model. The model is adjusted regularly to reflect measured conditions. As the model adjusts over time, so will this corridor profile, which will be periodically updated as new data becomes available.</p> <p>The interaction of truck size and weight with pavement conditions and the traffic stream must be addressed at the ADOT policy level. This comment will be forwarded to ADOT Multimodal Planning Division for consideration.</p> <p>Congestion in the urban segments of I-19 is documented in Working Paper #2: Existing Corridor Performance which recognizes the effects on truck traffic.</p> <p>Given the nature of this project, which is restricted to data common to all corridors in the study, we are not able to modify truck traffic projects using other study results. However, Working Paper #1: Literature Review references a large selection of other studies. Those studies should be consulted during project development for any proposed improvements.</p>
We should seek to advance economic competitiveness through infrastructure improvements.	
There is a strong desire to accommodate projected traffic and truck traffic growth before it become even more problematic.	
A bottleneck exists at the SR 189 Traffic Interchange resulting in periodic delays for trucks. Please include other study data in the corridor profile. See BORDER WIZARD for projected truck flows at the border crossing.	
Expansion of Mexican seaports will contribute to increasing truck traffic flowing north through Mexico to the United States. The Sonoran Corridor (Highway 15) is currently being expanded south of the border and will carry a greater volume of traffic, especially trucks, north.	
Truck weight limits are an impediment to full development of the corridor as an international truck route. A lot of heavier vehicles have begun entering the US through Texas, which inhibits achieving full economic potential. The higher Mexican weight limits require splitting loads before traveling Arizona highways. The weight limits, restrictions on tandem trailers, and pavement load capability should be adjusted to accommodate heavier vehicles.	
Time is everything to the truck industry. Congested urban corridors slow truck traffic and cost money. The future I-11 would utilize the southern part of I-19 in any case. I-11 may bypass Tucson and provide benefits to truck travel times and reliability.	
Please include other study results in the corridor analysis.	
<b>GENERAL TRAFFIC &amp; GROWTH</b>	
Current trend of urbanization south of Tucson to Sahuarita will continue in the future	<p>Working Paper #2: Existing Corridor Performance effectively documents the migration of urban level traffic volumes and congestion south from Tucson during the planning period. Those results will inform the Corridor Profile Study as it identifies solutions in subsequent phases.</p> <p>These items are a focal point of the study and are documented in Working Paper #2.</p> <p>Delay in several locations is documented and is attributed to a number of causes.</p> <p>This study focuses on mainline conditions. The study team does recognize that near capacity interchanges have a dramatic effect on local mobility. Previous studies documented in Working Paper #1 address interchanges, ramps, and frontage roads at a detailed level. Those plans are expected to proceed as documented elsewhere.</p>
Concern about future population growth and economic development south and west of Tucson, including impacts to traffic. Be sure to address commuting requirements for outlying communities.	
Focus on safety, infrastructure condition and the efficient movement of freight.	
Safety problems and accidents contribute to delay.	
Poor traffic interchange operations contribute to delay.	
Congestion at I-19/Ruby Road will continue to worsen.	
Frontage roads from Pima Mine Road north would support economic development along corridor.	
<b>OTHER</b>	
Please include the San Xavier Indian Reservation of the Tohono O'odham Nation on maps	Reservations are included on principal corridor maps to show the overview of jurisdictions and other land uses. Jurisdictional boundaries are not displayed on data-specific maps so as to effectively highlight the map's subject matter.

### 3 SUMMARY PERFORMANCE BY PERFORMANCE AREA

The I-19 Corridor Profile Study established a comprehensive set of performance measures in Work Paper #2: Existing Corridor Performance. The measures include five primary measures or indices: pavement, bridge, mobility, safety, and freight. Each index provides a high level overview of the performance area at the corridor and segment level.

In addition to the five primary measures, a set of secondary measures have been identified to provide more in-depth views into more specific components of performance, also at both the corridor and segment level. See **Table 5**. This section summarizes key measures that are not performing at optimal levels. See Working Paper #2 for a detailed description of the measures and the performance of I-19. See **Figure 2**.

**Table 5: Performance Measures**

Performance Index	Primary Measures	Secondary Measures
<b>Pavement</b>	<ul style="list-style-type: none"> <li>Pavement Serviceability &amp; Cracking</li> </ul>	<ul style="list-style-type: none"> <li>Directional Pavement Serviceability</li> <li>Percent Pavement Area Failure</li> <li>Pavement Hot Spots</li> </ul>
<b>Bridge</b>	<ul style="list-style-type: none"> <li>Deck, Sub-structure, &amp; Superstructure</li> <li>Structural Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Bridge Sufficiency Rating</li> <li>Functionally Obsolete</li> <li>Bridge Hot Spots</li> </ul>
<b>Mobility</b>	<ul style="list-style-type: none"> <li>Average of Current and Future V/C</li> </ul>	<ul style="list-style-type: none"> <li>Existing Directional Peak Hour Volume/Capacity</li> <li>Future Volume/Capacity</li> <li>Directional Travel Time Index</li> <li>Directional Planning Time Index</li> <li>Directional Closure Frequency</li> <li>Percent Non-SOV Trips</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>Fatal/Serious Injury Crashes</li> </ul>	<ul style="list-style-type: none"> <li>Percent Strategic Highway Safety Plan Emphasis Areas</li> <li>Fatal Truck Crashes</li> <li>Safety Hot Spots</li> </ul>
<b>Freight</b>	<ul style="list-style-type: none"> <li>Truck Planning Time Index</li> </ul>	<ul style="list-style-type: none"> <li>Directional Truck Travel Time Index</li> <li>Directional Truck Planning Time Index</li> <li>Closure Duration</li> <li>Clearance Restrictions</li> </ul>

**Figure 2: Summary Corridor Performance**

#### 3.1 Pavement

Pavement performance is rated Good on average for the corridor. Areas of poor pavement condition in the International Roughness Index (IRI) and Percent Cracking have been identified on portions of the corridor.

#### 3.2 Bridge

Bridge performance is rated Fair on average for the corridor. Factors negatively affecting the Bridge Index include the deck condition and structural elements. While the Bridge Sufficiency Rating (a composite index of condition ratings) rates high for most structures on the corridor, one-third of the total 76 bridges are rated Functionally Obsolete – mainly due to pavement width relative to increased traffic volumes. All four bridges on I-19 in Nogales are rated Functionally Obsolete.

#### 3.3 Mobility

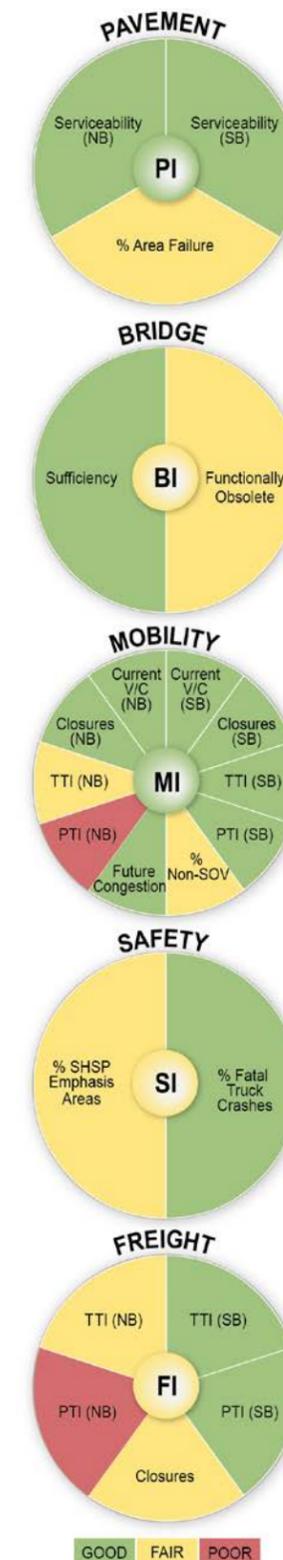
Mobility performance is rated Good on average for the corridor, with exceptions in the Tucson area where heavy traffic volumes exceed Level of Service (LOS) expectations during peak hour traffic and for all traffic in the future. Travel time reliability measures (Travel Time Index and Planning Time Index) are also performing at lower levels, particularly for northbound traffic near the Nogales Border Crossing and at the Border Patrol Checkpoint in the Tubac area. Multimodal Opportunities, measured by the number of non-single occupant vehicles, is Fair throughout the corridor, primarily for the lack of effective intercity bus from Nogales to Tucson.

#### 3.4 Safety

Safety performance is rated Good on average for the corridor based on the total number of serious and fatal crashes. However, the number of such incapacitating crashes categorized as emphasis areas in the Strategic Highway Safety Plan (SHSP) falls in the Fair category. SHSP emphasis areas include speeding/aggressive driving, impaired driving, seatbelt use, use of motorcycle helmets, and distracted driving.

#### 3.5 Freight

Truck performance is rated Good on average for the corridor. However, areas of concern are noted, especially in the Planning Time Index which reflects slow travel speeds relative to the posted speed limit on southern parts of the corridor. In addition, the duration of closures is rated Fair throughout the corridor.



## 4 CORRIDOR VISION AND PERFORMANCE GOALS

### Corridor Vision

Future investments on the I-19 corridor will focus on its role as a major regional corridor for intrastate traffic and international commerce between Mexico and the US, providing efficient and safe movement of trucks and goods from the international border crossing in Nogales to its connection with I-10 in Tucson.

As the Tucson area continues to grow, the I-19 corridor will continue to support the efficient movement of people and vehicles during daily commutes and other trips to and from the Tucson and outlying suburban areas. Future efforts on the corridor will strive to attain and maintain performance of Infrastructure condition, safety, and multimodal opportunities within targeted ranges.

### 4.1 Emphasis Areas

Future investments will emphasize objectives and goals that improve or maintain performance at the highest feasible level in performance areas that support the corridor vision. Emphasis areas include Mobility, Freight, and Safety. Performance goals are identified in this corridor vision for the emphasis areas that achieve reported performance in the above average, or good, range.

*Note: While the prevalence and severity of vehicle crashes on I-19 is substantially better than certain other corridors, spot analysis confirms some areas of concern. ADOT's goal is always to reduce the frequency and severity of crashes.*

Achieving these goals will help ensure that investments are targeted toward improvements that support the safe and efficient movement of freight by trucks on the corridor. Addressing current and future congestion, thereby improving mobility on congested segments, will also help the corridor fulfill its potential as a significant contributor to the region's economy.

Goal achievement will improve or reduce current and future congestion, increase travel time reliability, and reduce fatalities and serious injuries resulting from vehicle crashes.

Where performance is rated good, the goal is always to maintain that standard, regardless of whether or not it is an emphasis area. Budgetary and other prioritization needs will be considered within overall system needs.

The objective for each of the five index areas applies to the weighted average for the entire corridor. Objectives for each of the secondary performance measures applies to each specific corridor segment. Corridor performance will be measured against corridor and segment goals to

determine needs in subsequent tasks and working paper 4. See **Table 6** on the next page for summary of corridor objectives and corridor and segment goals.

### 4.2 Pavement

Current pavement performance ranks well above the average. Several spot locations of pavement failure were noted in the analysis where performance ranks poor, or well below average. Since serious impediments to truck and commuter travel are not typical through the corridor, current average performance is deemed adequate and should be maintained at least at that level. Maintaining current performance levels over time will require on-going pavement repair and rehabilitation, including the improvements at locations reporting poor performance.

### 4.3 Bridge

Current bridge performance ranks near average. Since serious impediments to truck and commuter travel are not typical through the corridor, current performance is deemed adequate and should be maintained at least at that level. Improvements should be made as funding permits. Maintaining current performance levels over time will require on-going bridge repair and rehabilitation, including the replacement of functionally obsolete bridges where identified.

### 4.4 Mobility

Mobility on the corridor ranks good, or above average, with some spot exceptions. Since Mobility is identified as an emphasis area, the goal is to maintain a high level of performance for vehicle and truck traffic throughout the corridor. In addition, travel time reliability in some segments is Poor. Investing in improved travel time reliability in segments with lower performance will result in improved overall corridor performance scores.

### 4.5 Safety

Safety on the corridor ranks good, or above average, with some spot location exceptions. Since reducing the number and seriousness of vehicle crashes is identified as a key statewide goal and a corridor emphasis area future investments will continue to be directed to safety improvements at locations with higher than average severe or fatal crash rates. This strategy will help maintain a high level of safety performance on the corridor.

### 4.6 Freight

Freight performance on the corridor ranks good, or better than average, with some spot location exceptions. Since freight and commercial traffic is a strategic goal for I-19, the goal for this emphasis area is to maintain and improve freight performance scores in the good category. Performance measures indicate unacceptable performance in travel time reliability in certain spot locations. Future investments will focus on creating better truck travel time reliability where needed.

Table 6: Goals and Objectives by Performance Area

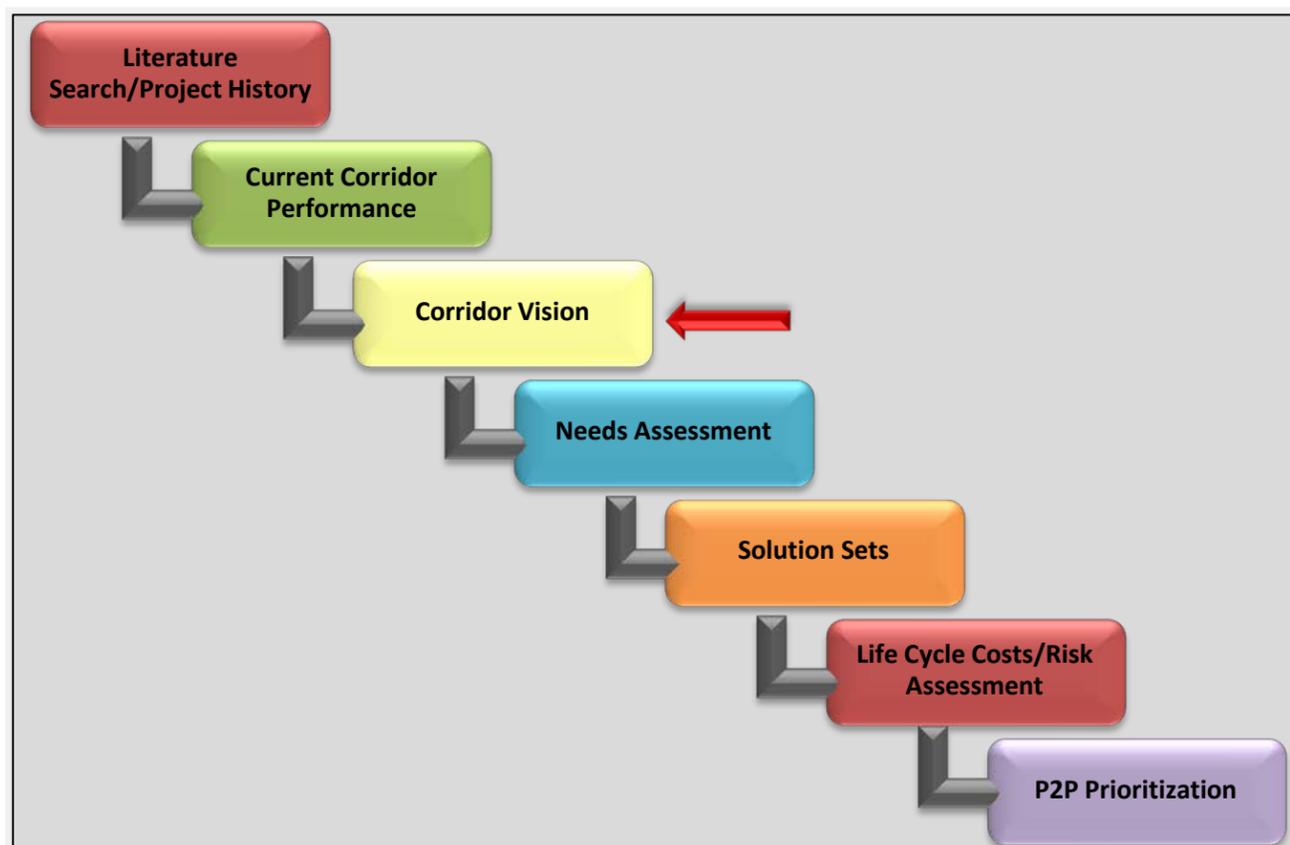
I-19 Corridor Goals and Performance Objectives						
L RTP Statewide Goals	Performance Area	Corridor Goals	Emphasis Area		Corridor Objectives (Weighted Average)	Segment Objectives
<b>Preserve and Maintain the System</b>	Pavement	Maintain roadway in fair or better condition		<b>Pavement Index</b>	Fair or better	Fair or better
				Directional Pavement Serviceability		Fair or better
				Percent Pavement Area Failure		Fair or better
	Bridge	Reduce the number of structurally deficient bridges		<b>Bridge Index</b>	Fair or better	Fair or better
				Bridge Sufficiency Rating		Fair or better
				% Deck Area on Functionally Obsolete Bridges		Fair or better
<b>Improve Mobility and Accessibility</b> <b>Support Economic Growth</b>	Mobility	Reduce current and future congestion on congested segments	✓	<b>Mobility Index</b>	Good	Fair or better
				Existing Directional Peak Hour V/C		Fair or better
				Future V/C		Fair or better
		Increase vehicle travel reliability	✓	Directional Closure Frequency		Fair or better
				Directional Travel Time Index		Fair or better
				Directional Planning Time Index		Fair or better
	Increase modal choice		Percent Non-SOV Trips		Fair or better	
	Freight	Improve freight travel reliability	✓	<b>Freight Index</b>	Good	Fair or better
				Directional Travel Time Index		Fair or better
				Directional Planning Time Index		Fair or better
Closure Duration					Fair or better	
<b>Enhance Safety and Security</b>	Safety	Reduce fatalities and serious injuries	✓	<b>Safety Index</b>	Good	Fair or better
				Percent SHSP Emphasis Areas		Fair or better
				Percent Fatal Truck Crashes		Fair or better

## 5 NEXT STEPS IN CORRIDOR PROFILE STUDY

The next step in the I-19 Corridor Profile Study will be to conduct a needs assessment based on the relationship of performance to goals. The project team will compare measured performance (see Working Paper #2) to the Corridor Objectives and Goals identified in this Working Paper #3.

The variance between performance and goals will be identified as “need.” Following the needs analysis, the project team will undertake to identify “solution sets” designed to mitigate corridor deficiencies and improve performance.

Figure 3: Corridor Profile Study Tasks





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## Appendix B Stakeholder Comments

1 PAG Stakeholder Visioning Meeting Notes 011415

2 SEAGO 121114

3 Tucson District 010615

4 Romero\_ Tucson 011415

5 City of Tucson DOT 011515

6 Town of Marana 011515



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### Meeting Notes

**I-19 Corridor Profile Study  
Nogales to Junction I-10  
ADOT Work Tast No. MPD 072A-14  
ADOT Contract No. ADOT11-013177**

Subject: I-19 Corridor Profile Study Visioning Meeting  
Date: January 14, 2015  
Time: 1:00 PM  
Location: Pima Association of Governments (PAG) office  
Prepared by: Dale Wiggins & Ed Hocker

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**ATTENDEES:** See attached sign-in sheet

#### **MEETING NOTES:**

- Above all, the future I-19 corridor should be attractive to truck/freight haulers.
- Bottleneck at SR 189 Traffic Interchange. Please include other study data in the corridor profile. See BORDER WIZARD.
- Concern about future growth south and east of Tucson, and economic development, including impacts to traffic. Be sure to address commuting requirements for outlying communities.
- Desire to accommodate projected traffic and truck traffic growth before it become even more problematic.
- Expansion of Mexican seaports will contribute to increasing truck traffic. The Sonoran Corridor (I-510) is currently being planned and will bring more traffic. New TI with I-19 proposed north of Pima Mine TI.
- Current trend of urbanization south of Tucson including Green Valley will continue in the future.
- Concern that corridor profile traffic and truck projections do not adequately address future inputs.
- Please include the San Xavier Indian Reservation of the Tohono O'odham Nation on maps.
- Truck weight limits are an impediment to full development of the corridor as an international truck route. A lot of heavier vehicles have begun entering the US through Texas, which inhibits I-19 from achieving its full economic potential. The higher Mexican weight limits require splitting of loads before traveling on Arizona highways. The weight limits, restrictions on tandem trailers, and pavement load capability should be adjusted to accommodate heavier vehicles. Current heavy load restrictions start at Rio Rico. There is also interest in the adjusting the weight limits to allow rail freight to be more easily transferred to and from trucks at the Port of Tucson and along I-19. ADOT Research Branch (Javier Gurrola) will be performing a Heavy Weight Study on I-19.
- Time is everything to the truck industry. Congested urban corridors slow truck traffic and cost money. The future I-11 would utilize the southern part of I-19 in any case. I-11 may bypass Tucson to the west and provide benefits to truck travel times and reliability.
- Safety problems and accidents contribute to delay.

- Poor Traffic interchange operations contribute to delay. Traffic backs up on the ramps onto I-19 at a few TI's causing delay and congestion on I-19.
- Frontage roads from Pima Mine Road north would support economic development along corridor, provide alternate routes and improve access along I-19.
- Improve economic competitiveness through infrastructure improvements.
- Please include more information regarding the sources of data. Particularly Arizona's Statewide Travel Demand Model and what data is used as inputs from the region and Mexico.
- While interchanges may be beyond the scope of this study, they are a critical element along this corridor given the many communities along I-19 and the need for efficient access.
- Will this study reference ADOT priorities as expressed as part of the Key Commerce Corridors, the TTCA Roadmap, funding priority of improvement to SR-189, and others?
- While the quantitative analysis of these corridor studies will be important for comparing needs and performance among these corridors, jurisdiction representatives requested that it be noted that this should not be the only study used to inform transportation funding priorities. If not mentioned in the text, perhaps this could be added.



From: [Randy Heiss](#)  
To: [Wiggins, Dale](#)  
Subject: RE: I-19 Corridor Profile Study - Existing Corridor Performance  
Date: Wednesday, December 10, 2014 4:02:15 PM

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Dale –

In response to the visioning questions:

What are the major functions of I-19?

***From our perspective, this is a critical rural freight corridor, even though it hasn't been designated as such just yet. It is also a vital link between Nogales and Tucson and points north, east and west.***

What problems do you see now and in future?

***Congestion at the I-19/Ruby Road TI will continue to worsen, although this does not appear to be a consideration in your corridor analysis. If the truck traffic doubles along the corridor as predicted with the expanded capacity at the Mariposa LPOE, and improvements currently being planned for the I-19/SR189 TI, we may soon see traffic backing up all the way down the NB Ruby Road exit ramp and into the right NB lane of I-19. Congestion will also become worse on the approach to the Border Patrol checkpoint worsening the Truck Travel Time Index.***

Emphasis on Freight, Travel Reliability, Congested Segments, and Safety?

***Yes, all of the above.***

What do you see as desired future for I-19?

***A corridor that will safely and efficiently accommodate the movement of goods and people.***

This coming January is an extremely busy month for us at SEAGO, so depending on the date and time for the TAC meeting, it may be difficult to participate.

Thanks,

Randy Heiss

Executive Director

SouthEastern Arizona Governments Organization

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From: David Brauer  
Sent: Tuesday, January 06, 2015 10:08 AM  
To: Asadul Karim  
Cc: Emily Dawson  
Subject: I-19 Corridor Profile Study

Asad,

Attached is the District's view on the study emphasis.

Regards,

**David G. Brauer PE  
Project Manager  
Urban Project Management Group  
1221 S. 2<sup>nd</sup> Ave.  
Tucson, AZ 85713-1602  
520.388.4263**



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From: Emily Dawson  
Sent: Tuesday, January 06, 2015 9:59 AM  
To: David Brauer  
Subject: I-19 Corridor Profile Study

Hello David, URS requested Tucson District provide input on our priorities concerning the I-19 Corridor Profile Study. Would you please review and forward District's comments to the interested parties.

Thank you man,

I-19 is the only transportation corridor in Arizona for traffic from Mexico, Central and South America. The port in Nogales delivers millions of dollars of produce and other products across the United States and over 1.2 million passenger vehicles cross here each year. With the recent improvements at the Mariposa Port of Entry, the port in Nogales is expected to see increases of three times the traffic volumes it currently handles and increases in overweight truck traffic. The majority of this traffic will find its way onto I-19. I-19 will eventually tie into the I-11 corridor transporting freight and other traffic throughout Arizona. It is imperative, if we want Arizona to be

the preferred route into the United States, that I-19 is perceived as the safest and most efficient route. Otherwise freight will use ports in California or Texas and severely impact the economy of Arizona.

Tucson District recommends this study incorporate the latest traffic volume data through the port and information gained from the MPD Key Commerce Corridor Study. We need to focus on Safety, infrastructure condition and on the efficient movement of freight across Arizona and I-19 is the critical component in accomplishing this goal.

**Emily Dawson**

**Tucson District Development**

1221 S. 2nd Ave MD T100

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REGINA ROMERO, COUNCIL MEMBER  
WARD 1 COUNCIL OFFICE

Arizona Department of Transportation  
c/o Samuel Sanford, Transportation Planner  
Pima Association of Governments  
1 E. Broadway Blvd., Suite 401  
Tucson, AZ 85701

January 14, 2015

**RE: Arizona Department of Transportation I-19 Corridor Profile Study**

I would like to express my gratitude to the Arizona Department of Transportation for recognizing the need to evaluate corridor conditions on Interstate 19. I have joined public servants and business leaders in recent years to advocate for interchange improvements at Ajo and I-19, and I am pleased to see that project moving forward. I strongly believe that we must continue to prioritize greater modernization and improvements along the length of I-19.

Interstate 19 is a critical corridor through the City of Tucson, linking our urban core with growing neighborhoods to the Southwest and connecting our region to Mexico, our largest international trade and commerce partner. A recently renovated port of entry in Nogales has created additional opportunities for growing tourism and trade channels through our region. Due to this vital connectivity created by I-19, the corridor has outgrown its current capacity, creating heavy congestion and subsequent safety concerns.

Increased development and rapid growth on the southwest side of Tucson has resulted in a growing demand for interchanges that can accommodate greater traffic flow along the corridor. Most notably the opening of Spectrum mall at Irvington and I-19 has increased congestion on Irvington, which creates delays and traffic back-ups on the west side of the freeway.

In addition to capacity issues, age and heavy use have led to deteriorating pavement conditions, which contribute to traffic congestion, become a hazard for local users and a deterrent for freight traveling through the region. Collectively, these concerns could drive international trade and commerce from Arizona to better maintained corridors.

The needs of I-19 touch on nearly all priority improvement areas for ADOT. Our infrastructure should facilitate expanded opportunities to move freight on an international scale, while improving travel reliability and safety by increasing capacity and addressing congestion. The City of Tucson has recognized these needs, and implemented traffic mitigation features and intersection improvements west of I-19 at Irvington in order to help address this problem. These projects have improved traffic flow some but large scale interchange improvements must be made to appropriately ease congestion for freeway traffic as well as cross-freeway access along the corridor.

With appropriate planning and investment, I-19 could serve as an international trade and commerce corridor, connecting Tucson to Mexico and serving the growing populations of Southwest Tucson as well as the Tohono O'odham and Pascua Yaqui nations. I would like to request that ADOT prioritize the interchange and corridor improvements to Interstate 19, and schedule the project for investment. This corridor is a priority for international economic development and local growth in our region.

In Community,

A handwritten signature in black ink, appearing to read "Regina Romero".

From: Robin Raine [mailto:Robin.Raine@tucsonaz.gov]  
Sent: Thursday, January 15, 2015 7:44 AM  
To: ssanford@PAGregion.com  
Cc: Albert Elias; Daryl Cole  
Subject: Comments for ADOT's I-19 Vision

Mr Sanford,

Following are some comments for the ADOT Corridor Profile Study to assist in creating the Vision for I-19:

Include enough increases in commuter and freight traffic volumes based on additional traffic due to growth of industry on both sides of the border.

If possible, account for planned projects like the highway 15 improvements in Sonora, Mexico, and the Pima County corridor from I-19 to I-10 east.

It will be important for I-19 to be attractive as a freight corridor while it continues to be a heavy commuter route. Within the City of Tucson, this will mean upgrades to the interchanges and increased lanes to provide for better traffic movement even during heavy usage periods. Outside the City, this may mean additional frontage roads.

I-19 provides a great deal of connectivity among adjacent and eastern and western communities while also connecting the border to Tucson. This function would increase as all of those communities continue to grow.

Thanks for the opportunity to assist,

*Robin L. Raine, P.E.*

Deputy Director

Tucson Department of Transportation

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From: [Sam Sanford](#)  
To: "[Curt Woody](#)"  
Cc: [Asadul Karim](#); [Wiggins, Dale](#)  
Subject: RE: I-19 Vision ADOT Corridor  
Date: Friday, January 16, 2015 8:54:12 AM  
Attachments: [image001.jpg](#)  
[image002.png](#)  
[image003.jpg](#)  
[image004.jpg](#)

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Hello Curt,

Thank you very much for your participation in the I-19 Corridor Profile Study Vision meeting and for your written comments. I have included Mr. Karim, from ADOT, and Mr. Wiggins, from AECOM, in this message so they will receive your comments which are included below.

If you would like to follow along with this study as it progresses the website can be located at <http://azdot.gov/planning/CurrentStudies/corridor-profile-studies>. There is a link to I-19 specific information at the bottom of the page.

Thank you for your participation,

Sam

---

**Samual Sanford**

*Transportation Planner*

**PAGsignature**



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From: Curt Woody [mailto:cwoody@MARANA.COM]  
Sent: Thursday, January 15, 2015 5:18 PM  
To: ssanford@pagregion.com  
Subject: I-19 Vision ADOT Corridor

Sam,

Thank you for allowing us to weigh in on this subject. I'm sure the items we identify have already been mentioned and documented. There are going to be a lot of "what ifs" and "could be" statements, especially if I-19 becomes part of the I-11 piece.

- What are the major functions of I-19?  
Currently, I-19 serves as the major arterial for moving people and commerce from Arizona to Mexico and vice versa, as well as the local movement of people and freight to the outlying communities.
- What problems do you see now and in the future?  
As population increases to the South of Tucson in the Sahuarita area the congestion on I-19 will become significant. Arizona and Mexico are increasing their talks for a higher level of commerce to cross the border in both directions. This will further the strain on I-19 and its current capacity.
- What should be the emphasis areas? (Freight, Travel Reliability, Congested Segments, Safety, others)  
Yes! All of the above. If I-11 is to become a reality, and there continues to be no identifiable revenue source for this corridor, then I-19 becomes a much cheaper alternative to building a new highway. Upgrade this section to handle the future activities. Three/four lanes, dedicated freight lane(s), etc.
- What do you see as the desired future for I-19?  
See above

Thank you,

*Curt Woody*, AzED Pro  
Director  
Economic Development & Tourism



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