

# CITY OF DOUGLAS

## *Small Area Transportation Study*

### Final Report

*Prepared for*  
**City of Douglas**

*Prepared by*

*TRANSCORE.*

**and**



**with**  
**Lima & Associates**  
**The Planning Center**

**July 2007**



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# **1. INTRODUCTION**

## **PROJECT PURPOSE**

The general purpose of a small area transportation study (SATS) is to provide a smaller community, like the City of Douglas, Arizona, with guidance on how to address existing and potential future transportation issues within the community. Typically, these studies are conducted within growing communities where city staff, area residents, business owners, or local decision makers have already identified some existing traffic issues and see the potential need for transportation system improvements as the community continues to grow.

A SATS provides city staff and local decision makers with a list of transportation system improvements to meet existing, mid-term, and long-term needs. This allows the community to prioritize the improvements, budget for improvement implementation, and implement the improvements in a manner that meets the needs of the community in the most cost-effective manner. Local funding for transportation improvements is typically very limited, and in many cases the needed roadway system improvements are on state-owned facilities. The state highways may be the most significant transportation facilities in the area, carrying the highest levels of traffic demand.

## **PROJECT OBJECTIVES**

Key objectives of the SATS for the City of Douglas are to provide a comprehensive transportation plan for the future growth in Douglas that will support and enhance cross-border commercial traffic, as well as the increasing traffic demands resulting from new commercial and residential developments. Another important objective is to analyze multi-modal transportation alternatives, including possible transit, bicycle, and pedestrian improvements that will connect existing and future activity centers within the study area. A third major objective is to provide a transportation plan that supports the policies and strategies contained in the adopted 2003 General Plan for the City of Douglas, so that in combination, the transportation plan and the General Plan provide a comprehensive planning approach for future city growth and development.

To support these major objectives, other elements of the project are:

- Identify current regional economic trends.
- Identify regional impacts to the area, including border-crossing activities.
- Incorporate findings of on-going regional planning studies being conducted by ADOT.
- Update the year 2020 population and employment projections in the 2003 General Plan to year 2030.
- Develop a traffic forecast that is based on future population and employment projections and a distribution of development consistent with the 2003 General Plan.
- Evaluate traffic operations for year 2005 and 2030 and assess existing and future roadway system improvement needs.
- Summarize the extent of the existing transit service provided in the study area.
- Evaluate existing and future travel patterns and demand that could be serviced by transit, and develop transit service recommendations.
- Evaluate the need for improvements in pedestrian and bicycle facilities and develop recommended improvements for these modes.

- Conduct a public involvement program for the project that both informs the public on project activities and recommendations, and solicits appropriate information from the public on study area transportation problems and potential solutions.

## **ORGANIZATION OF THE REPORT**

The remainder of this document is organized in the following manner:

- Existing Roadway and Traffic Conditions
- Existing Transit Conditions
- Existing Land Development, Population, and Employment
- Future Land Use and Socio-Economic Data
- Forecast Travel Demand and Traffic Operations Analysis
- Future Multimodal Conditions
- Summary of Existing and Future Deficiencies and Recommendations
- Summary of Public Involvement Activities and Responses

## **2. EXISTING ROADWAY AND TRAFFIC CONDITIONS**

Existing conditions data for the study area were gathered from several sources, including the state Highway Performance Monitoring System (HPMS) database, previous traffic studies conducted within the study area, the Arizona Department of Transportation (ADOT), the 2000 US Census, the adopted 2003 Douglas General Plan, the US Customs Service, area transit service providers, the City of Douglas, the Douglas Unified School District, and field data collection conducted by the Project Team. This section provides a summary of the existing roadway and traffic conditions. Additional details on data used in this study are provided later in this chapter.

### **ROADWAY AND TRAFFIC DATA**

#### **Daily Traffic Volumes**

Average daily traffic volume data were compiled from the ADOT Year 2005 HPMS database. Additional average daily traffic data were provided by ADOT from permanent traffic count stations located on state highways in the study area, and by the US Customs Service for traffic at the Douglas Port of Entry. These data are summarized in Exhibit 2-1. SR 80 from US 191 to Pan American Avenue, Pan American Avenue from the Port of Entry (POE) to SR 80, and 10<sup>th</sup> Street from Pan American Avenue to Florida Avenue are the major traffic carriers in the study area with 10,000 to 20,000 vehicles per day. Other roadways in the study area typically average less than 10,000 vehicles per day.

#### **Roadway Functional Classification**

The existing roadway functional classification for the study area roadways is provided in Exhibit 2-2. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of traffic service that they are intended to provide. There are three highway functional classifications: arterial, collector, and local roads. All streets and highways are grouped into one of these classes, depending on the character of the traffic (i.e., local or long distance) and the degree of land access that they allow. These classifications are described in Exhibit 2-3.

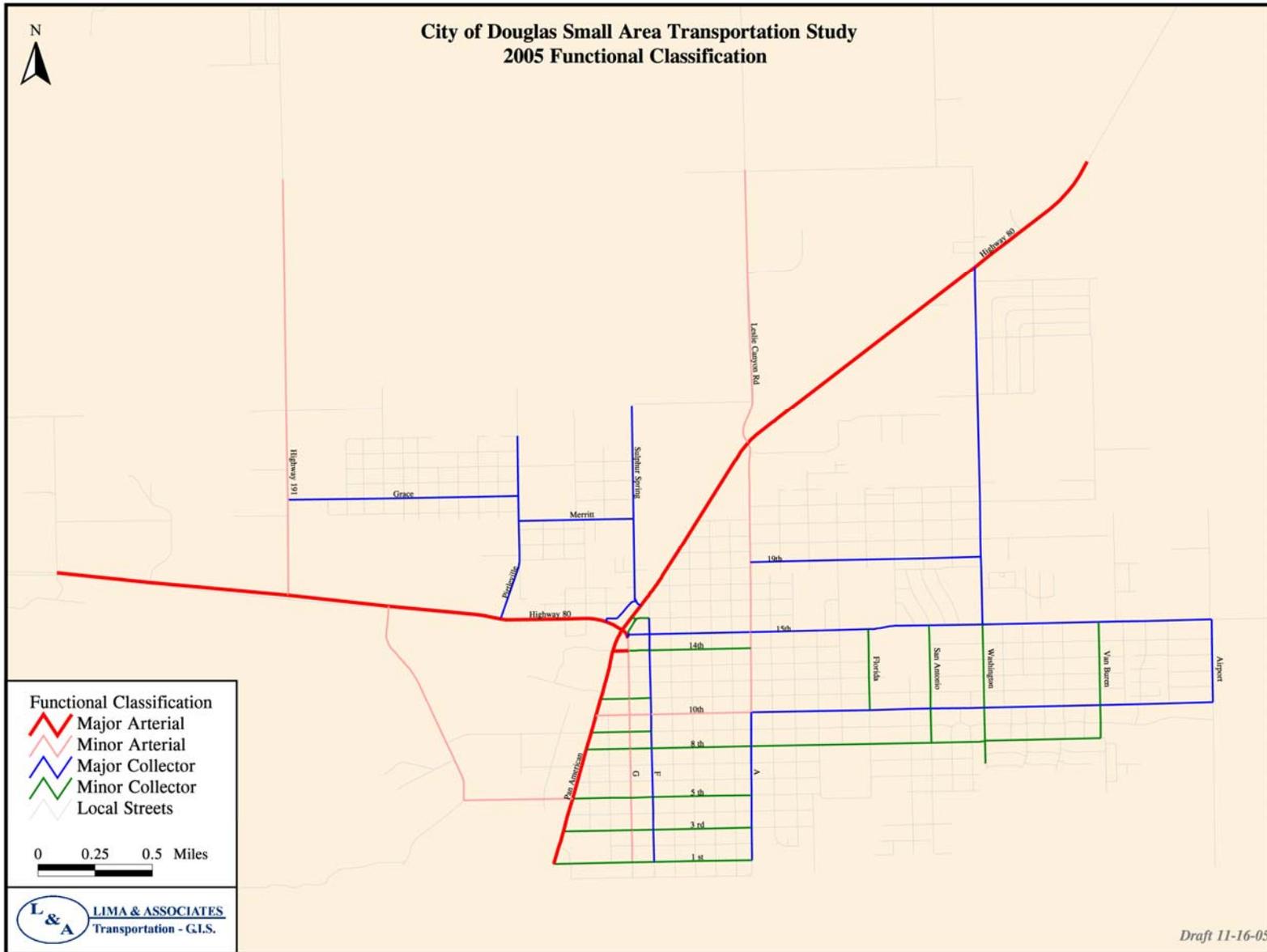
#### **Existing Speed Limits and Number of Lanes**

The existing speed limits in the study area were compiled from the HPMS database and through a field review for the study area roadways. Exhibit 2-4 provides a summary of the existing speed limit information. The analysis of the existing speed limits identified some minor issues that should be addressed by the City of Douglas:

- In a few instances, the speed limits on a collector roadway were posted with different limits in opposite directions of travel (e.g., A Avenue from 16<sup>th</sup> Street to 6<sup>th</sup> Street is posted 30 mph southbound and 25 mph northbound) with no apparent reason for the difference.
- SR 80 transitions to G Avenue at the intersection of Pan American Avenue. SR 80 is a major arterial posted at 40 mph approaching the intersection, and G Avenue is a minor arterial that enters the downtown with a speed limit of 25 mph. There are no speed limit signs posted on G Avenue at the Pan American Avenue intersection alerting motorists on SR 80 of the change in the speed limit (See Exhibit 2-5) as they cross Pan American Avenue.



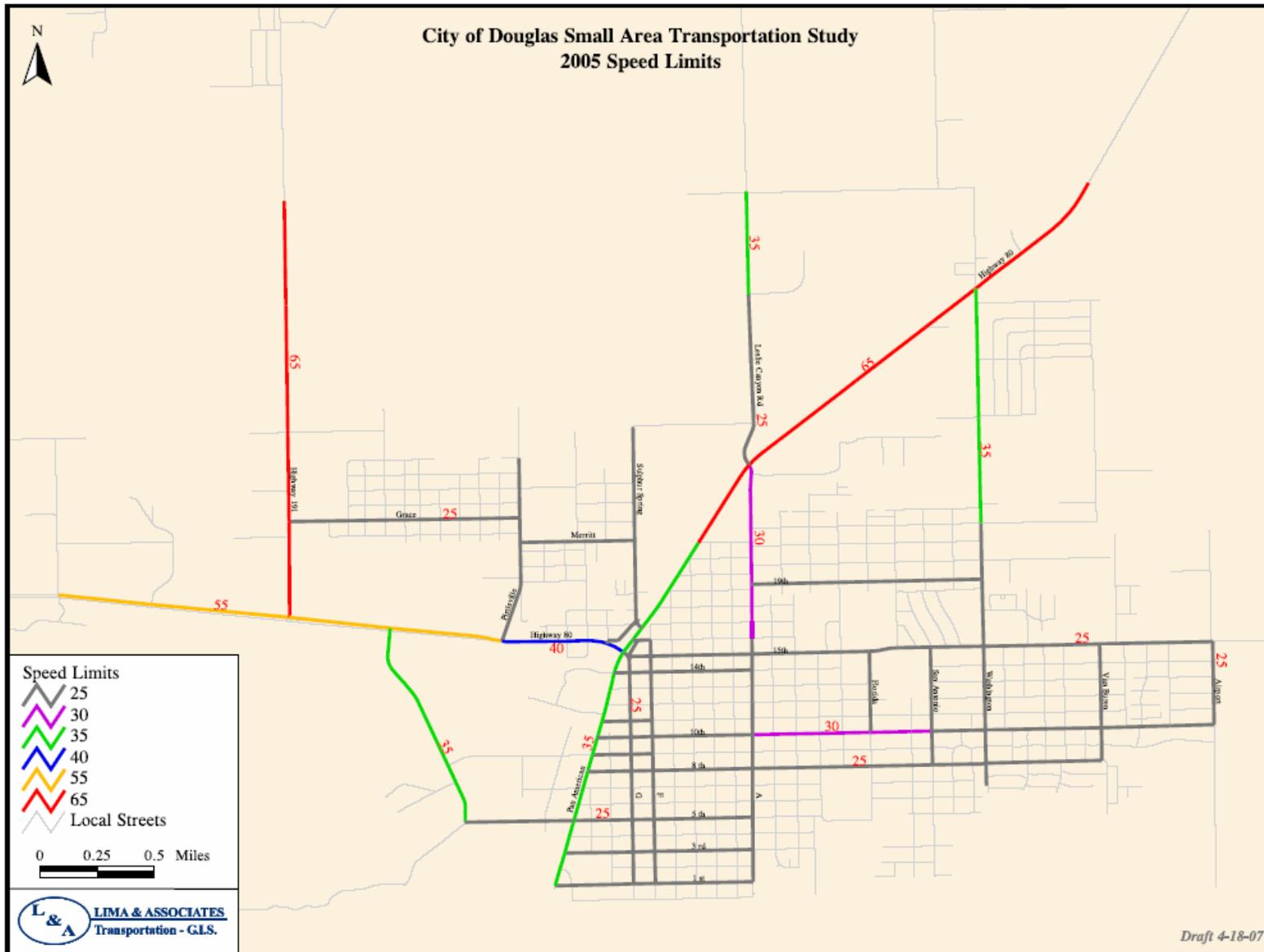
## Exhibit 2-2 EXISTING ROADWAY FUNCTIONAL CLASSIFICATION



**Exhibit 2-3**  
**FUNCTIONAL CLASSIFICATION SYSTEMS**

<b><i>Functional System</i></b>	<b>Services Provided</b>
<b>Arterial</b>	Provides the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control.
<b>Collector</b>	Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.
<b>Local</b>	Consists of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

## Exhibit 2-4 EXISTING ROADWAY SPEED LIMITS



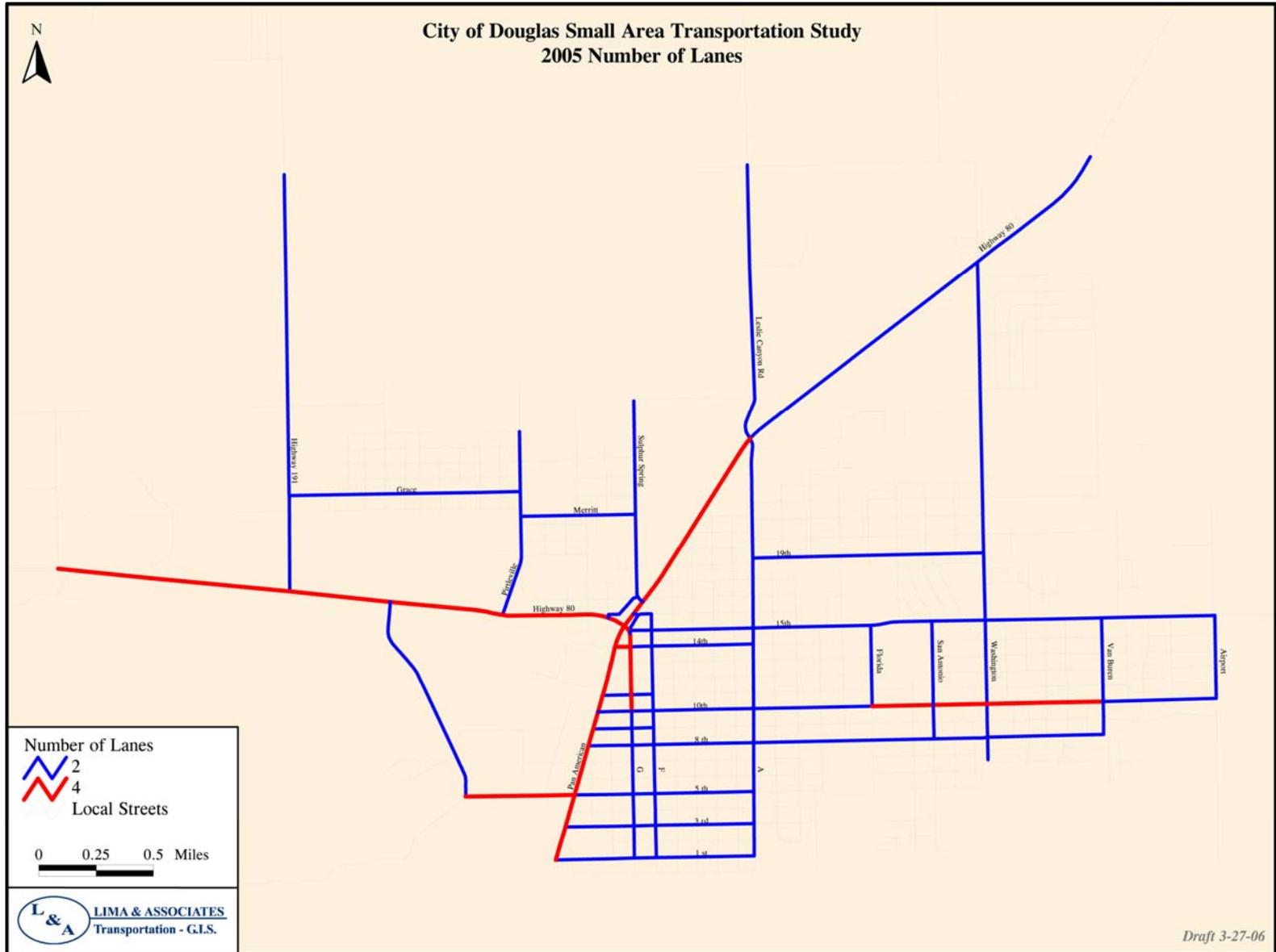
**Exhibit 2-5  
VIEW OF THE INTERSECTION OF SR 80 AND  
PAN AMERICAN AVENUE LOOKING EAST ALONG SR 80**



- The posted speed limit along 10<sup>th</sup> Street is inconsistent. Between A Avenue and Washington Avenue the speed limit is 30 mph, while west of A Avenue, and east of Washington Avenue it is posted at 25 mph.
- From the limited field review, it is suggested that a complete field inventory of speed limit posting be conducted by the City of Douglas to identify and correct inconsistencies.

The existing roadway number of travel lanes was also compiled from the HPMS database and through a field review of the study area roadways. Exhibit 2-6 provides a summary of the existing number of through lanes between major intersections.

## Exhibit 2-6 EXISTING ROADWAY NUMBER OF THROUGH LANES



## **Hourly Traffic Volumes and Intersection Turn Movements**

Four traffic studies have been conducted in Douglas since year 2002. These studies are:

- *ADOT Traffic Signal Evaluation: US191B at 10th Street*, February 2003.
- *SR80/US191 Intersection Study*, August 2003.
- *Wal-Mart Supercenter Chino/5th Street Final Traffic Impact Analysis*, December 2003.
- *Rancho La Perilla Estates Traffic Impact Analysis Report*, December 2004.

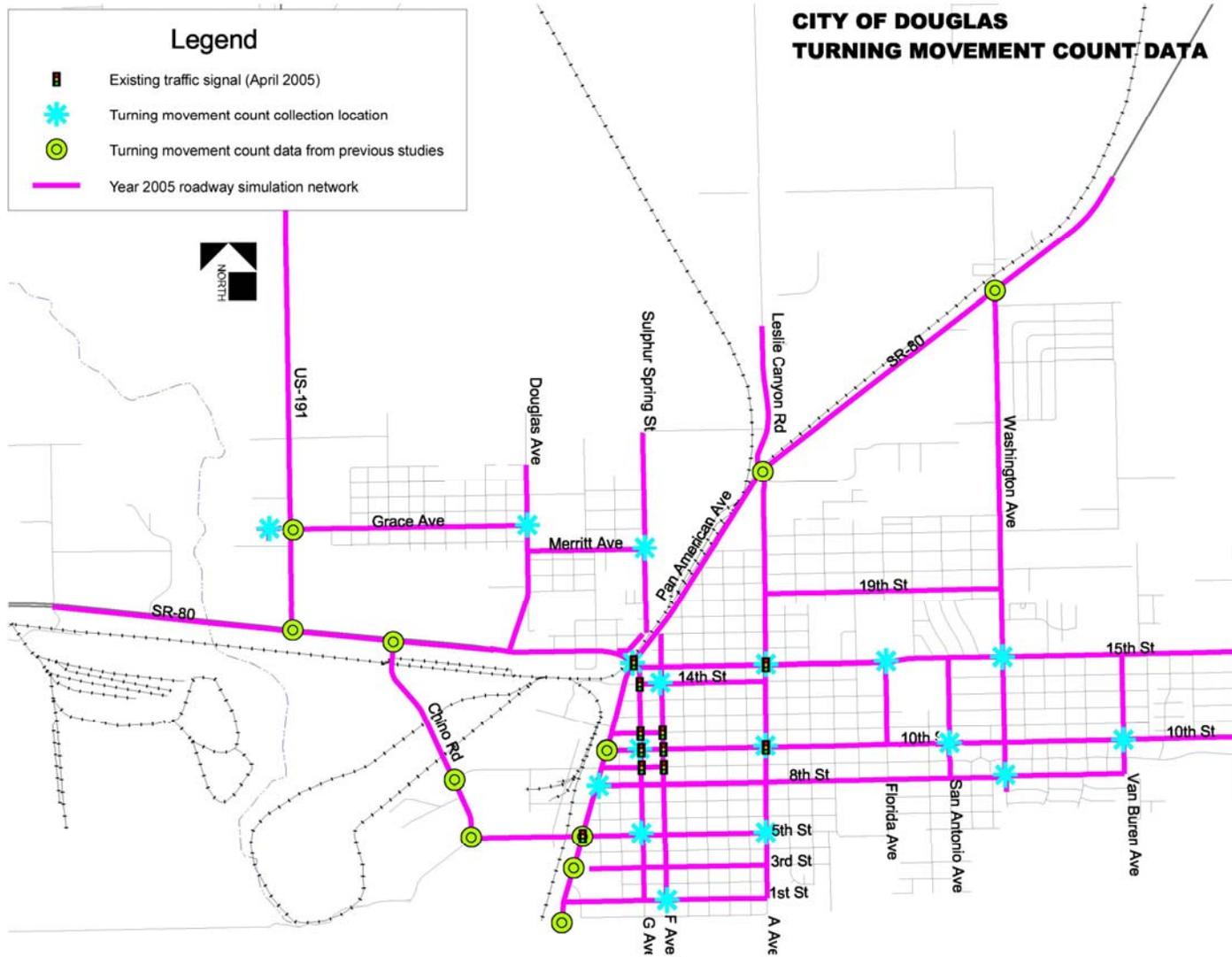
These studies contained intersection turning movement counts for 10 intersections of importance to the SATS. These intersections are indicated in Exhibit 2-7.

Turning-movement volumes for these locations were used as part of the database to develop the existing conditions AM and PM peak-hour traffic volumes for the study area. The process for developing these traffic volumes is described in Working Paper #1 of this study.

Additional turning movement traffic data were collected at a sample of 17 intersections within the study area on typical weekdays during the AM and PM peak hours of travel on September 21 and 22, 2005. The peak travel hours were identified to be in the time periods from 7:00 to 9:00 AM, and 3:00 to 5:00 PM. The locations of these 17 sample intersections are provided in Exhibit 2-7, along with the locations of turning movement traffic data taken from previous studies.

These data were used to evaluate existing traffic operations and levels of service at the intersections within the study area. The details of the process for developing the turning movement data are provided in Working Paper #1 of this study.

## Exhibit 2-7 LOCATIONS OF TURNING MOVEMENT COUNT DATA COLLECTION



## **Traffic Volumes at the International Port of Entry (POE)**

Traffic volumes at the Douglas POE were obtained from the US Customs Service. For traffic entering the US from Mexico, data are collected separately for trucks, defined as commercial vehicles bringing merchandise into the US, and privately owned vehicles (POVs) consisting of all other vehicles (cars, pickup trucks, passenger vans, etc., except buses). Buses are commercially operated vehicles that transport paying passengers, which includes smaller shuttle buses that are commercially operated.

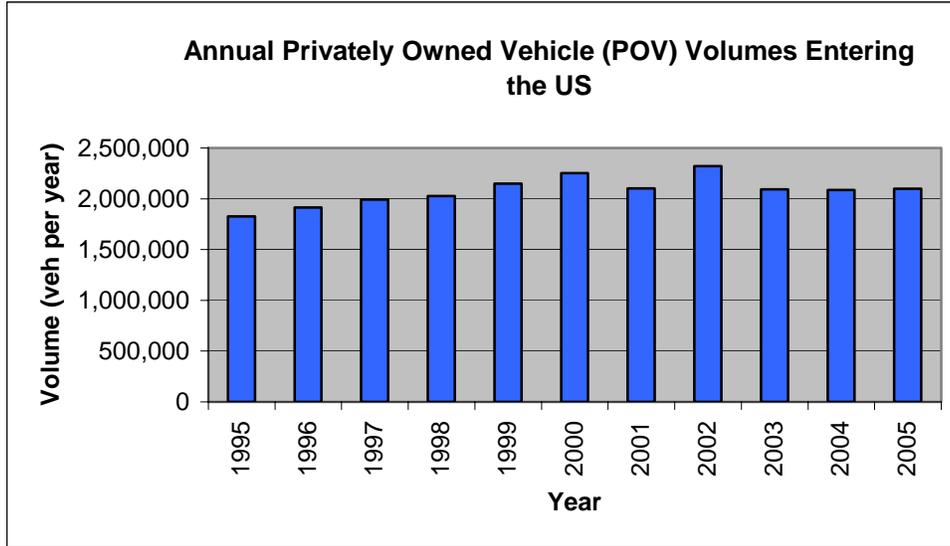
Annual summaries of traffic entering the US for the 11-year period 1995 through 2005 are provided in Exhibits 2-8 through 2-11. POVs entering the US peaked in year 2002 and have declined slightly since then. Truck volumes entering the US peaked in year 1996 and then declined steadily through 2002. Since 2002, truck volumes have increased slightly in 2003, 2004, and 2005. Bus volumes entering the US have grown steadily since 1995, with a significant increase from year 2000 through year 2003. However, during 2004 and again during 2005 bus volumes declined sharply. The number of pedestrians entering the US through the POE showed a general increase each year from 1995 through 2003, but a sharp decline in numbers occurred during 2004 yielding the lowest value for the 11-year period. Pedestrian traffic then increased significantly from the year 2004 low value during 2005, which may be directly related to the decline in bus traffic crossing the border during 2005.

There is no clear trend exhibited in the annual traffic volumes indicating what might be expected in the future. While Douglas continues to develop commercial activities near the border it should be expected that the number of POVs, pedestrians, and buses will also increase. While truck volumes have been trending upwards since 2002, the 2004 and 2005 volumes are still substantially below the peak volumes in 1996.

Data for the number of vehicles entering the US and leaving the US to Mexico by hour of the day were also provided by US Customs for selected days. Hourly data were provided for typical weekdays (Tuesday through Thursday) for October and November 2004, and for August and September 2005. These data were used primarily for the evaluation of traffic operations during the peak traffic hours of the day. Inbound hourly data are available for passenger vehicles and buses combined, and trucks. Outbound data are not available by vehicle type, and are presented as the total number of vehicles per hour.

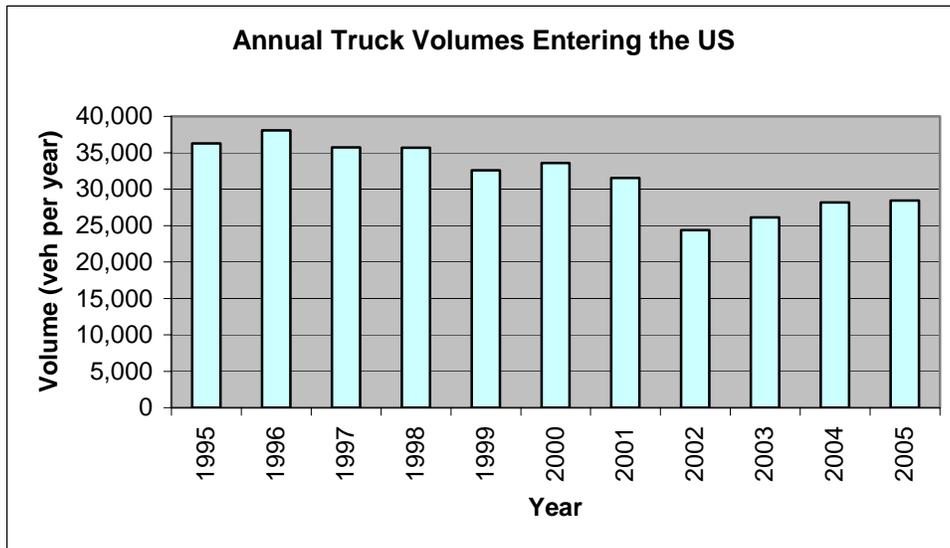
The average hourly inbound total traffic volume for a typical weekday is provided in Exhibit 2-12. The average hourly volume for inbound trucks is provided in Exhibit 2-13. The average hourly total outbound traffic volume for a typical weekday is provided in Exhibit 2-14.

**Exhibit 2-8  
ANNUAL PRIVATELY OWNED  
VEHICLES ENTERING THE US AT THE POE**



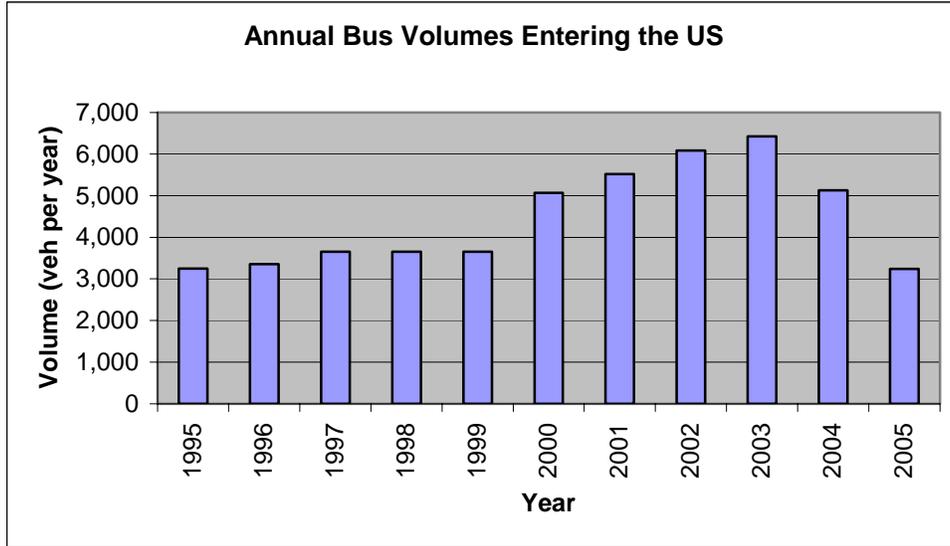
Source: US Customs Service, Tucson, Arizona.

**Exhibit 2-9  
ANNUAL TRUCK VOLUMES  
ENTERING THE US AT THE POE**



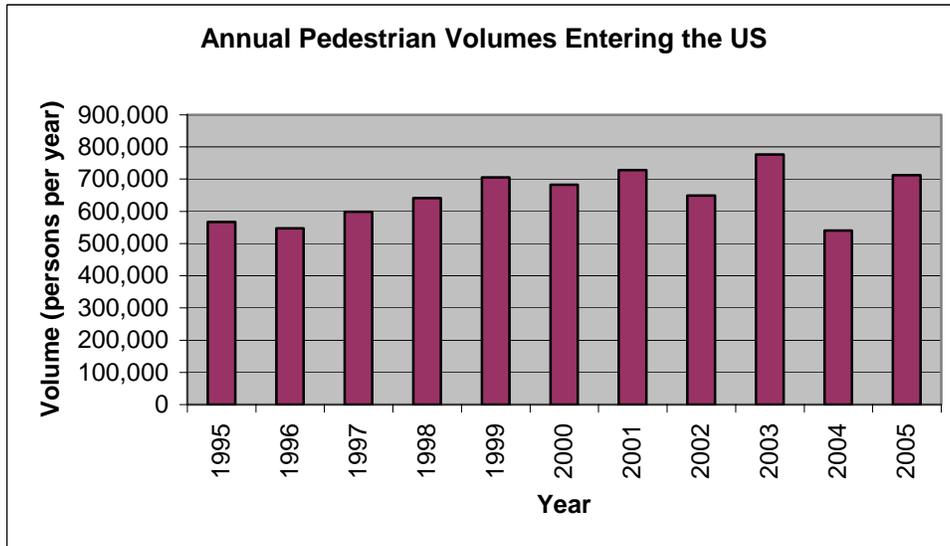
Source: US Customs Service, Tucson, Arizona.

**Exhibit 2-10  
ANNUAL BUS VOLUMES  
ENTERING THE US AT THE POE**



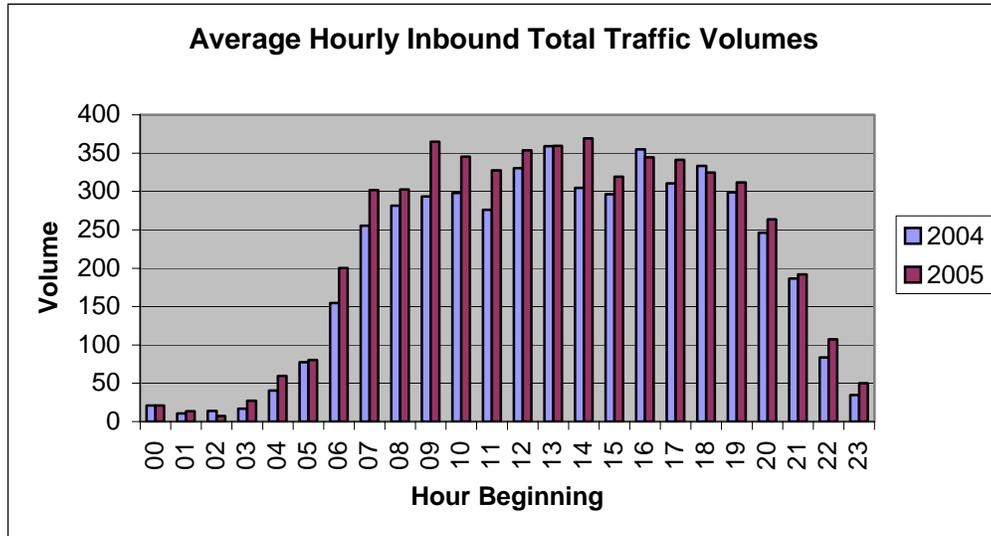
Source: US Customs Service, Tucson, Arizona.

**Exhibit 2-11  
ANNUAL PEDESTRIAN VOLUMES  
ENTERING THE US AT THE POE**



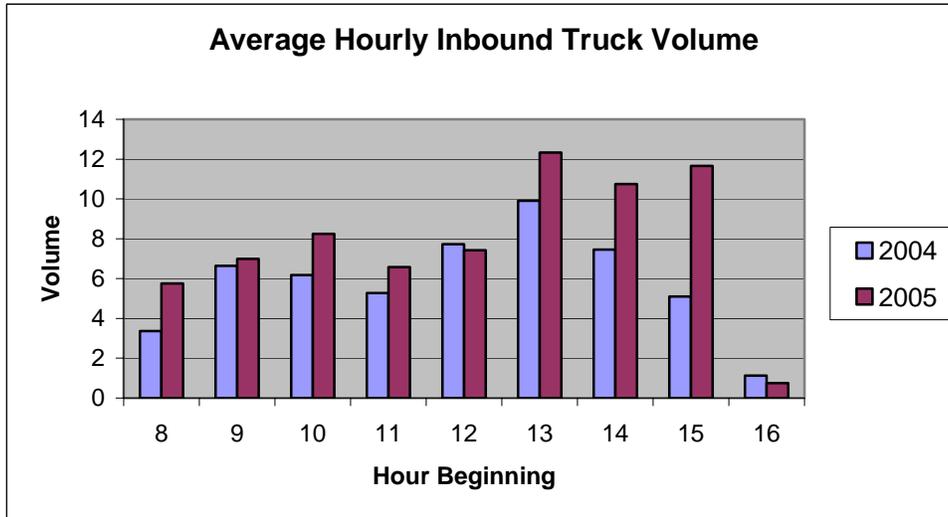
Source: US Customs Service, Tucson, Arizona.

**Exhibit 2-12  
POE WEEKDAY AVERAGE HOURLY  
INBOUND TOTAL TRAFFIC VOLUMES**



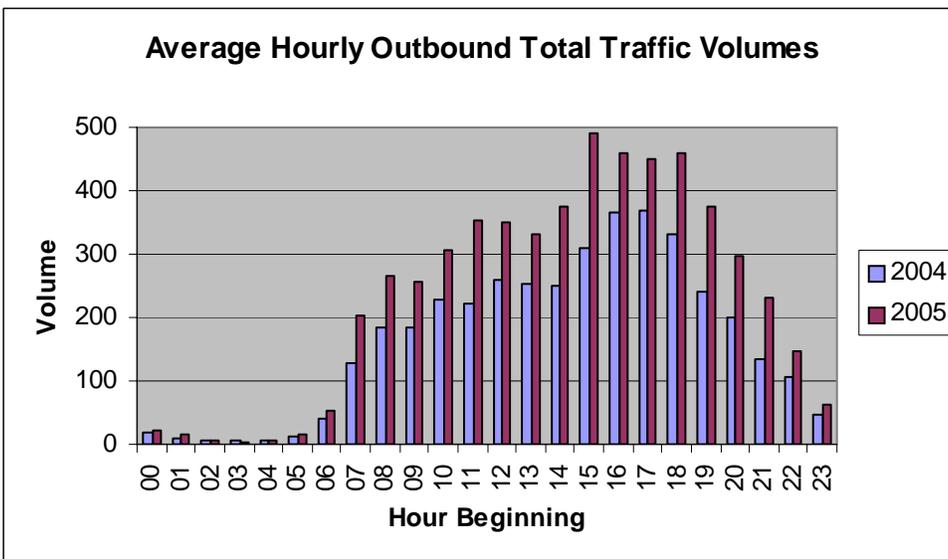
Source: US Customs Service, Tucson, Arizona. Tuesday, Wednesday, Thursday data. August and September 2005, and October and November 2004.

**Exhibit 2-13  
POE WEEKDAY AVERAGE HOURLY  
INBOUND TRUCK VOLUME**



Source: US Customs Service, Tucson, Arizona. Tuesday, Wednesday, Thursday data. August and September 2005, and October and November 2004.

**Exhibit 2-14  
POE WEEKDAY AVERAGE HOURLY  
OUTBOUND TOTAL TRAFFIC VOLUMES**



Source: US Customs Service, Tucson, Arizona. Tuesday, Wednesday, Thursday data. August and September 2005, and October and November 2004

## Truck Traffic in the Study Area

There is no information available on the amount of truck traffic on the study area roadways east of Pan American Avenue or north of SR 80, except along US 191. The most current information on truck volumes is from the US Customs Service as discussed above and from the *SR 80/US 191 Intersection Study*, Final Report (August 2003) prepared for ADOT.

## EXISTING LEVEL OF SERVICE AND TRAFFIC CIRCULATION ISSUES

Level of service (LOS) is a quantitative stratification of the quality of service provided by elements of the transportation system. LOS reflects the quality of service as measured by a scale representing the generalized levels of congestion and travel delay on the highway system. LOS is divided into six letter grades ranging from "A" to "F", with "A" being the best (no congestion and virtually no delay to highway travel), and "F" being the worst (traffic volumes exceed the capacity of the roadway resulting in significant congestion and high levels of delay). The engineering standards for estimating traffic delays and LOS under various types of highway conditions are contained in the *Highway Capacity Manual 2000*, published by the Transportation Research Board. The relationships between travel delay and LOS used in the *Highway Capacity Manual 2000* are presented in Exhibit 2-15.

**Exhibit 2-15  
LEVEL OF SERVICE CRITERIA FOR  
STOP-CONTROLLED AND SIGNALIZED INTERSECTIONS**

<b>Level of Service</b>	<b>Stop Controlled Intersections Average Delay (seconds/vehicle)</b>	<b>Signalized Intersections Average Delay (seconds/vehicle)</b>
<b>A</b>	<b>≤ 10</b>	<b>≤ 10</b>
<b>B</b>	<b>&gt; 10 to 15</b>	<b>&gt; 10 to 20</b>
<b>C</b>	<b>&gt; 15 to 25</b>	<b>&gt; 20 to 35</b>
<b>D</b>	<b>&gt; 25 to 35</b>	<b>&gt; 35 to 55</b>
<b>E</b>	<b>&gt; 35 to 50</b>	<b>&gt; 55 to 80</b>
<b>F</b>	<b>&gt; 50</b>	<b>&gt; 80</b>

Source: Highway Capacity Manual 2000

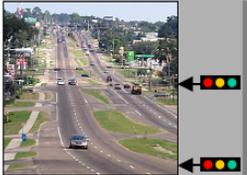
The photographs in Exhibit 2-16 are provided to assist in the understanding of the LOS concept. These photographs depict typical traffic conditions associated with the various LOS categories for an arterial roadway with traffic signals. LOS A, B, and C are considered very good with low levels of delay, and not in need of remedial measures. For transportation planning studies LOS D conditions are considered adequate and not in need of improvements to address congestion. For developed urban areas such as a city downtown, LOS D is often used as the desirable standard for long-term future travel conditions.

For this planning study the estimates of travel delay and LOS were based on the analysis of traffic delay at signalized and stop-controlled intersections within the study area. Peak-hour level of service and congestion were estimated using the computer software Synchro/SimTraffic. Initially, the SimTraffic micro-simulation model was used to determine if there were any significant congestion problems creating traffic back-ups that impacted upstream intersections.

This phenomenon was not present in the simulation and was not noted in the field review of the AM and PM peak-hour traffic conditions. Therefore, it was decided that the Synchro analysis of intersection operations, based on the *Highway Capacity Manual 2000* procedures, would provide reasonable estimates of intersection approach levels of service.

A summary table of intersection approach level of service for each intersection in the analysis network is provided in the Appendix. Exhibit 2-17 provides a summary of only those intersection approaches with existing congestion issues (LOS E and F conditions) and those approaches with potential or emerging congestions issues (LOS D) during the AM and PM peak-hours, respectively.

**Exhibit 2-16  
EXAMPLES OF LEVEL OF SERVICE BY MODE FOR URBAN ROADWAYS**

Level of Service	Automobile	Bicycle	Pedestrian	Bus
A/B				
C/D				
E/F				
				

Source: Florida Department of Transportation, *Quality/Level of Service Handbook*, 2002.

The following locations are indicated to have existing or emerging congestion problems during the **morning peak-hour**:

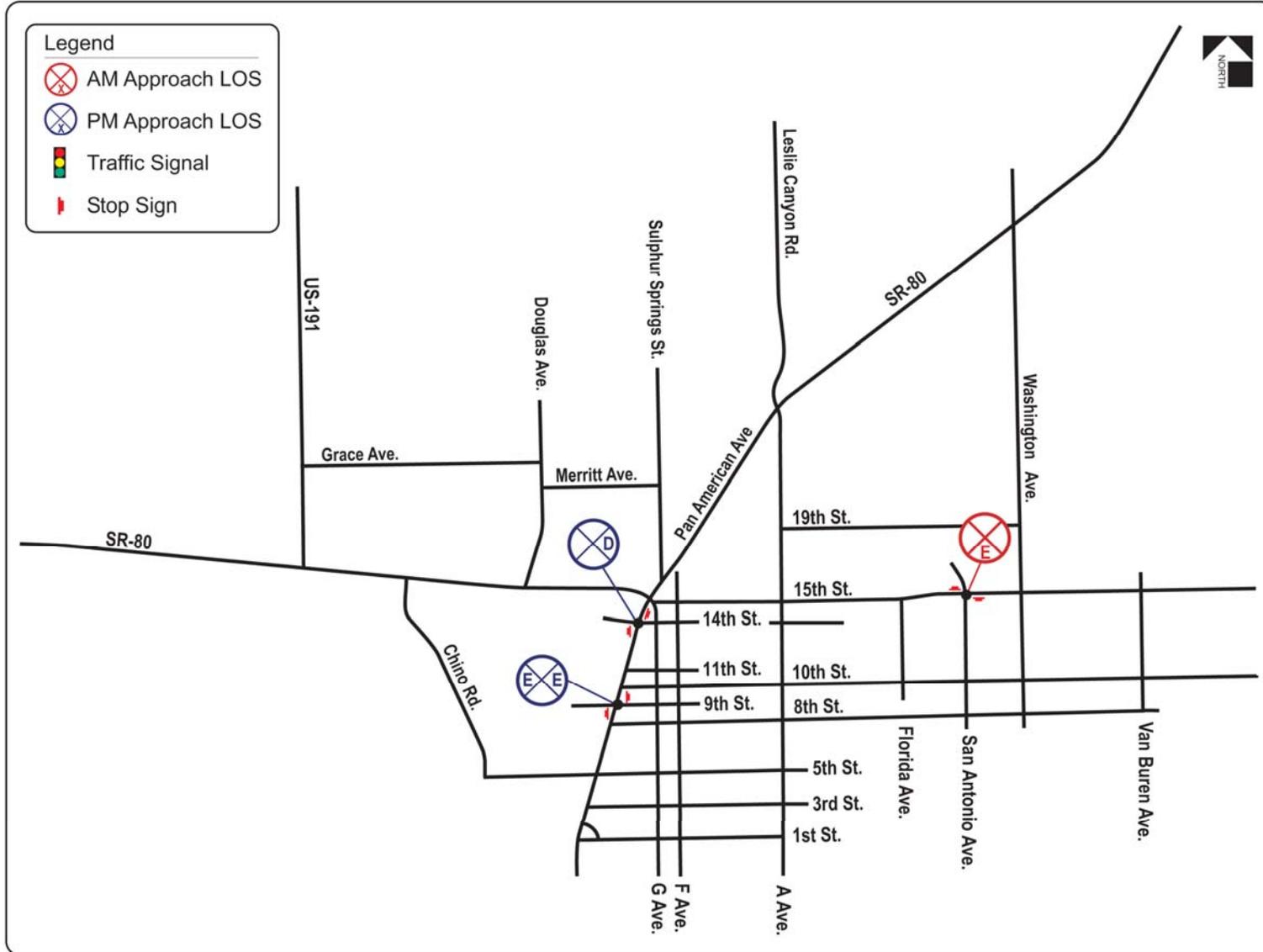
- Northbound approach at the intersection of San Antonio Avenue and 15<sup>th</sup> Street - LOS E (capacity), stop controlled. This intersection is adjacent to a middle school located in the northwest quadrant of the intersection, and the congestion was observed in a field review to be directly related to the arrival of children for school. A four-way stop control was tested using Synchro and found to provide a much improved LOS on the

northbound approach with reasonable levels of service on all other approaches. This intersection may be a candidate for a future traffic signal, but a traffic signal is not warranted at this time.

The following locations are indicated to have existing or emerging congestion problems during the **afternoon peak-hour**:

- Westbound approach of 14<sup>th</sup> Street at Pan American Avenue – LOS D (emerging congestion) stop controlled. No remedial action is required at this time.
- Eastbound and westbound approaches of 9<sup>th</sup> Street at Pan American Avenue – LOS E (capacity), stop-controlled. The westbound traffic operations may be improved with the installation of the traffic signal one block north at 10<sup>th</sup> Street. Some westbound left-turning and through traffic may divert to 10<sup>th</sup> Street rather than be delayed at the 9<sup>th</sup> Street intersection. An option may be to prohibit through and left-turn movements on the eastbound and westbound approaches.
- Northbound approach of San Antonio Avenue at 15<sup>th</sup> Street – LOS E (capacity) stop controlled. The concentration of four schools (see discussion of pedestrian activity below) along 15<sup>th</sup> Street between Florida and Washington Avenues creates some traffic peaking during morning and afternoon associated with school traffic at this location. This intersection may be a candidate for a future traffic signal, but a signal is not warranted at this time. An all-way stop control may provide better traffic operations at this location, but an all-way stop warrant analysis should be conducted to determine if this treatment is warranted before installation.

**Exhibit 2-17  
EXISTING CONDITION INTERSECTION LEVEL OF SERVICE RESULTS**



## TRAFFIC SIGNAL WARRANT EVALUATIONS

Three intersections were identified for traffic signal warrant analyses based on the existing condition level of service analysis. These intersections are:

- 15<sup>th</sup> Street and San Antonio Avenue
- 15<sup>th</sup> Street and Washington Avenue
- 10<sup>th</sup> Street and Florida Avenue

Twenty-four hour traffic count data were collected at each of these intersections on Tuesday, October 17, 2006 and Thursday, October 19, 2006. These data were used to evaluate the traffic volume signal warrants as presented in the 2003 *Manual on Uniform Traffic Control Devices* (MUTCD). The details of the analysis and the data are contained in a separate report prepared for this study (*Three Intersections – Signal Warrant Analysis*, prepared for the City of Douglas, October 2006). These data were also used to update the traffic volumes for the existing level of service analysis, which resulted in an improved level of service estimate at the intersection of 15<sup>th</sup> Street and Washington Avenue, and 10<sup>th</sup> Street and Florida Avenue.

The signal warrant analyses indicated that none of these three intersections warrants a traffic signal based on existing traffic volumes. Traffic conditions at these locations should be monitored in the future to determine if this condition changes.

## PARKING INVENTORY AND ANALYSIS

An inventory of on-street parking available in the Douglas downtown area was conducted on October 25 and 26, 2005. The purpose of this inventory was to examine parking issues and availability in the downtown commercial district. The following data were collected on 10<sup>th</sup> Street, from E Avenue to Pan American Avenue, on F Avenue from 7<sup>th</sup> Street to 12<sup>th</sup> Street, and on G Avenue, from 7<sup>th</sup> Street to 14<sup>th</sup> Street:

- The number of marked on-street spaces on each side of the street by block.
- The number of designated handicapped spaces on each side of the street by block.
- The type of parking, either angle or parallel.
- The posted time limit and/or the time period of parking restrictions on each side of the street by block.

Details of the parking inventory by street are provided in Working Paper #1. The following observations can be made from the on-street parking inventory:

- Every available space on the streets inventoried is used for parking.
- Total spaces = 405
  - Handicapped Spaces = 17
  - Loading only = 3
  - General use = 385
- Parking time limit:
  - 165 spaces have no parking duration limit.
  - 196 have a 2-hour limit.
  - 12 have a 30-minute limit.
  - 12 have a 10-minute limit.
  - 3 are designated as loading only.

- Not all of the handicapped spaces are located immediately adjacent to handicapped ramps leading to the sidewalk. Several of these spaces are mid-block and a handicapped person incapable of mounting the curb would have to travel some distance in the street in order to reach a ramp. These spaces are not ADA compliant. All on street handicapped parking spaces should be located immediately adjacent to curb ramps.
- Angle and parallel parking:
  - 260 angle parking spaces.
  - 131 parallel parking spaces.
  - 14 90-degree angle spaces.
- The presence of the angle parking restricts cross-street sight distance at stop-controlled intersections in the downtown area. This phenomenon is illustrated in the photograph in Exhibit 2-18. Angle parking also restricts motorists' view of pedestrians attempting to cross the street, and it creates a crash hazard with vehicles attempting to back out of these spaces into traffic. The angle parking does provide a buffer between the sidewalk area and the street.
- High curbs, designed for storm water runoff, in some areas would make conversion of angle parking to parallel parking difficult, as some of the spaces would be unusable from the passenger side of an automobile.
- Existing parking availability and demand did not appear to be an issue during the time of the inventory, but the City of Douglas should conduct a parking utilization study during the highest seasonal demand periods to determine if additional downtown parking space is needed.

An additional inventory of City of Douglas owned off-street parking, privately owned off-street parking, and privately owned land that is currently vacant that could be converted to off-street parking was also conducted. The locations of the inventoried sites are provided graphically in Exhibit 2-19 along with an estimate of the number of potential parking spaces.

The off-street parking inventory suggests the following:

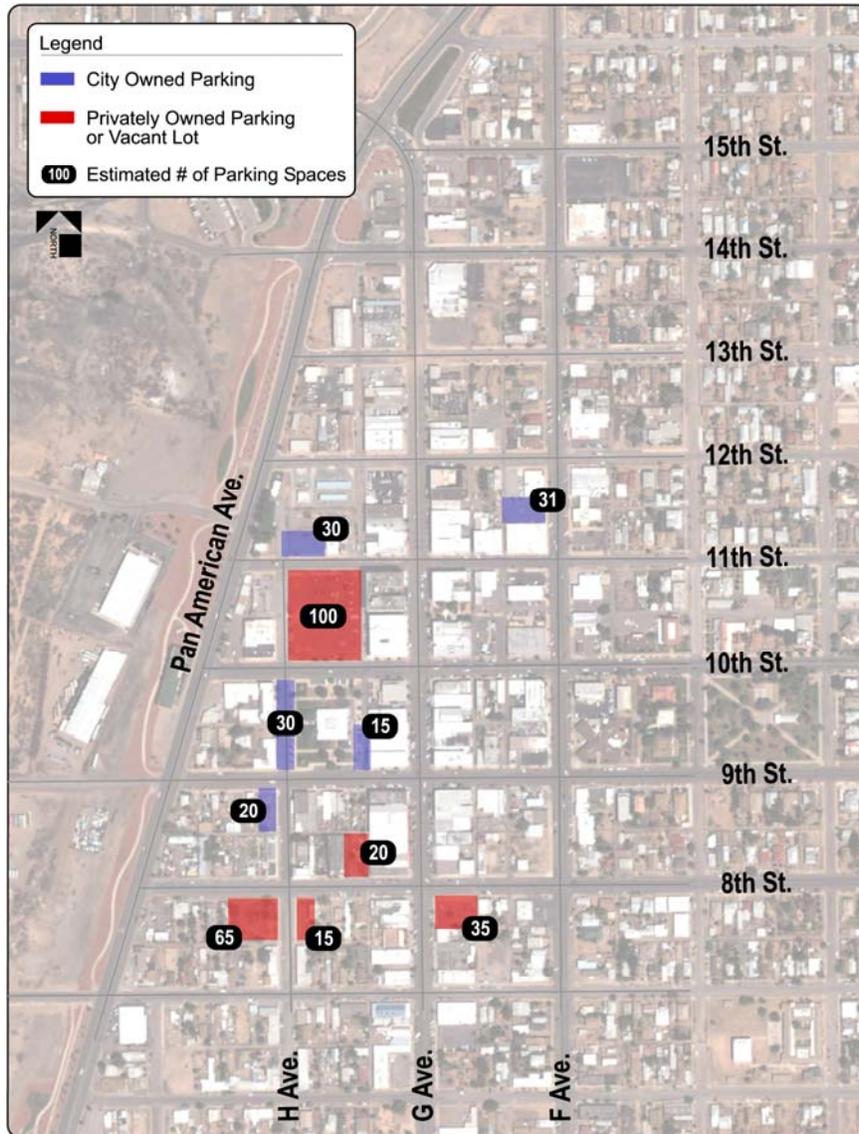
- There are approximately 361 potential off-street spaces representing a significant potential for available parking.
- The largest single facility is located adjacent to 11<sup>th</sup> Street between G Avenue and Pan American Avenue on the south side of the street. This facility is currently used for parking, it is privately owned, and was estimated to have room for approximately 100 spaces.
- There is a potential for this off-street parking to be used to replace on-street parking, if a decision was ever made to eliminate some on-street parking by converting angle parking to parallel parking the downtown area.

**Exhibit 2-18  
PHOTOGRAPH OF ANGLE PARKING  
RESTRICTING CROSS-STREET SIGHT DISTANCE**



G Ave at 8<sup>th</sup> Street looking north. Angle parking blocking cross-street sight lines

**Exhibit 2-19  
LOCATIONS OF POTENTIAL OFF-STREET PARKING**



**CRASH ANALYSIS**

The City of Douglas identified six intersections that were considered locations of concern with regards to crash history. The City of Douglas Police Department provided hard copies of the crash reports at each intersection for the years 2003, 2004, and 2005 (through September 2005). The six intersections are:

- 14<sup>th</sup> Street at G Avenue
- 16<sup>th</sup> Street (SR 80) at Pan American Avenue
- 9<sup>th</sup> Street at Pan American Avenue
- 5<sup>th</sup> Street at Pan American Avenue
- 10<sup>th</sup> Street at A Avenue
- 11<sup>th</sup> Street at A Avenue

The crash reports were reviewed in detail and summary information was tabulated for each intersection and included in a collision diagram for each intersection. These details are contained in Working Paper #1. A field review of each location was conducted by the project team with the City of Douglas Project Manager on October 25, 2005. A summary of the crash analysis for each intersection is provided below.

### **14th Street at G Avenue**

This is a traffic signal-controlled, and illuminated intersection with a total of eight crashes at this location. None of these crashes resulted in a fatality. Four of these crashes were angle collisions involving a vehicle running the red light. This represents a rather high percentage of collisions with vehicles failing to stop for the red light. In each case the vehicle that failed to stop was traveling northbound on G Avenue. A photograph of the northbound approach to this intersection is provided in Exhibit 2-20. The field review did not suggest any particular sight restrictions on the northbound approach to this intersection that might be contributing to the situation of vehicles running the red light.

The existing traffic signal at this location has a single signal head suspended over the northbound and southbound approaches, with a second signal head mounted on the signal pole behind the curb. The northbound and southbound approaches each have two through lanes with an exclusive left-turn lane. It may be possible to reduce the number of collisions involving vehicles running the red light through the use of a new traffic signal design incorporating an additional traffic signal heads suspended over the northbound and southbound traffic lanes.

A view of the southbound approach to this intersection is provided in Exhibit 2-21. Although there is nothing in the crash history to suggest the presence of any issues on this approach, the field review suggested two proactive measures for this approach. As shown in Exhibit 2-22, the presence of the traffic signal at 14<sup>th</sup> Street and G Avenue is obscured by landscaping as the roadway curves to the south to become G Avenue. An advanced traffic signal warning sign should be considered for placement on this approach. In addition, a 25 mph speed limit sign should be placed on this curve as the roadway is transitioning from SR 80 to G Avenue in this area.

**Exhibit 2-20**  
**G AVENUE AT 14<sup>TH</sup> STREET LOOKING NORTH ALONG G AVENUE**



**Exhibit 2-21**  
**TRANSITIONING FROM SR 80 TO G AVENUE,  
LOOKING SOUTHEAST TOWARDS 14<sup>TH</sup> STREET**



### **16<sup>th</sup> Street (SR 80) at Pan American Avenue**

This is a traffic signal controlled intersection with a total of 13 crashes at this location, none of which were fatal. To the west, 16<sup>th</sup> Street is SR 80 and to the east it turns south and transitions to G Avenue. The northbound, southbound and eastbound approaches to this intersection have two through lanes, and exclusive right-turn lane and an exclusive left-turn lane. The westbound approach has two through lanes and an exclusive left-turn lane. The intersection is illuminated.

Two of the 13 crashes were angle crashes that involved a motorist running the red light. In both cases the motorist that failed to stop for the red light was traveling southbound on Pan American Avenue. Four of these crashes involved motorists attempting to make a left-turn from Pan American Avenue being struck by opposing through traffic.

There were two crashes involving pedestrians at this location. One pedestrian crash resulted when a pedestrian crossing Pan American Avenue eastbound was struck by an eastbound motorist making a left-turn to northbound Pan American Avenue. The other pedestrian crash occurred when a southbound motorist struck a person riding a skateboard in the street. Both of these crashes occurred at night.

There is nothing in the crash history or the field review indicating any particular problems at this location. The crash history is typical of that for a major signalized intersection.

### **9<sup>th</sup> Street at Pan American Avenue**

This is a simple stop controlled intersection with 9<sup>th</sup> Street traffic stopping for Pan American Avenue. On the west leg of the intersection, 9<sup>th</sup> Street is a narrow two-lane roadway serving several warehouses to the west. There were a total of nine crashes at this location, three of them angle crashes. None of the crashes at this location were fatal. Two of the crashes involved injuries. Two of the crashes involved bicyclists, one of which was an injury crash.

There is nothing in the crash history suggesting any particular problems at this location. However, the field review revealed a significant traffic operations problem involving the narrow west leg of the intersection. Exhibit 2-22 is a photograph showing the west leg of this intersection. Large trucks on Pan American Avenue have a difficult time entering the west leg of this intersection to access the warehouses to the west. This is especially problematic for southbound trucks attempting to turn right onto westbound 9<sup>th</sup> Street. This maneuver is nearly impossible to perform for large trucks without encroaching on the eastbound lane of 9<sup>th</sup> Street. If a vehicle is waiting at the stop sign on the eastbound approach when a truck approaches the intersection on Pan American Avenue to turn onto westbound 9<sup>th</sup> Street, the truck must wait until the vehicle on 9<sup>th</sup> Street leaves the intersection. To solve this problem, the westbound exit leg of the intersection should be widened to accommodate an additional westbound lane. This improvement would require relocating the utility pole and the natural gas lines located in the northwest quadrant of the intersection (see Exhibit 2-23). Large trucks also have a difficult time turning right from eastbound 9<sup>th</sup> Street to southbound Pan American Avenue without encroaching on the eastbound left-turn lane. This problem could be solved by widening the eastbound, 9<sup>th</sup> Street approach to this intersection.

**Exhibit 2-22**  
**VIEW OF THE WEST LEG OF THE 9<sup>TH</sup> STREET /**  
**PAN AMERICAN AVENUE INTERSECTION LOOKING EAST**



**5<sup>th</sup> Street at Pan American Avenue**

This is a traffic signal controlled intersection, where a total of twelve crashes were reported. None of these crashes were fatal, and only one involved an injury.

There is nothing in the crash history suggesting any safety problems at this location. The field review did reveal a minor situation that should be changed. The west leg of this intersection serves as the entrance and exit to the new Wal-Mart shopping center located west of the intersection. The eastbound approach to the intersection (see Exhibit 2-23) provides an exclusive left-turn lane, a single through lane, and an exclusive right-turn lane. As shown in Exhibit 2-23, the eastbound approach does not have any pavement markings or signing indicating the lane use on the approach.

**Exhibit 2-23**  
**VIEW OF THE 5<sup>TH</sup> STREET / PAN AMERICAN AVENUE**  
**INTERSECTION EASTBOUND APPROACH, LOOKING EAST**



**10<sup>th</sup> Street at A Avenue**

This is a traffic signal controlled intersection with eleven reported crashes. None of these crashes involved a fatality. Four of these crashes resulted from a motorist running the red light. The two angle crashes involved a motorist running the red light, the crash on September 16, 2004, involved a motorist running the red light while attempting to make a left-turn, and the crash on July 30, 2004 also occurred when a motorist ran the red light while attempting to make a left turn. One of the red light running crashes resulted in an injury. Four of these crashes were rear-end collisions. One crash involved a pedestrian being hit while legally in the crosswalk by a motorist turning left at the intersection. This pedestrian accident was not indicated to have resulted in an injury.

Neither the crash history nor the field review suggests any particular problems at this location. However, there are some conditions that are less than ideal. On-street parking is allowed on the northbound approach and the northbound departure leg of intersection (see Exhibit 2-24) up to a point very close to the intersection. On the northbound departure leg of the intersection this parking serves the adjacent houses. It may be desirable to move the curb to the east on the northbound departure leg to provide a cut out parking area for two or three vehicles. There are driveways to the gas station/mini-mart on the southbound approach and the westbound departure leg of the intersection that are too close to the intersection (see Exhibit 2-25). It is recommended that these driveways be closed as there are other driveways on each leg of the intersection serving this business.

**Exhibit 2-24**

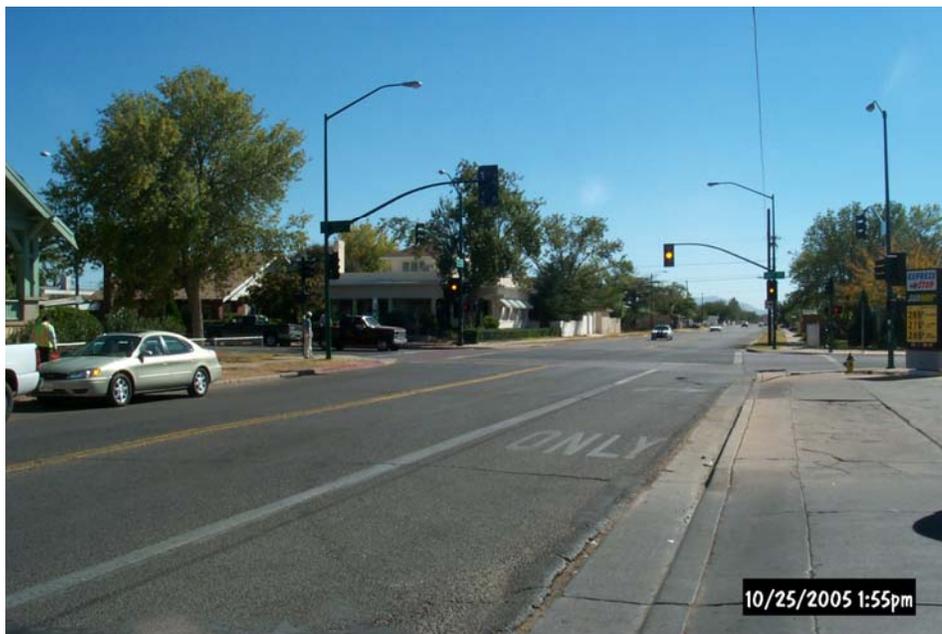
**VIEW OF 10<sup>TH</sup> STREET AND A AVENUE INTERSECTION LOOKING NORTH SHOWING ON-STREET PARKING NEAR THE INTERSECTION**



**Exhibit 2-25**  
**VIEWS OF 10<sup>TH</sup> STREET AND A AVENUE INTERSECTION SHOWING**  
**DRIVEWAY ACCESS TO ADJACENT GAS STATION/MINI-MART**



Westbound departure leg.



Southbound approach.

## **11<sup>th</sup> Street at A Avenue**

This is a simple stop-controlled intersection with 11<sup>th</sup> Street traffic stopping for A Avenue. There were seven reported crashes at this location, five of which involved vehicles on 11<sup>th</sup> Street failing to stop at the stop sign. Although the overall number of crashes at this location is not particularly high, the fact that 71 percent of these crashes have a common element of motorists failing to stop for the stop sign is a concern.

The field review did not identify any specific problems at this location. However, east and west of this location, 11<sup>th</sup> Street is the through street, with cross traffic stopping for 11<sup>th</sup> Street. It may be that the stop on 11<sup>th</sup> Street at A Avenue is somewhat unexpected. There are traffic control measures that can be implemented that may reduce the number of motorists failing to stop at this location. These traffic control measures include the following:

- Place advance stop ahead warning signs on the eastbound and westbound 11<sup>th</sup> Street approaches, and use larger stop signs at this location.
- Use a Warning Beacon as a supplemental emphasis to the stop signs.
- Use an Intersection Control Beacon in addition to the stop signs on 11<sup>th</sup> Street.

In addition to the traffic control measures identified above, parking on each side of A Avenue should be prohibited at the intersection to maintain adequate cross-corner sight distance on all approaches.

## **AREAS OF SIGNIFICANT PEDESTRIAN ACTIVITY**

The scope of this study did not include provisions to conduct a survey or analysis of pedestrian or bicycle commuting patterns within the study area. Information on areas of pedestrian activity was gathered from City staff, POE statistics provided by US Customs, and from a brief field reconnaissance and observation.

There are three primary locations within the study area that have significant pedestrian activity. These locations are:

- The Port of Entry and the area extending from the POE north along Pan American Avenue.
- The Douglas downtown area and shopping district, extending from approximately 8<sup>th</sup> Street on the south to 15<sup>th</sup> Street on the north, and from Pan American Avenue on the west to F Avenue on the east.
- The area along 15<sup>th</sup> Street from approximately A Avenue on the west to Washington Avenue on the east. This is an area containing a high school, a junior high school, a charter school, and an elementary school. City of Douglas staff indicated that this area along 15<sup>th</sup> Street lacked adequate sidewalks, curbs and gutter, and required drainage improvements, particularly around the 15<sup>th</sup> Street/San Antonio intersection.

## **Port of Entry Area**

Typically, between 2,000 and 2,500 pedestrians per day enter the US through the Douglas POE. In recognition of this high pedestrian volume, the City of Douglas has provided a pedestrian rest area just north of the POE on Pan American Avenue in a small city owned park that includes drinking fountains, benches, and rest rooms. Pedestrians typically use an unimproved pathway to move east from the City Park through Speer Park at H Avenue and 3<sup>rd</sup> Street to access the downtown shopping district.

The City of Douglas has also provided a shared-use path for pedestrians and bicyclists which extends from the 3<sup>rd</sup> Street north to 14<sup>th</sup> Street on the west side of Pan American Avenue. A new shopping district has been developed west of Pan American Avenue along 5<sup>th</sup> Street in the Wal-Mart shopping area. The Wal-Mart store and the area surrounding the Wal-Mart are connected to the shared-use path by a sidewalk along 3<sup>rd</sup> Street and a sidewalk between 3<sup>rd</sup> Street and 5<sup>th</sup> Street. The shared-use path does not extend south of 3<sup>rd</sup> Street to the Port of Entry.

The improvements that the City of Douglas has already made near the Port of Entry have provided the characteristics of a gateway into the city from across the border. City staff has indicated a desire to continue the development of the POE area as a gateway to the city.

### **The Downtown Area**

The Douglas downtown area and shopping district attracts significant pedestrian activity to the many shops and restaurants. The downtown area is generally well suited for pedestrian activity, providing wide sidewalks, shade trees, and angle parking that provides a buffer from traffic. Exhibit 2-26 is a photograph showing typical pedestrian features in downtown Douglas. As noted earlier in this report, the angle parking does create a barrier to cross street site lines, and this is true for motorists and pedestrians. As it is, pedestrians must step into the street to see around the parked cars. This can be remedied by providing curb extensions at the corners of the streets with angle parking, as illustrated in Exhibit 2-27, which is a photograph of downtown Tucson, Arizona along Congress Street showing angle parking and curb extensions. The curb extensions provide pedestrians a protected area to stand and view the cross street and they shorten the crossing distance. Pedestrians standing on the curb extensions waiting to cross are also more visible to motorists on the cross street. The curb extensions can also provide a decorative treatment to the streetscape.

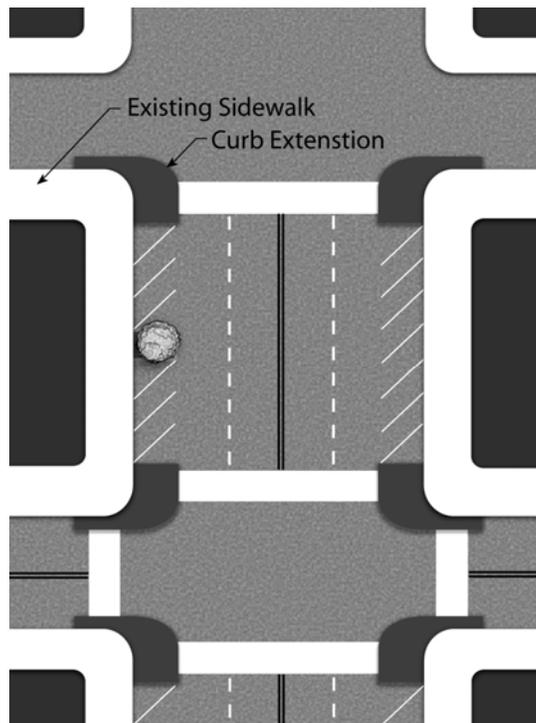
**Exhibit 2-26**  
**VIEW OF G AVENUE LOOKING SOUTH FROM 10<sup>TH</sup> STREET**



**Exhibit 2-27**  
**VIEW OF CURB EXTENSION WITH ANGLE PARKING**  
**IN DOWNTOWN TUCSON, ARIZONA**



**Exhibit 2-28**  
**PLAN VIEW ILLUSTRATION OF ANGLE PARKING WITH CURB EXTENSIONS**



## **15<sup>th</sup> Street Area**

The area along 15<sup>th</sup> Street between A Avenue and Washington Avenue has significant pedestrian activity primarily associated with the schools in this area. Douglas High School is located north of 15<sup>th</sup> Street at Florida Avenue, Paul H. Huber Junior High School is located north of 15<sup>th</sup> Street at Washington Avenue, A Avenue Elementary School is located at on the northeast corner of 15<sup>th</sup> Street and A Avenue, the Omega Alpha Academy School (a K-10 charter school) is located just south of 15<sup>th</sup> Street on San Antonio Avenue, and the Center for Academic Success, the #3 School is also located just south of 15<sup>th</sup> Street on San Antonio Avenue. This creates significant pedestrian activity both along and crossing 15<sup>th</sup> Street in this area. Discussions with City staff and a field review revealed the following pedestrian related issues in this area:

- No sidewalk between Florida and San Antonio Avenues on the south side of 15<sup>th</sup> Street.
- The asphalt sidewalk on the north side of 15<sup>th</sup> Street between Cochise Drive and Washington Avenue is in poor condition.
- The sidewalk on the south side of 15<sup>th</sup> Street between San Antonio and Washington Avenues is narrow and immediately adjacent to the roadway.
- There are no sidewalks along Louis Avenue between of 15<sup>th</sup> and 19<sup>th</sup> Streets connecting to the schools north of 15<sup>th</sup> Street. In addition, the striping of a center left-turn lane on Louis between 15<sup>th</sup> and 19<sup>th</sup> Streets would help reduce traffic conflicts through this area resulting from school related traffic.
- There are drainage issues along 15<sup>th</sup> Street associated with the lack of curb and gutter in this area.
- A new access to the charter school parking lot on the south side of 15<sup>th</sup> Street between Florida and San Antonio Avenues would help improve traffic circulation and reduce traffic conflicts associated with school related traffic.

## **Curbing and Sidewalk Master Plan**

The City of Douglas has adopted and implemented a *Curbing and Sidewalk Master Plan* which allocates \$1.3 million for improvements. This plan provides a \$20,000 yearly allocation for improvements.

## **AREAS OF SIGNIFICANT BICYCLE ACTIVITY**

There were only very limited bicycle count data available for this study, and there was no significant bicycle activity noted during the field review conducted during October 2005. ADOT provided 24-hour bicycle count data collected in November 2002 at two locations within the study area:

- SR 80 east of US 191: 22 bicycles eastbound, 16 bicycles westbound.
- US 191 south of Pirtleville: 7 bicycles northbound, 9 bicycles southbound.

The compact size of the City of Douglas, the relative close proximity of residential areas to the downtown and the schools located along 15<sup>th</sup> Street, and the low traffic volumes and lower speeds on most of the areas streets, would make the City a reasonably good place for bicycling. However, many of the City's arterial and collector streets are relatively narrow, have no designated bicycle facilities, and allow on-street parking, all of which tends to discourage bicycling. The shared-use path along the west side of Pan American Avenue from the POE to 14<sup>th</sup> Street is a notable bicycle feature provided by the City.

The City does not have an adopted bicycle system plan. The City should develop and adopt a bicycle route plan and implement that plan to provide a continuous bicycle route system to interconnect all of the City activity centers. The development of the bicycle route plan should contain a bicycle route system analysis, identify preferred bicycle routes, provide the City with design guidelines and typical cross-sections for various elements of the bicycle route system, provide recommended policies for system implementation, and a prioritized list of projects and time frame for project implementation.

### 3. EXISTING TRANSIT CONDITIONS

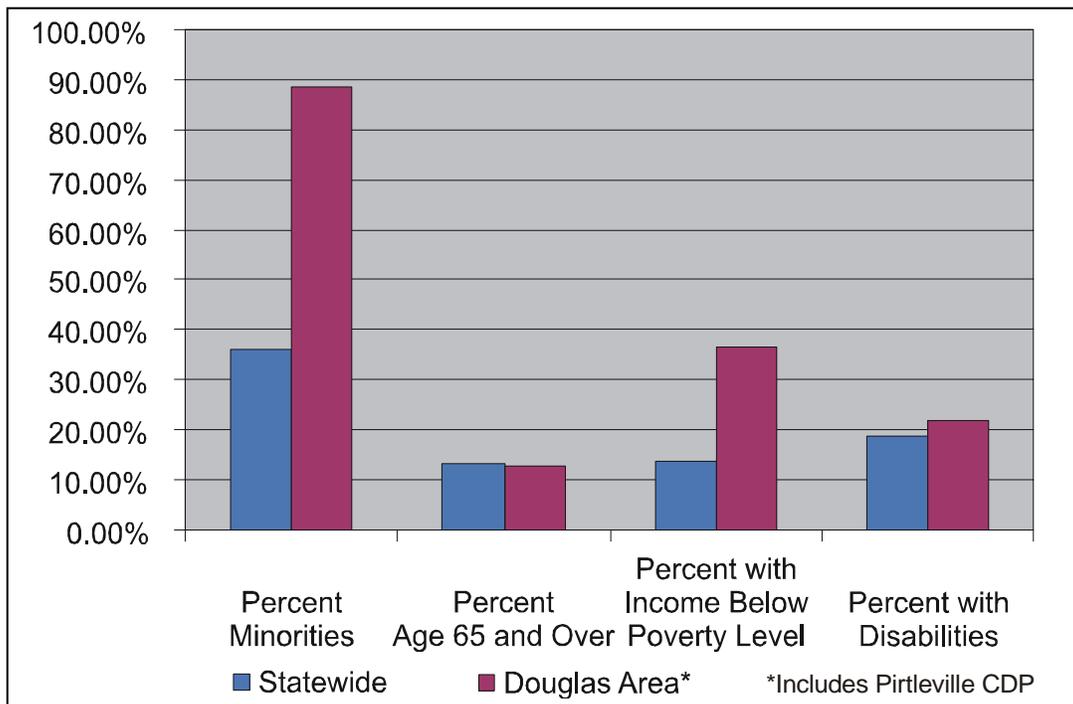
This section describes existing transit service conditions in the Douglas area. First, the existing transit characteristics are presented including the current demographic conditions and statistics on the current mode to work. Next, existing transit service in the City is described. Previous studies and plans that have addressed transit issues in the Douglas area are then briefly summarized. A summary of findings is then present on transit needs and actions that have been recommended by previous studies and plans. Specific strategies for addressing unmet transit needs in Douglas, as well as mode choice, funding, and equipment issues, will be described in future working papers.

#### EXISTING TRANSIT CHARACTERISTICS

##### Demographics

Exhibit 3-1 illustrates the percentages of the Douglas area's 2000 population that are more likely to be transit dependent: minorities, seniors, persons living below poverty, and mobility-limited persons. As shown in the exhibit, three of the four transit dependent percentages are above the statewide average.

**Exhibit 3-1  
STATEWIDE AND DOUGLAS AREA PERCENTAGES  
OF POPULATION MORE LIKELY TO BE TRANSIT-DEPENDENT**



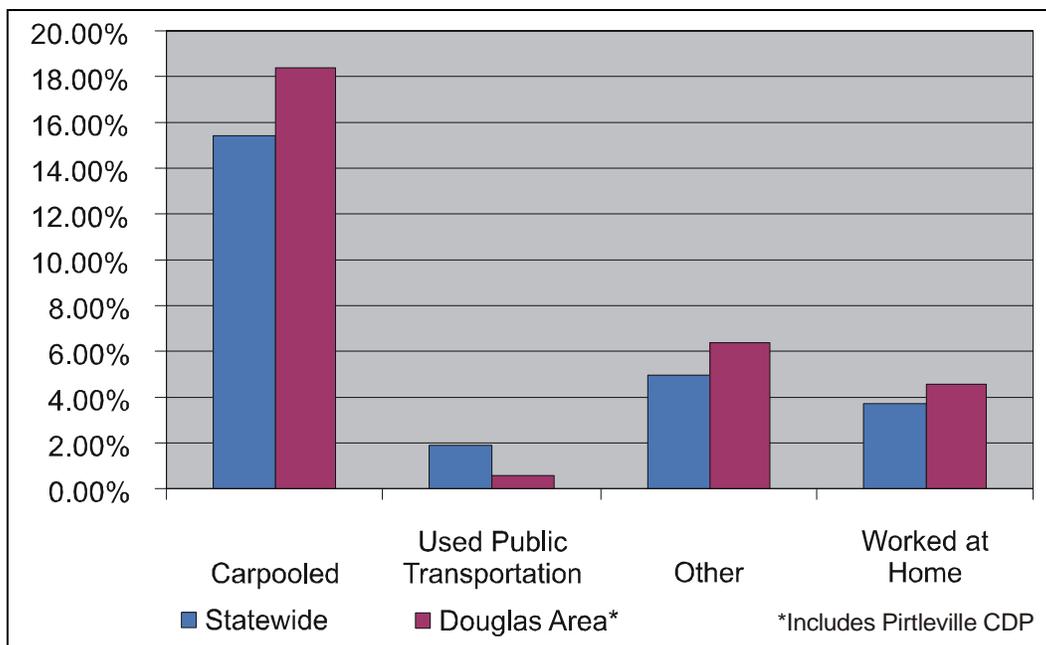
Source: Census 2000

Exhibit 3-1 is based on the Census survey of Douglas and Pirtleville residents only, and does not reflect the large numbers of persons from Agua Prieta, Sonora, Mexico who visit the City daily for shopping and other purposes. Many of these persons cross the border as pedestrians and are also potentially dependent on transit services for conducting their business in Douglas.

**Current Mode to Work**

Although the Douglas area currently has a high percentage of transit dependent persons, the percentage of persons in the area who use public transit to commute to work is below the statewide average (see Exhibit 3-2). This is due to the current limited transit service in the area.

**Exhibit 3-2  
MEANS OF TRANSPORTATION TO WORK  
BY PERSONS NOT DRIVING ALONE**



Over 70 percent of workers aged 16 and over drive alone to work in the Douglas area. The percentage of persons using public transportation in Douglas is well below that of the statewide average of approximately two percent. However, the percentage of persons in the City who carpool to work is significantly higher than the statewide average. The increased carpooling and working at home in Douglas may be indicators of a latent demand for transit services.

**EXISTING TRANSIT SERVICES**

Existing transit services are provided by four bus or van operators and two taxicab operators. Regional service is provided between Douglas and Bisbee, Sierra Vista, Tombstone, Benson, Tucson, and Phoenix, as well as between Agua Prieta and cities in northwestern Mexico. Both dial-a-ride and taxicab services are available locally within the Douglas area. Summaries of each of these services follow:

## **Douglas Shuttle**

The privately owned Douglas Shuttle was established in 1992 and currently operates a fleet of eight vans between Douglas, Tucson, and Phoenix. Six trips per day are operated in each direction, spaced evenly throughout the day. The first trip leaves Douglas at 7:00 AM and the last trip leaves Douglas at 6:00 PM. The first trip leaves Phoenix at 7:15 AM and the last trip leaves Phoenix at 7:00 PM. The one-way adult fares are \$25 between Douglas and Tucson and \$35 between Douglas and Phoenix.



—Lima & Associates photo

The shuttle also makes stops in Tombstone and Benson and will pick-up or drop off passengers in Casa Grande if prior arrangements have been made. The Douglas Shuttle maintains its own offices in the Douglas, Tucson, and Phoenix downtown areas and does not serve the airports in either Tucson or Phoenix, or connect with Greyhound or other carriers. However, the shuttle's Benson stop is a service station that is within walking distance of the Amtrak and Greyhound stops in that city.

## **Food City – Port of Entry Shuttle**

The Food City Market operates a free shuttle service seven days a week between the Market and the Mexico Port of Entry using a minibus. The minibus makes three round trips each hour between 8:00 am and 6:00 pm. The service is operated as a means of facilitating the patronage of the Market by pedestrians entering Douglas from Agua Prieta, Sonora, via the Port.

## **Catholic Community Services**

Catholic Community Services has been providing transportation and other services to the elderly and physically disabled for over 20 years in Cochise County. The services are provided with the assistance of various federal, state, and local funding sources including FTA Section 5310 and 5311 funding. Three of the operations serve the Douglas area; Douglas Rides, the Cochise Commuter and the Dial-a-Ride, which are summarized below. Catholic Community Services also operates the Bisbee Bus, a local area circulator in the Bisbee area.

### ***Douglas Rides***

In December 2006 Catholic Community Services began providing a local circulator transit service along three fixed loop routes within the Douglas area, called Douglas Rides. The three routes can be generally described as follows:

- Bay Acres Route: serving the Bay Acres area and the northern portion of the City east of Pan American Avenue.
- Midtown Route: connects the downtown area with the central portion of the City, extending east to Van Buren Avenue.
- Pirtleville Route: serves the Pirtleville area, and the neighborhoods and activity centers west of Pan American Avenue and north of SR 80.

The three loop routes have a common transfer point near City Hall at 11<sup>th</sup> Street and H Avenue. Each route also extends to the Port of Entry and loops through the new Wal-Mart shopping area west of Pan American Avenue along 5<sup>th</sup> Street. This new service operates from 7:00 AM to 6:00 PM. This service was just beginning at the time this study was being completed. A total of 326 passengers were carried in December 2006, and over 400 were carried during the first three weeks of January 2007. This service is funded in part through the FTA Section 5311 Program administered by ADOT.

### ***Cochise Commuter***

The Cochise Commuter is a service for the general public that was established in 2003 as a three-year demonstration regional transit project with a grant from HUD that ended in December 2005. Cochise Commuter vans operate three times a day in each direction between Douglas, Bisbee, and Sierra Vista. Twice-daily service is provided on Saturdays. Schedules are timed to facilitate usage by Sierra Vista and Bisbee residents commuting to work in Douglas, as well as by Douglas and Bisbee residents commuting to work in Sierra Vista. The system also serves Cochise College and receives significant patronage by students.

Cochise Commuter ridership is growing dramatically. During the entire 2004-2005 fiscal year, the service carried 2,482 persons. However, during the first four months of the 2005-2006 fiscal year, the Cochise Commuter has already carried 2,398 riders. By comparison, during the same four months in the previous year, the service had carried just 710 persons. Catholic Community Services currently receives FTA Section 5311 funding assistance for the Cochise Commuter operation.

### ***Dial-a-Ride***

The Dial-a-Ride operates Monday through Friday between 9:30 AM and 2:30 PM using an accessible Dodge van. Service is available to the general public, and typical trips include shopping trips, doctor appointments, and medical prescription pick-ups. Monthly dial-a-ride ridership averages between 450 and 500 trips. Nutrition and transportation services to seniors are provided through Title III B funding under contract with SEAGO. The Dial-a-Ride operation is a recipient of FTA Section 5310 funding administered by ADOT; fares and client donations are also collected to support the Dial-a-Ride operation.

Every other week, service to and from Douglas is provided for elderly and disabled clients in the Elfrida area for grocery shopping, nutrition services and doctor appointments. The service is provided on a voluntary donation basis.

### **Douglas ARC**

The Douglas ARC is a non-profit organization established in 1958 to provide transportation and other services to developmentally disabled persons and other mobility-limited individuals. The agency is a recipient of FTA Section 5310 funding and currently operates a fleet of seven vans. Transportation for employment, medical, or rehabilitation purposes is provided to a client base of approximately 150 persons. The vehicles are also used to deliver meals to an additional 150 homebound seniors under the "Meals on Wheels" program.

### **LOCAL TAXICAB OPERATORS**

Taxi service is provided by two taxicab operators in Douglas: Anaya Taxi and Quijada Taxi. Anaya Taxi operates one vehicle within the Douglas area only. Quijada Taxi operates two cabs within the Douglas area but will also provide service to Tucson or Phoenix upon request.

## **AUTOTRANSPORTES TUFESA**

Autotransportes TUFESA is a Mexico-based intercity bus company serving the Mexican States of Sonora and Sinaloa as well as Phoenix and Tucson. The company uses deluxe tour coaches and maintains a full-service bus depot in Agua Prieta. Service from Agua Prieta is provided to Culiacan and Hermosillo three times daily and to Ciudad Obregon, Nogales, and Navojoa twice daily.

## **PREVIOUS STUDIES AND PLANS**

Exhibit 3-3 briefly summarizes the findings of studies and plans that addressed transit issues within local jurisdictions located in Cochise County. Key recommendations of previous plans and studies addressing transit issues in Arizona are listed below.

## **SUMMARY OF FINDINGS**

### **Transit Needs**

- Unmet needs for transit service within the Douglas area exist due to the large numbers of potentially transit-dependent persons living in the area and the high number of persons who carpool to work.
- A coordinated effort is needed to address the transit needs of Cochise County communities identified in previous studies.
- No coordination exists among the various regional and intercity transit operations such as the Douglas Shuttle, the Cochise Commuter, and the I-10 corridor operations such as Greyhound and Amtrak.
- The Douglas Shuttle does not serve the Tucson or Phoenix airports.
- Autotransportes TUFESA does not share terminals or coordinate schedules with any of the US-based carriers.

### **Key Recommendations of Previous Plans and Studies**

- Local jurisdictions should designate transit service coordinators to oversee the addition, expansion, or coordination of transit services within their areas.
- The County and local jurisdictions should identify locations for one or more transit centers to serve as transfer points among the various providers in the region and to facilitate the entry of additional operators.
- Locations for future park-and-ride lots should be identified and sufficient space preserved for their construction.
- The development of public transportation should be encouraged as an alternative to automobile travel.
- Plan for expanded regional bus service between Douglas and the Phoenix and Tucson areas.

### **City of Douglas Transit-Related Issues**

- The City of Douglas General Plan does not specifically address transit needs or issues.
- No provision exists for the consideration of transit needs when improving or widening City streets, including provisions for sidewalks, bus shelters, and bus pull-outs where curb lane traffic volumes warrant.

- The geometry of some downtown Douglas streets, including steeper than average cross-slopes and higher than average curbs, might impede the loading and unloading of transit vehicles and the use of wheelchair lifts or ramps.

**Exhibit 3-3  
SUMMARY OF PREVIOUS STUDIES AND PLANS**

Title and Source of Plan	Date	Summary of Transit-related Findings and Recommendations
<b>ADOT</b>		
Intercity Bus Analysis	June 1995	Evaluates intercity bus (ICB) services and needs throughout the state and provides a summary of the needs and recommendations for the intercity bus mode in Arizona.
<b>Local Jurisdictions</b>		
City of Douglas General Plan	June 2002	Goals include the provision of an integrated multimodal transportation system offering choices among modes and a balance of facilities and services by mode. Transit is not emphasized.
City of Douglas Housing Plan	June 2002	Provides information regarding the residential building stock and demographics in different areas of the City that will be used in evaluating potential future transit corridors and service areas.
Douglas/Agua Prieta Port Efficiency Study	September 2000	Examines options for improving the traffic flow and other efficiency measures regarding the US/Mexico Port of Entry. Suggests new facility placement and pedestrian concepts that would impact future transit service in the area.
Three Year Transit Plan for the Bisbee Bus	December 2001	Proposes Inter-community service linking Douglas and Bisbee with Sierra Vista. The 6-days-per-week service would be funded with a combination of LTAF II and TANF funds, together with farebox revenues. Would be operated by Catholic Community Services.
Three Year Transit Plan for Sunsites Transportation	December 2001	Non-profit service to transit dependent persons in the retirement community of Sunsites provides service to Douglas on alternate Tuesdays for shopping and medical appointments. Document supports application of service for continued FTA Section 5311 funding.
Sierra Vista Public Transit System Three Year Transit Plan Update	April 1999	Update study of an existing successful urban transit operation in Cochise county. Recommends additional service upgrades and extensions. Document supports application of service for continued FTA Section 5311 funding.

## **4. EXISTING LAND USE DEVELOPMENT, POPULATION, AND EMPLOYMENT**

### **YEAR 2005 LAND USE DEVELOPMENT**

This section provides the baseline land use data used in the preparation of this transportation plan. These data update the baseline data provided in the *City of Douglas General Plan 2003 Data and Analysis* volume and were disaggregated to the Transportation Analysis Zone (TAZ) system developed for this study.

### **Traffic Analysis Zone System Description**

The sketch planning level traffic forecasting model requires population, number of dwelling units, and employment disaggregated by Transportation Analysis Zone (TAZ) for years 2005 and 2030. A TAZ system was established to spatially represent the current land use and socioeconomic conditions of the city. This TAZ system encompasses a total area of analysis, and it is depicted in Exhibit 4-1. A total of 55 TAZs were established for this study. The TAZs are smaller in areas with higher levels of land use and roadway system development in order to provide better estimates of future traffic forecasts. In general, the TAZ structure was established to correspond with the roadway system used in the traffic forecast and analysis.

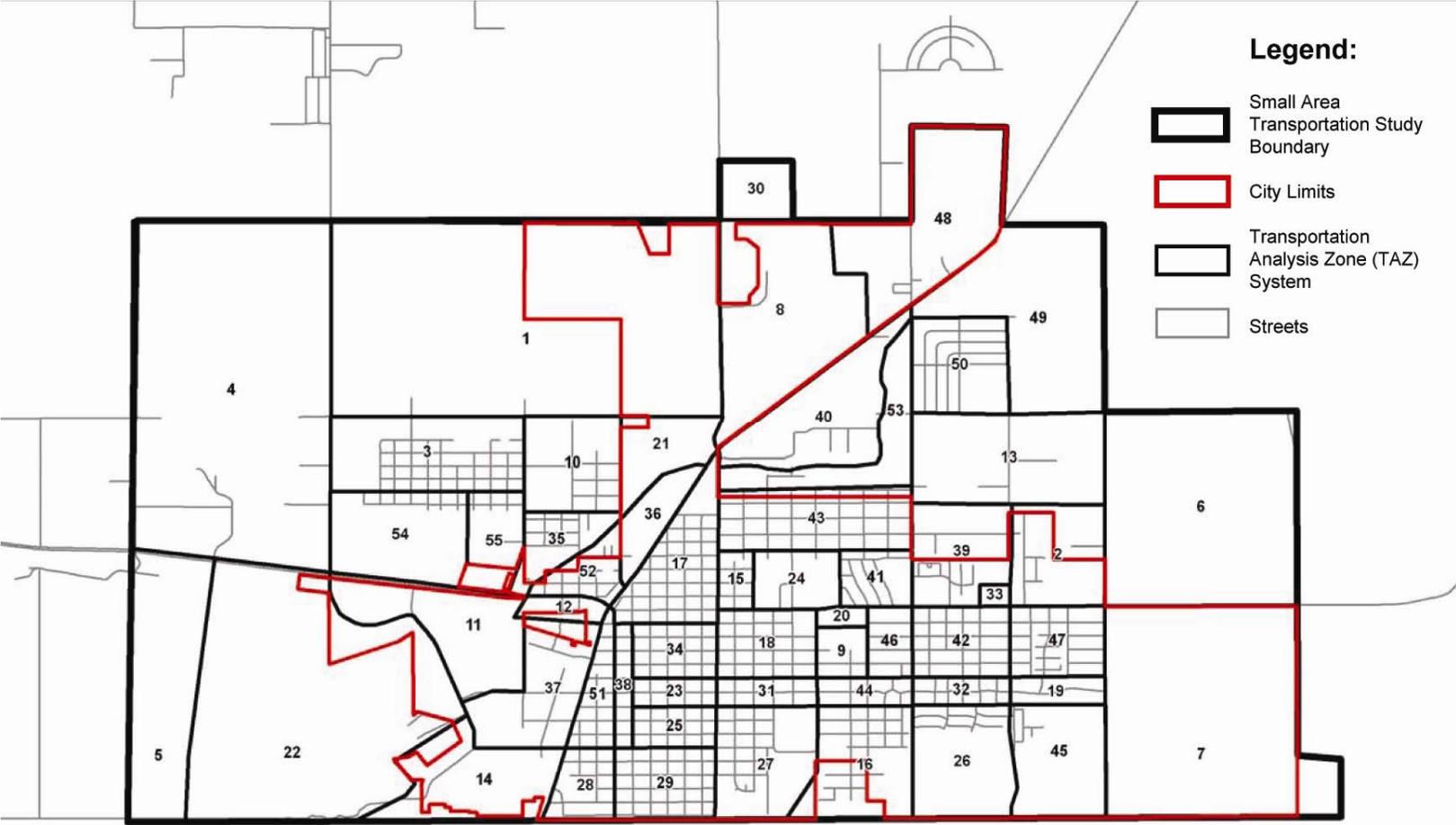
### **Procedure for Updating 2000 Census Data to 2005**

Year 2005 population and number of dwelling units, for each TAZ are based on year 2000 census data, updated using aerial photographs, building permits, and information provided by the City, to reflect recent development. These data were also field verified.

The 2005 number of employees for office, retail, and general commercial development per TAZ is based on a field inventory of commercial properties completed in 2005. Major employer data per TAZ are based on data provided by Cochise College Center for Economic Research. School related data such as number of employees and number of students per TAZ are based on data provided by the Douglas Unified School District Superintendent Office.

The US Bureau of the Census no longer provides inter-census data at the block level for small non-metropolitan areas such as the City of Douglas. Therefore, a methodology to estimate population and occupied housing units at the block level was used.

**Exhibit 4-1  
DOUGLAS SMALL TRANSPORTATION AREA STUDY BOUNDARY AND TAZ STRUCTURE**



Bureau of the Census housing unit counts report that there were 5,186 housing units in Douglas and 531 units in Pirtleville in 2000. Based on the new home permits provided in Exhibit 4-2, an additional 116 new housing units have been built in Douglas between 2000 and 2005.

The total 2005 existing housing stock within the study area based on census counts and adjusted to reflect number of new home permits processed during the 2000-2005 planning period, includes 6,431 housing units. As shown in Exhibit 4-2, of these 6,431 housing units, 5,302, or 82 percent are located in the City, or 8 percent are located in Pirtleville area; and 598, or 10 percent, are located within the portion of Cochise County inside of the study area. No residential growth has taken place in the Pirtleville area. Therefore, the 116 new home permits processed by the City are located in Douglas.

**Exhibit 4-2  
2005 TOTAL NUMBER OF HOUSING UNITS  
BASED ON 2000 CENSUS AND NEW HOME  
BUILDING PERMITS ISSUED BY THE CITY**

<b>Description</b>	<b>Number of Housing Units</b>	<b>Percent</b>
2000 Census Housing Units Douglas	5,186	80
2000 Census Housing Units Pirtleville	531	8
2000 to 2005 Total New Home Building Permits within City	116	2
Cochise County (within study area)	598	10
<b>Total Number of Housing Units</b>	<b>6,431</b>	<b>100</b>

Sources: 1990 and 2000 Census for Douglas and Pirtleville, US Bureau of the Census; Building Permits 2000-2005, City of Douglas Staff, 2005; Cochise College Center for Economic Research, 2005.

## **2005 POPULATION AND EMPLOYMENT ESTIMATES**

According to Cochise College Center for Economic Research, the 2000 population for Douglas was 16,496 representing an increase of 3,359 people since the 1990 census. Much of this growth is due to annexation of the Arizona State Prison in 2000, which increased the City population by 1,936 people, and the 23<sup>rd</sup> Street annexation, which increased the City population by another 248 people. The official 2000 Census counts reports a population of 14,312 for Douglas. This number does not include the two annexations mentioned above.

Exhibit 4-3 provides 2004 Census estimates and 1990 and 2000 Census counts for Douglas, Pirtleville, and other major cities in Cochise County. The City of Douglas experienced slow but consistent growth in the 1990s. Between 1990 and 2000, the population grew 8.9 percent. In 2001, Douglas ranked 65<sup>th</sup> among 87 incorporated cities for population growth between 1998 and 2000. Douglas ranks 28<sup>th</sup> among Arizona cities and second among Cochise County cities in terms of population. These growth figures and rankings are based on the official 2000 Census count.

**Exhibit 4-3  
2004 AND 2005 ESTIMATES AND 1990 AND 2000 CENSUS  
COUNTS FOR DOUGLAS AND PIRTLEVILLE**

<b>Place</b>	<b>1990</b>	<b>2000</b>	<b>2004</b>	<b>2005</b>
Douglas	12,822	16,496	16,706	16,983
Pirtleville	1,364	1,550	1,624	1,643

Sources: 2004 Estimates and 1990 and 2000 Census Counts, US Bureau of the Census, 2005; Adjusted City of Douglas 2000 counts; Cochise Center for Economic Research, 2005; 2005 Estimates, The Planning Center, 2005.

**Year 2005 Household Size, Housing Units and Occupied Housing**

The average household size is defined as the average number of permanent residents for each permanently occupied housing unit. The national household size has been decreasing in the past few decades, and it is expected to continue to decline at a decreasing rate.

The decline in household size experienced is attributed to changes in life style, declining birth rates, increasing divorce rates, the tendency for older persons to maintain their own homes and a trend of young adults forming one- or two-person households.

The US Bureau of the census reported that the City of Douglas average household size decreased from 3.16 in 1990 to 3.07 in 2000. The same agency reported that Pirtleville's average household size decreased from 3.57 in 1990 to 3.41 in 2000. Exhibit 4-4 provides 2004 and 2005 household size estimates for Douglas and Pirtleville based on 1990 and 2000 Census.

**Exhibit 4-4  
HOUSEHOLD SIZE FOR DOUGLAS AND PIRTLEVILLE**

<b>Place</b>	<b>1990</b>	<b>2000</b>	<b>2004</b>	<b>2005</b>
Douglas	3.16	3.07	3.03	3.02
Pirtleville	3.57	3.41	3.35	3.33

Sources: 2004 Census Estimates and 1990 and 2000 Census Counts, US Bureau of the Census; 2005 Estimates, The Planning Center, 2005

The national trend of decreasing household size is evident in Douglas and Pirtleville. It is anticipated that this trend of decreasing household size will continue throughout the planning horizon.

For the purpose of traffic modeling, occupied housing is utilized to generate number of vehicle trips per household. Additional adjustments were required to avoid counting segments of the population that do not generate trips, such as inmate population. Therefore, the existing 2005 population was derived as a function of occupied housing units at the block level of analysis.

Exhibit 4-5 shows population, housing units, and occupied housing units based on 1990 and 2000 Census and 2005 estimates. Details of population, housing, and occupied housing by TAZ are provided in Appendix A.

**Exhibit 4-5  
STUDY AREA POPULATION, HOUSING UNITS,  
AND OCCUPIED HOUSING UNITS**

	Year		
	1990	2000	2005
Population	15,741	17,284	17,592
Total Housing		6,294	6,431
Occupied Housing		5,499	5,777

Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census and Aerial Flight of Douglas, Arizona, 2000.

**Year 2005 Employment Estimates**

Exhibit 4-6 provides year 2005 employment estimates by employment category and by major employers within or near the study area. Retail, office/service, and general commercial employment estimates for the study area are based on the commercial land use inventory conducted for this transportation plan. Employment data for major employers were provided by the Cochise College Center for Economic Research. The employment levels by TAZ are provided in Appendix A along with the location of the areas major employers. Based on the data in Exhibit 4-5, approximately 888 employees were employed in the retail, office/service, and general commercial sectors at the time the commercial inventory was conducted in 2005, and approximately 3,548 employees were reported employed by major employers. When adding these two groups, there are approximately 4,436 employees employed by the retail, office/services, and general commercial sectors within the City of Douglas. Of this total, approximately, 80 percent are employed by major employers.

Manufacturing and construction employment were not calculated. This project was scoped to update the population and employment data from information available from the Arizona Department of Economic Security (DES) or the Census Bureau. Neither of these two agencies provides data estimates at the block level for non-metropolitan areas or small communities like the City of Douglas for non-decennial years. In addition, there were no current aerial photographs for Douglas and the 1990 and 2000 census block delineations were inconsistent. Therefore, these data could not be estimated under the negotiated scope of work.

**SCHOOL ENROLLMENT**

Another population group generating traffic trips is the student population. Exhibit 4-7 provides the total school enrollment for the 11 Douglas Unified School District schools for years 2001 through 2005. The enrollment figures for each school are provided in Appendix A.

**Exhibit 4-6**  
**2005 EMPLOYMENT BY EMPLOYMENT CATEGORY**  
**AND MAJOR EMPLOYER, AND SCHOOL ENROLLMENT**

Employment Category/Employer	Year 2001	Year 2005
Retail Employees	NA	241
Office/Service Employees	NA	235
General Commercial Employees	NA	412
<b>Subtotal</b>	<b>NA</b>	<b>888</b>
<b>Major Employers Within the Study Area</b>		
Douglas Unified School District (various schools)	423	405
City of Douglas	250	235
Wal-Mart	224	408
Southeast Arizona Medical Center	141	104
Safeway	136	84
Basha's/Food City	0	110
Gadsden Hotel	65	70
US Customs/US Immigration	57	39
J.C. Penney	0	46
<b>Subtotal</b>	<b>1,296</b>	<b>1,501</b>
<b>Major Employers Outside the Study Area</b>		
US Border Patrol/DHS <sup>1</sup>	850	1,046
Cochise Community College	835	327
Arizona State Prison <sup>2</sup>	700	674
<b>Subtotal</b>	<b>2,385</b>	<b>2,047</b>
<b>TOTAL</b>		<b>4,436</b>

Sources: City of Douglas Land Field Survey, 2005. Major Employers, Douglas, Arizona, Cochise College Center for Economic Research, 2005.

1. In 2004, The US Border Patrol merged with DHS (Department of Homeland Security)

2. Regional employer located outside of the Small Area Transportation Study area.

NA = Not Available

**Exhibit 4-7**  
**TOTAL SCHOOL ENROLLMENT FOR**  
**DOUGLAS UNIFIED SCHOOL DISTRICT SCHOOLS**

	Year				
	2001	2002	2003	2004	2005
<b>Total Students</b>	4,239	4,095	4,107	3,928	4,237

Source: Douglas Unified School District Superintendent Office, 2005.

**HISPANIC POPULATION**

As shown in Exhibit A-6 provided in Appendix A, the largest population group within the City of Douglas is the Hispanic population. According to the 2000 Census of population, of the total 17,284 people residing within the study area, approximately 12,909, or 75 percent identified as Hispanic. According to 2005 estimates of population, of the total 17,529 people residing within the study area, approximately 13,325, or 76 percent identify as Hispanic. For comparison, the State of Arizona and Cochise County have a 25 percent and 31 percent Hispanic population, respectively. Details on the number and percentage of Hispanic population by TAZ are provided in Appendix A.

**POPULATION AGE 65 AND OLDER**

According to the 2000 Census of population, of the total 17,284 people residing within the study area, approximately 2,284, or 13 percent were age 65 or older. According to 2005 estimates of population, of the total 17,529 people residing within the study area, approximately 2,400, or 14 percent were 65 and older. Details on the number of persons age 65 and older by TAZ are provided in Appendix A.



## **5. FUTURE LAND USE AND SOCIO-ECONOMIC DATA**

### **METHODOLOGY**

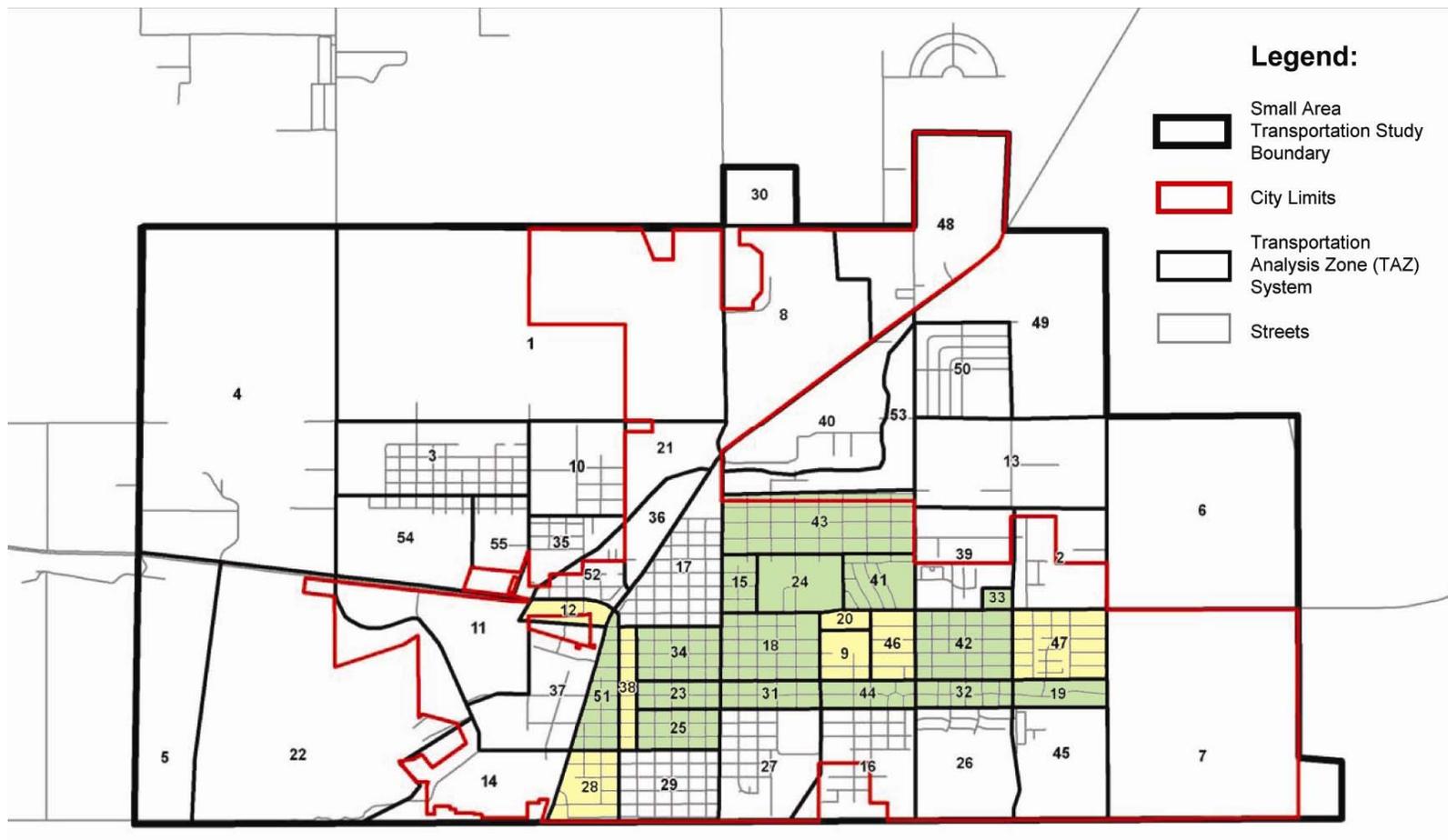
Forecasts were developed for years 2010, 2020, and 2030 for population, employment, housing units, occupied housing, and school enrollment for the study area. These are the factors that represent the primary determinants of future travel demand. Land use forecasts were developed based on the amount of land available for development within the study at the TAZ level.

The methodology for and details of the development of the future land use and socio-economic data are presented in Working Paper #1 of this study. The information below provides a summary of the factors relevant to developing the travel demand forecast for the study area.

### **LAND USE FORECAST**

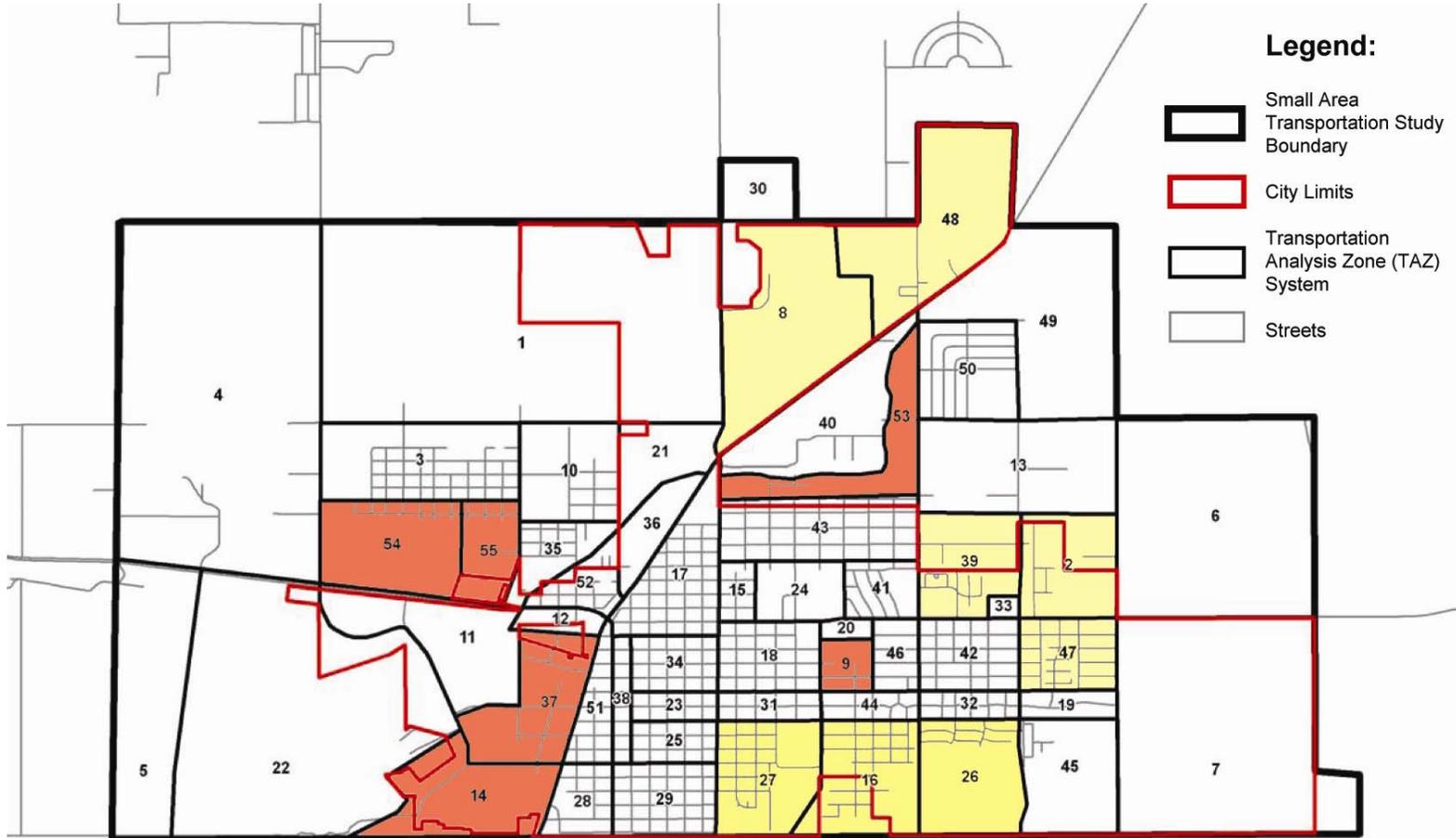
The land use inventory provided background information relative to the amount of land available for growth in each TAZ, TAZs with a potential to experience growth, and TAZs that are either built-out or would probably not experience any new growth. This information is summarized in the maps provided in Exhibits 5-1 through 5-3.

### Exhibit 5-1 TAZs AT OR NEAR BUILDOUT



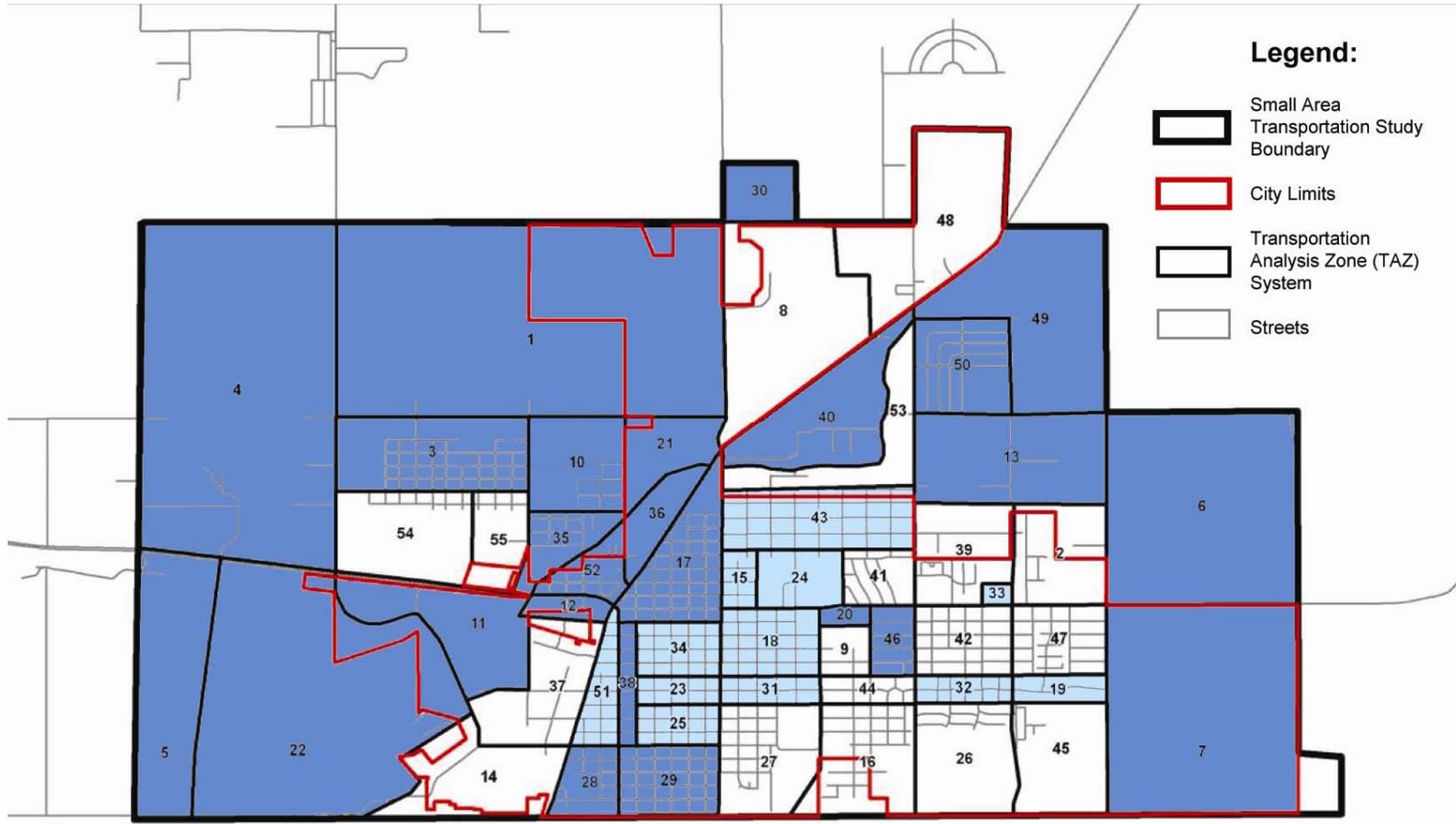
- TAZ at Buildout
- TAZ with 4 acres or less of adjusted developable vacant land (near buildout)

**Exhibit 5-2  
TAZs EXPERIENCING RESIDENTIAL AND NON-RESIDENTIAL GROWTH**



- TAZ experiencing non-residential (commercial, industrial, or public services) growth
- TAZ experiencing residential growth

**Exhibit 5-3  
TAZs EXPECTED TO EXPERIENCE NO GROWTH**



- TAZ experiencing no growth
- TAZ experiencing no growth due to being at buildout in 2000.

## FORECAST POPULATION, HOUSING UNITS, AND OCCUPIED HOUSING

Exhibit 5-4 provides 2010, 2020, and 2030 population, housing units, and occupied housing units projections developed for this transportation plan. The forecasts indicate a modest growth for the Douglas area over the next 24 years. The details of this forecast by TAZ are provided in Appendix B.

**Exhibit 5-4  
FORECAST POPULATION, HOUSING UNITS,  
AND OCCUPIED HOUSING UNITS**

	Year		
	2010	2020	2030
<b>Population</b>	18,091	19,016	19,741
<b>Housing Units</b>	6,739	7,320	7,898
<b>Occupied Housing Units</b>	6,047	6,587	7,118

## FORECAST RETAIL, OFFICE/SERVICE, AND GENERAL EMPLOYMENT

The 2010, 2020, and 2030 retail, office/service, and general commercial employment forecasts are based on percentages of population employed by each of these categories. These percentages utilize 2005 as the base year and were applied to 2010, 2020, 2030 population projections. Exhibit 5-5 provides retail, office/service, and general commercial employee forecasts for the study area. The forecasts by individual TAZ are provided in Appendix B.

**Exhibit 5-5  
FORECAST RETAIL, OFFICE/SERVICE,  
AND GENERAL COMMERCIAL EMPLOYMENT**

Employment Category	Year		
	2010	2020	2030
<b>Retail</b>	248	261	270
<b>Office/Service</b>	242	254	264
<b>General Commercial</b>	424	445	462
<b>Totals</b>	<b>914</b>	<b>960</b>	<b>996</b>

## FORECAST EMPLOYMENT FOR MAJOR EMPLOYERS

The forecast for major employers was obtained based on the percentage of the total population employed by each major employer. Year 2005 was used as the base year for these percentages, which were applied to 2010, 2020, 2030 population projections.

Exhibit 5-6 provides the employment forecasts for major employers for years 2010, 2020, and 2030.

**EXHIBIT 5-6  
2010, 2020, AND 2030 EMPLOYMENT BY MAJOR EMPLOYER BY TAZ**

<b>TAZ Number</b>	<b>Major Employers</b>	<b>Year 2005 Percent of Total Population</b>	<b>Year 2010</b>	<b>Year 2020</b>	<b>Year 2030</b>
Outside of Study Area	US Border Patrol/DHS <sup>1</sup>	5.9	1,076	1,131	1,174
Outside of Study Area	Cochise Community College	1.9	336	353	367
Outside of Study Area	Arizona State Prison <sup>2</sup>	3.8	693	729	756
See Notes	Douglas Unified School District <sup>3</sup>	2.3	416	438	454
<b>51</b>	City of Douglas	1.3	242	254	264
<b>14</b>	Wal-Mart	2.3	420	441	458
<b>4</b>	Southeast Arizona Medical Center	0.6	107	112	117
<b>37</b>	Safeway	0.5	86	91	94
<b>9</b>	Basha's/Food City	0.6	113	119	123
<b>51</b>	Gadsden Hotel	0.4	72	76	79
<b>28</b>	US Customs/US Immigration <sup>4</sup>	0.2	40	42	44
<b>37</b>	J.C. Penney	0.3	47	50	52
<b>Total Employment</b>			<b>3,649</b>	<b>3,835</b>	<b>3,981</b>

Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts and Major Employers, Douglas, Arizona, Cochise College Center for Economic Research, 2005.

1. In 2004, The US Border Patrol merged with DHS (Department of Homeland Security)
2. Regional employer located outside of the Small Area Transportation Study area.
3. Employer has multiple locations. Number of employees per school and number of students per school by TAZ are provided in the Exhibits 5-7 and 5-8.
4. In 2004, the US Customs and the US Immigration became the Bureau of Immigration and Customs Enforcement.

## FORECAST SCHOOL EMPLOYMENT AND ENROLLEMENT

The forecast school employment for Douglas Unified School District schools was developed based on percentages of the school population employed by each school, and the percent of the total population employed by the school district. Year 2005 percentages were used as the base year and are applied to 2010, 2020, 2030 population projections.

Exhibit 5-7 provides 2010, 2020, 2030 school district employment by school based on the above methodology.

**Exhibit 5-7  
2010, 2020, AND 2030  
DOUGLAS UNIFIED SCHOOL DISTRICT EMPLOYMENT BY TAZ**

<b>TAZ Number</b>	<b>School Name</b>	<b>Percent of Total School Employment</b>	<b>Total Employees 2010</b>	<b>Total Employees 2020</b>	<b>Total Employees 2030</b>
3	Faras Elementary	6	26	27	28
18	Joe Carlson Elementary	11	44	46	48
24	Douglas High School	25	105	110	114
24	DHS East Campus	1	4	4	4
25	Sarah Marley Elementary	7	31	32	36
27	Clawson Elementary	9	37	39	40
29	Early Learning Center	6	26	27	28
34	Ray Borane Middle School	11	45	48	49
41	Paul Huber Middle School	12	51	54	56
42	Stevenson Elementary	8	35	37	38
42	Maryvale School	3	12	13	13
<b>Total School Employment</b>			<b>416</b>	<b>437</b>	<b>454</b>

Sources: Census 1990 and 2000 Summary File 1 (SF 1) Douglas, Pirtleville, and Cochise County portion, US Bureau of the Census 2000 Population Counts; Major Employers, Douglas, Arizona, Cochise College Center for Economic Research, 2005; Douglas Unified School District Office of the Superintendent, 2005.

The number of students per school for the Douglas Unified School District was obtained based on the year 2005 ratio of number of students per occupied housing unit, which is 0.73 students per occupied housing unit. This ratio was applied to the forecast number of occupied housing units to determine the total number of students for each forecast year. The year 2005 percentage of the total number of students attending each school was used to proportion the total number of students to each of the existing schools.

Exhibit 5-8 provides the forecast student population by school and TAZ.

**Exhibit 5-8  
2010, 2020, AND 2030  
DOUGLAS UNIFIED SCHOOL DISTRICT STUDENTS BY TAZ**

<b>TAZ Number</b>	<b>School Name</b>	<b>Percent of Population</b>	<b>Total Students 2010</b>	<b>Total Students 2020</b>	<b>Total Students 2030</b>
3	Faras Elementary	6	253	276	298
18	Joe Carlson Elementary	11	477	520	562
24	Douglas High School	27	1,190	1,296	1,400
24	DHS East Campus	1	55	60	65
25	Sarah Marley Elementary	7	298	325	351
27	Clawson Elementary	10	425	463	500
29	Early Learning Center	6	246	268	289
34	Ray Borane Middle School	9	419	456	493
41	Paul Huber Middle School	13	589	641	693
42	Stevenson Elementary	10	430	469	506
42	Maryvale School	1	32	35	38
<b>Total Projected Student Population</b>			<b>4,414</b>	<b>4,808</b>	<b>5,196</b>

Sources: Census 1990 and 2000 Summary File 1 (SF 1) Douglas, Pirtleville, and Cochise County portion, US Bureau of the Census 2000 Population Counts; Major Employers, Douglas, Arizona, Cochise College Center for Economic Research, 2005; Douglas Unified School District Office of the Superintendent, 2005

## **6. FORECAST FUTURE TRAVEL DEMAND AND TRAFFIC OPERATIONS ANALYSIS**

### **DAILY TRAFFIC FORECAST METHODOLOGY**

A study area sketch planning model was developed for forecasting future traffic volumes, analyzing future roadway deficiencies, and evaluating alternative improvements. The demographic data for each of the TAZs for the 2005 base year and for the 2030 horizon year were used to forecast future traffic. The demographic data included population, number of dwelling units, and employment data for retail, office, general, major employers, and student categories. These data were used as the basis for estimating the daily vehicle trips generated within the study area boundaries.

External sources of traffic that would impact the volume of traffic flowing into, out of, or within the Douglas area were also identified. These “externals” included Bisbee/Sierra Vista via SR 80 west, Willcox and points north via US 191 north, New Mexico and points east via SR 80 east, and Agua Prieta and origins or destinations in Mexico via the Port of Entry. Traffic count information for “externals” served by SR 80 and US 191 was obtained from ADOT and traffic counts for the Port of Entry were provided by the US Customs Service.

A travel demand model was developed using the base year socioeconomic data and the existing roadway network. Traffic volumes estimated by the model for the 2005 base year were calibrated against existing traffic counts. After the model was calibrated for the base year, Year 2030 socioeconomic data were used in generating a forecast for year 2030 daily traffic volumes on the existing roadway network.

Exhibit 6-1 presents example traffic forecast results from the sketch modeling process. Exhibit 6-2 shows estimated volumes for 2005 and forecasted volumes for year 2030. The sketch modeling exercise indicates that traffic volumes will grow slowly and steadily throughout much of the Douglas area between 2005 and 2030. However, volumes are forecast to increase by a greater percentage in the northeast quadrant of the study area (see Exhibit 6-3) due to residential development in that area.

Exhibit 6-1 also includes an estimated daily capacity for each of the sample roadway segments shown. These capacity estimates, in vehicles per day, are taken from the State of Florida, *2002 Quality/Level of Service Handbook*, and are generated based on the methods contained in the *Highway Capacity Manual 2000*. The reference materials from the Florida document are provided in Appendix C. The comparison of the daily capacity estimates to the forecast 2030 traffic volumes indicate that, in general, the forecast traffic volumes are well below the estimated capacities. This indicates that the roadway system in the Douglas area should provide good level of service and traffic operations for future traffic, and that no new major capacity improvements are required. A more detailed assessment of the future level service and traffic operations based on peak-hour traffic volumes is provided below.

Simple linear trend projections, based on the annual traffic data presented in Chapter 2, were used to estimate future year annual traffic entering the US through the Port of Entry. A comparison of year 2005 traffic levels to year 2010, 2020, and year 2030 is provided in Exhibit 6-4.

**Exhibit 6-1**  
**ESTIMATED AND FORECAST**  
**EXAMPLE DAILY TRAFFIC VOLUMES**

Roadway Segment	Daily Traffic Counts <sup>1</sup> By Year				Estimated Daily Capacity (Vehicles per Day) <sup>2</sup>
	2005	2010	2020	2030	
Pan American Ave. between 11th Street and 14th Street	9,601	10,395	12,029	13,592	30,600
Highway 80 east of junction with Highway 191	12,570	13,104	14,200	15,232	34,200
Highway 80 east of Leslie Canyon Road	3,041	4,248	6,645	9,023	16,300
G Avenue between 9th Street and 10th Street	1,802	1,833	1,888	1,931	14,600
15th Street between San Antonio and Washington	4,350	4,408	4,874	4,870	12,000
8th Street east of A Avenue	2,375	2,518	2,875	3,166	12,000
Highway 191 north of Highway 80	4,594	4,772	5,156	5,528	16,300

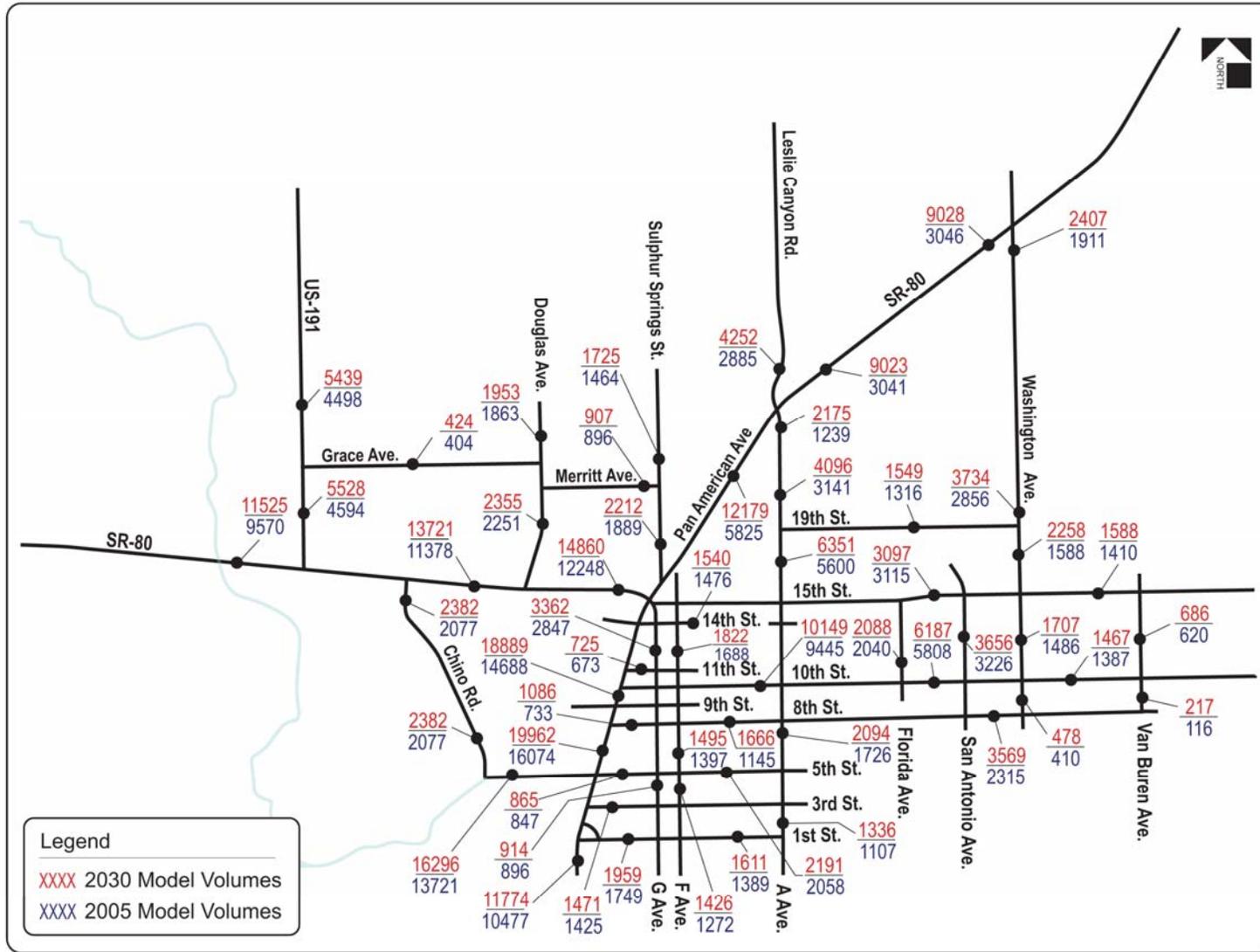
1. Year 2005 estimates from ADOT counts and traffic data from previous studies in the study area. Forecasts for Years 2010, 2020, and 2030 from Lima & Associates
2. Source: State of Florida, *2002 Quality/Level of Service Handbook*, Table 4-2, page 87.

**AM AND PM PEAK-HOUR TRAFFIC ANALYSIS AND LEVEL OF SERVICE FOR YEAR 2030 TRAFFIC**

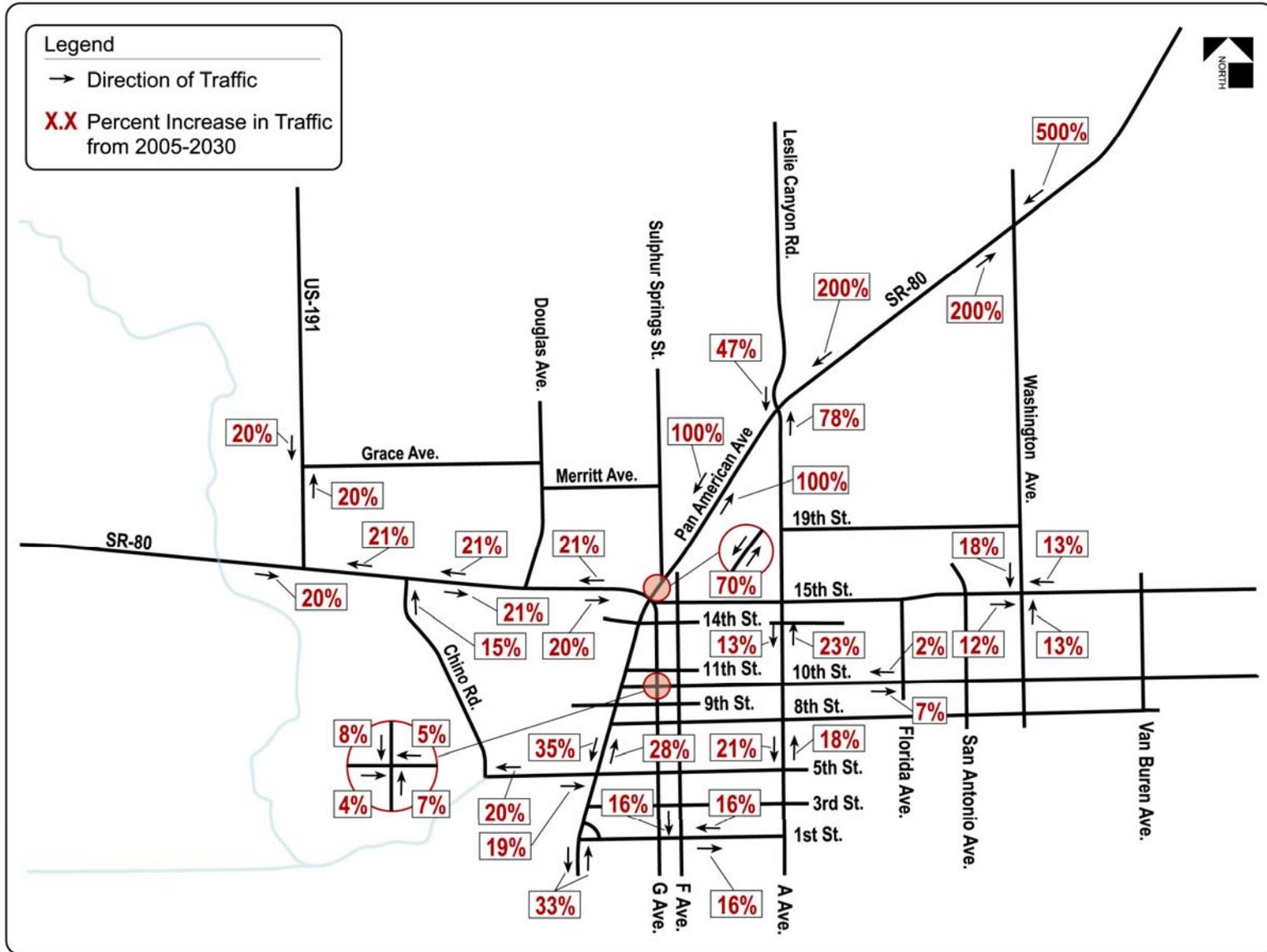
Morning and afternoon peak-hour traffic volumes were estimated first for year 2030 based on the year 2030 daily traffic forecasts. Exhibit 6-3 provides the estimated increase of daily traffic in percent for year 2030 in comparison to year 2005 daily traffic volumes. The method used to develop the year 2030 AM and PM peak-hour estimates was to increase the year 2005 peak-hour approach volumes by the same percentage increase forecast for the daily traffic volumes. The turn percentages were initially assumed to remain the same as those used in the year 2005 analysis, but they were adjusted in a few cases to better balance traffic flow between adjacent intersections and reflect a more realistic traffic flow pattern based on traffic operations and level of service. In addition, traffic volumes were updated based on the traffic data collected at three locations to conduct traffic signal warrant studies. The resulting AM and PM peak-hour turning movement volumes used in the year 2030 traffic operations analysis are provided in Appendix C.

### Exhibit 6-2 2005 VOLUMES VS 2030 VOLUMES

6-3



**Exhibit 6-3**  
**ESTIMATED PERCENT TRAFFIC GROWTH FROM YEAR 2005 TO YEAR 2030**



**Exhibit 6-4  
FORECAST ANNUAL TRAFFIC ENTERING THE U.S.  
THROUGH THE PORT OF ENTRY**

	Year			
	2005 <sup>1</sup>	2010	2020	2030
<b>Privately Owned Vehicles</b>	2,098,713	2,243,600	2,503,700	2,763,900
<b>Trucks</b>	28,418	38,700	56,300	75,600
<b>Buses</b>	3,241	6,400	8,500	10,600
<b>Total Vehicular Traffic</b>	2,129,372	2,288,700	2,568,500	2,850,100
<b>Pedestrians</b>	712,435	730,900	833,400	935,800

1. Year 2005 traffic count data provided by the US Customs Service, Tucson, Arizona.

**Year 2030 Level of Service Analysis**

The year 2030 turning movement volumes and estimates of future truck volumes were used in a SimTraffic micro-simulation analysis to determine if there were any significant congestion problems creating traffic back-ups that impacted upstream intersections. This phenomenon was not present in the simulation, therefore it was decided to use the Synchro analysis of intersection operations based on the *Highway Capacity Manual 2000* procedures.

A summary table of intersection approach level of service for each intersection is provided in the appendix. Exhibit 6-5 provides a summary of only those intersection approaches with future congestion issues (LOS E and F) and potential congestion issues (LOS D) during the AM and PM peak-hours. Intersection approaches with future levels of service A, B, or C are considered to be operating reasonably well and not in need of any remedial measures to address future congestion problems. The level of service results for all intersections are included in Appendix C.

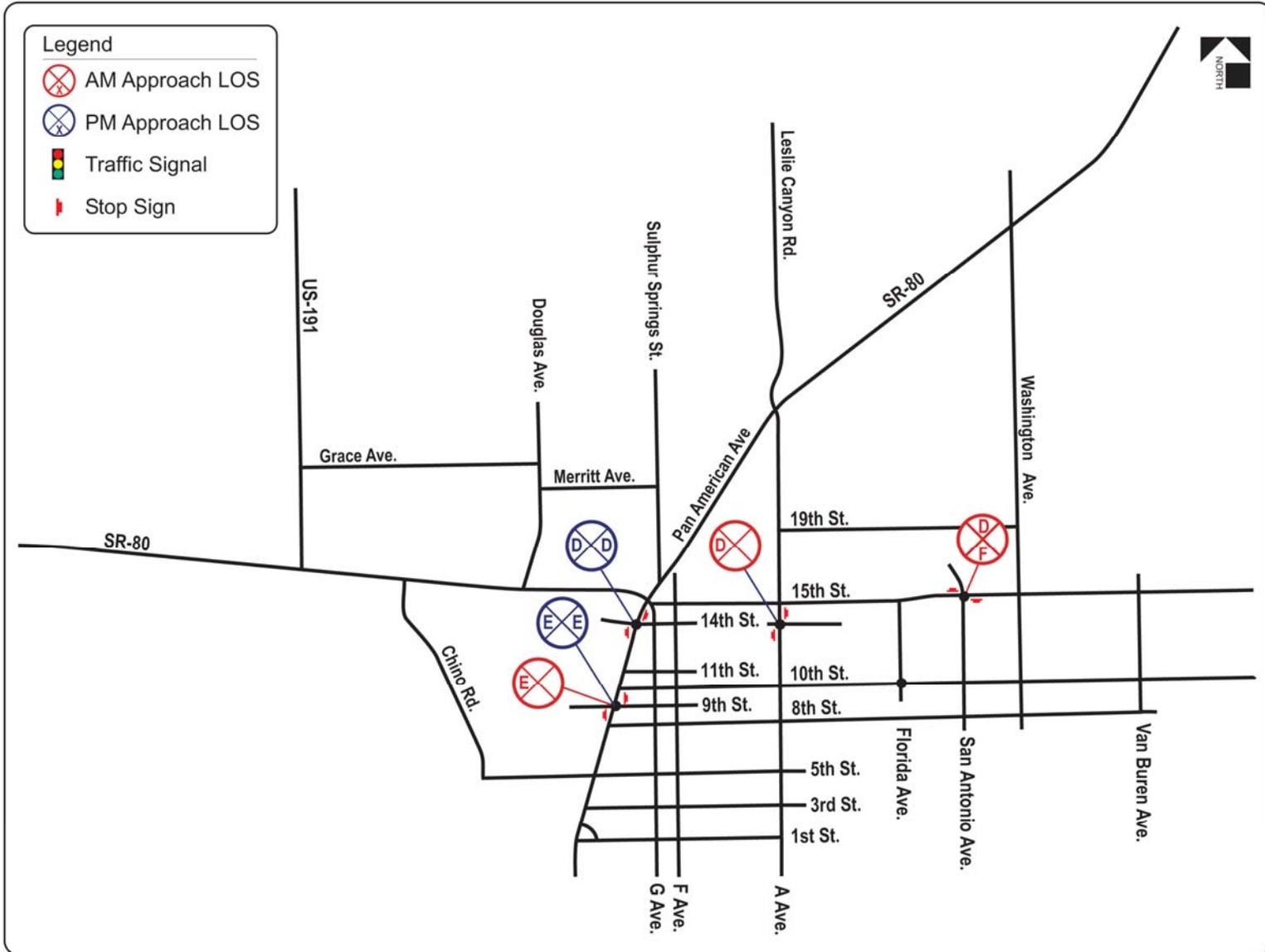
The following locations are indicated to have future year 2030 congestion problems during the **morning peak-hour**:

- Northbound approach at the intersection of San Antonio Avenue and 15<sup>th</sup> Street - LOS F (capacity), stop controlled. This is worse than the LOS E for the existing condition. A four-way stop control was tested using Synchro and found to provide a much improved LOS on the northbound approach with reasonable levels of service on all other approaches. Although this intersection does not warrant a traffic signal based on existing traffic volume, this intersection may be a candidate for a future traffic signal.
- Eastbound approach on 9<sup>th</sup> Street at Pan American Avenue – LOS E (capacity). A small increase in left-turn or through traffic at this location could result in a deterioration of operating conditions as traffic increases on Pan American Avenue. The increase in truck traffic on 9<sup>th</sup> Street will also contribute to this condition. An option may be to prohibit through and left-turn movements on the eastbound and westbound approaches.
- Eastbound approach on 14<sup>th</sup> Street at A Avenue – LOS D (emerging congestion). This is slightly worse than the existing condition for the eastbound approach, however it is generally not considered necessary to remedy LOS D conditions in an urbanized area such as this. Improvements are not considered necessary at this time.

The following locations are indicated to have future year 2030 congestion problems during the **afternoon peak-hour**.

- Eastbound and Westbound approaches of 14<sup>th</sup> Street at Pan American Avenue – LOS D (emerging congestion) stop controlled. This is slightly worse than the existing condition for the eastbound approach and is the same result as indicated for the existing condition traffic for the westbound approach. However, it is generally not considered necessary to remedy LOS D conditions in an urbanized area such as this. It is likely that as traffic volumes increase, westbound traffic will divert to adjacent street traffic signals to turn southbound on to Pan American Avenue. This is the assumption made in evaluating the traffic conditions at this location. An option would be to prohibit left-turns on the eastbound and westbound approaches if congestion becomes an issue in the future, but improvements are not considered necessary at this time.
- Eastbound and westbound approaches of 9<sup>th</sup> Street at Pan American Avenue – LOS E (capacity), stop controlled. A small increase in left-turn or through traffic on these approaches could result in a deterioration of operating conditions as traffic increases on Pan American Avenue. It is likely that westbound 9<sup>th</sup> Street traffic will divert to the 10<sup>th</sup> Street traffic signal if congestion becomes a problem. An increase in truck traffic on 9<sup>th</sup> Street may also contribute to this condition. An option may be to prohibit through and left-turn movements on the eastbound and westbound approaches.

**Exhibit 6-5  
ESTIMATED YEAR 2030 LEVELS OF SERVICE**





## 7. FUTURE MULTIMODAL CONDITIONS

### FUTURE PUBLIC TRANSPORTATION CONDITIONS

Within any urban area, the origin and destination of most trips—and of the percentage of trips that will be made by use of public transportation—is related to where residents of the area live and where they work. Concentrations of population within an area suggest where commute trips are likely to originate during the morning peak travel period, and concentrations of employment function as “attractors” where such trips are likely to terminate. In the afternoon, the roles are reversed: Trips originate in areas where employment is concentrated and terminate in residential areas.

The densities per square mile of these residential and employment areas has been empirically determined to indicate the appropriate mode, or modes, of public transportation that should be considered for these areas. These density threshold numbers have been used in a number of transit studies nationwide including the *High Capacity Transit Study* conducted in 2003 for the Maricopa Association of Governments and are shown in Exhibit 7-1 below.

**Exhibit 7-1  
MINIMUM CONSOLIDATED RESIDENTIAL AND  
EMPLOYMENT DENSITIES FOR VARIOUS  
TYPES OF TRANSIT SERVICES**

<b>Transit Service Type</b>	<b>Persons/Sq Mile <sup>1</sup></b>
Bus–minimum service	4,500
Bus–intermediate service	7,780
Light rail or Bus Rapid Transit	10,000

1. Calculated from Maricopa Association of Governments High Capacity Transit Study, 2003

Bus minimum service = 1/2 mi between routes, 20 buses/day

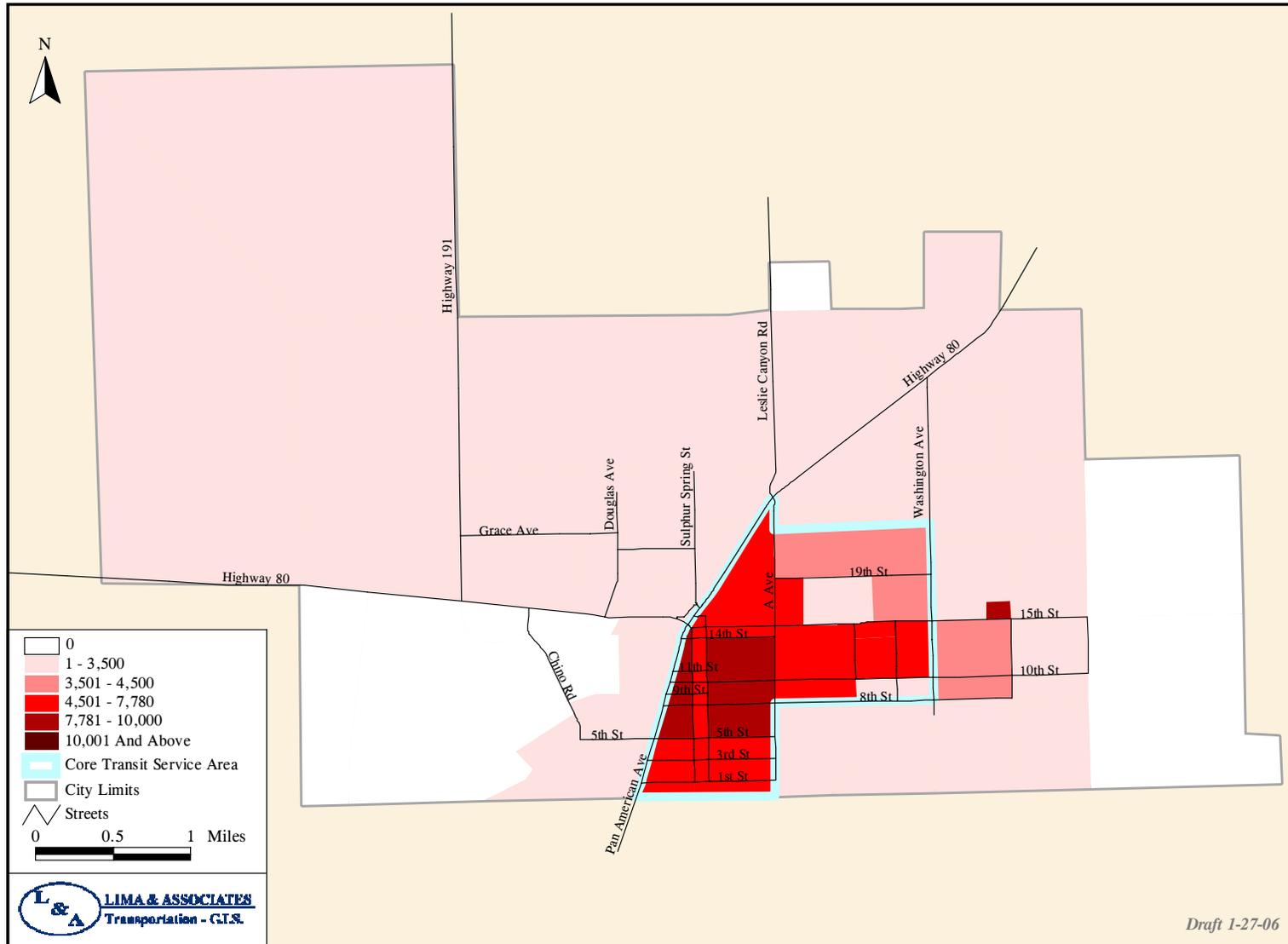
Bus intermediate service = 1/2 mi between routes, 40 buses/day

In order to analyze the concentrations of population (residential areas) and employment in Douglas, the 2005 population and employment levels were plotted by traffic analysis zone (TAZ) as shown in Exhibit 7-2. Note that each TAZ in Exhibit 7-2 reflects the sum of the population and employment within that TAZ. For example, for a TAZ with a population of 1,200 and employment of 800, a value of 2,000 was used. Exhibit 7-3 depicts the forecasted population and employment levels plotted by traffic analysis zone for 2030.

The value ranges for the “Persons per Square Mile” shown in Exhibit 7-2 and 7-3 were intentionally chosen to coincide with density thresholds for implementing various types of transit services as shown in Exhibit 7-1.

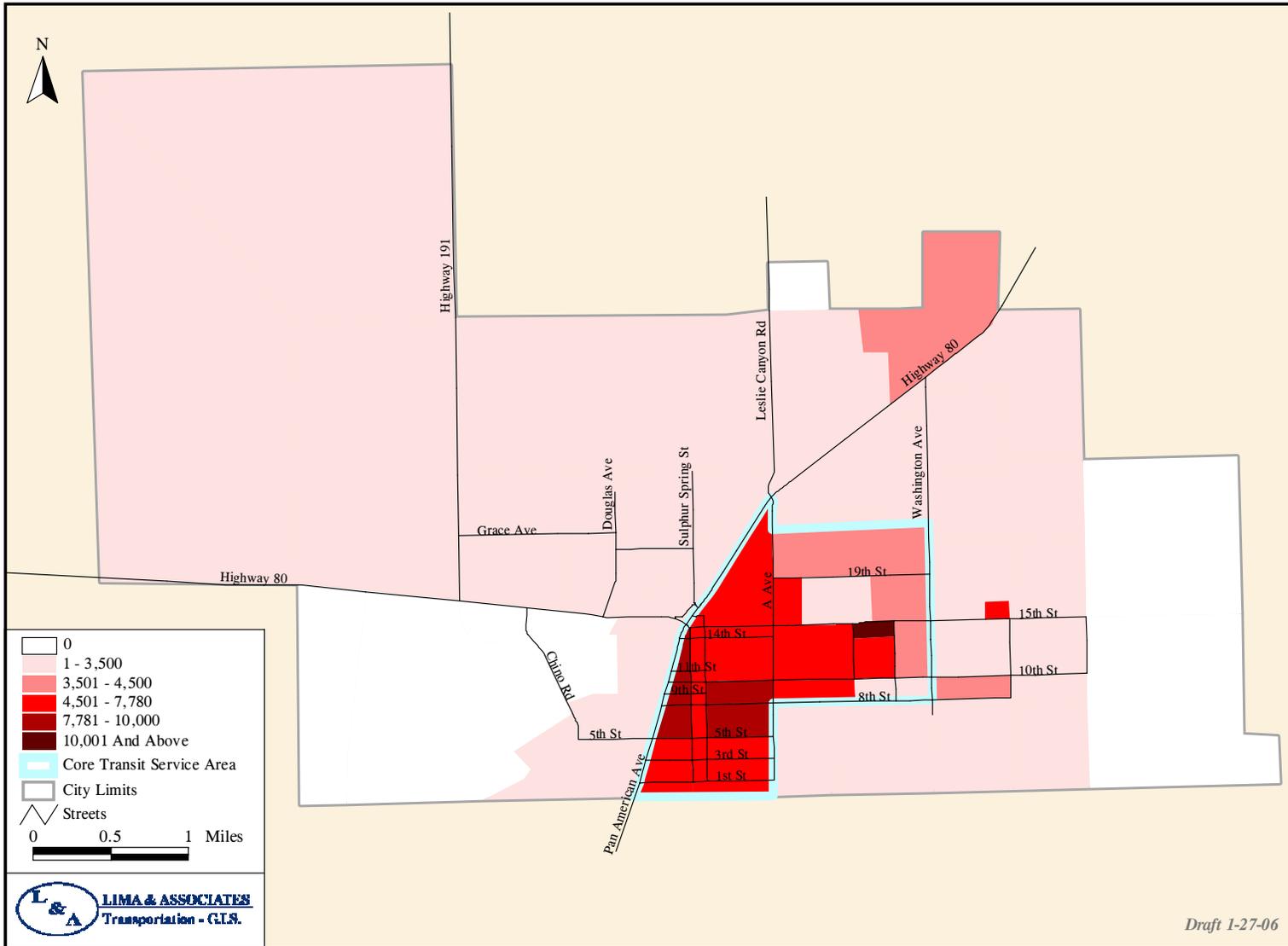
**Exhibit 7-2  
2005 COMBINED POPULATION AND EMPLOYMENT DENSITY PER SQUARE MILE BY TAZ**

7-2



**Exhibit 7-3  
2030 COMBINED POPULATION AND EMPLOYMENT DENSITY PER SQUARE MILE BY TAZ**

7-3



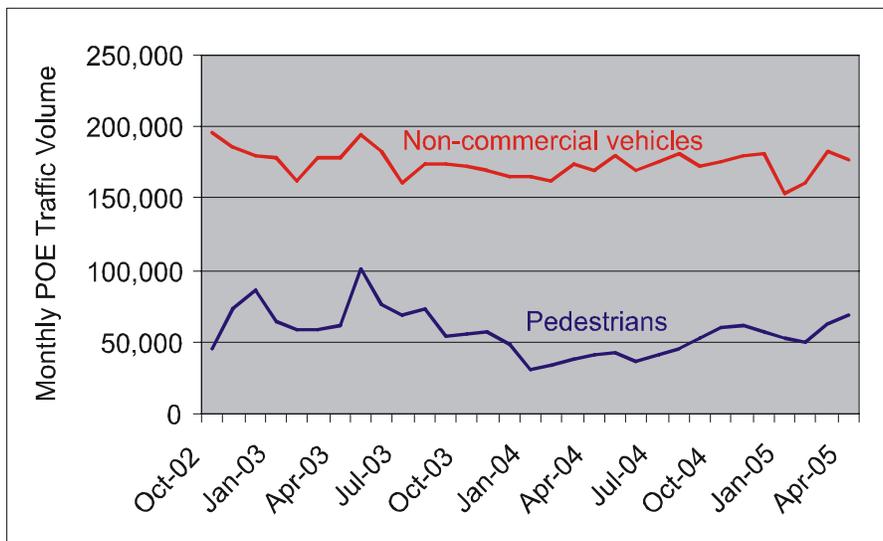
Unlike many other Arizona communities, the Douglas area is not forecast to grow dramatically between 2005 and 2030. However, as Exhibit 7-2 shows, a core area of the City already has the combined population and employment density necessary to justify the implementation of intermediate level bus service. As noted previously, an above average percentage of persons in the Douglas area carpool, possibly indicating a latent demand for transit service.

A comparison of Exhibits 7-2 and 7-3 shows that portions of Douglas north and east of the downtown area are actually forecast to become less densely populated between 2005 and 2030 because the number of persons per dwelling unit is projected to decrease. At the same time, the population in the core area is becoming slightly denser. In 2030, a residential area north of Highway 80 currently being developed is forecast to have sufficient population density to support bus transit.

Downtown Douglas is not only the core area of a small city, but is also a principal activity center of a metropolitan area including Douglas itself, as well as the significantly larger city of Agua Prieta, Sonora. At the time of a 1995 census, Agua Prieta had a population of 56,228. However, anecdotal evidence suggests that the Sonoran city has experienced explosive population growth during the 1995 – 2005 time frame. A conservative estimate is that the Douglas – Agua Prieta metropolitan area has a 2006 population of 100,000 or more. If the entire population of the region lived on the Arizona side of the border, it would be declared a Metropolitan Planning Area, and a metropolitan planning organization would be established to address the area’s transportation and transit needs.

Between 150,000 and 200,000 privately owned vehicles pass through the Douglas Port of Entry (POE) every month, together with more than 56,000 pedestrians. Exhibit 7-4 shows the monthly fluctuations in these numbers between October 2002 and April 2005. Both private vehicle and pedestrian volumes peaked in May 2003.

**Exhibit 7-4**  
**MONTHLY FLUCTUATIONS IN THE MOTOR VEHICLE AND**  
**PEDESTRIAN TRAFFIC AT THE PORT OF ENTRY**



Source: Customs & Border Protection Regional Mission Support Officer in Arizona, obtained from ASCG, Inc.

## TYPES OF TRANSIT VEHICLES AND SERVICES

The types of transit service that may be in operation in Douglas by 2030 include dial-a-ride and paratransit services, deviated fixed route local circulators, possible fixed-route bus service, and expanded regional commuter service. Definitions of these types of service are provided in Exhibit 7-5 and vehicles typically used for these services are shown in Exhibit 7-6.

### Exhibit 7-5 TRANSIT SERVICE TYPE DEFINITIONS

**Dial-a-Ride Service:** A demand-response service. Vehicles do not operate on a fixed route or schedule, but pick-up patrons at their origins and deliver them directly to their destinations. Before a trip begins, and during the course of a trip, the driver receives information from a dispatcher concerning pick-up and drop-off requests. A modification of this type of service, known as **Reserve-a-Ride**, functions like Dial-a-Ride except that pick-up requests are required to be made 24-hours in advance.

The dispatcher and driver decide the most efficient order in which to make stops. Such a procedure often means that, after being picked up, a passenger must remain on board while “detours” are made to pick up or drop off other passengers. Hence, a dial-a-ride trip can take significantly longer to complete than if the passenger had been able to drive directly to his or her destination, and such service appeals primarily to transit-dependent persons.

**Paratransit:** A complementary dial-a-ride service provided to seniors or disabled persons in a fixed-route service area as required by a provision of the Americans with Disabilities Act.

**Deviated Fixed Route Service:** Sometimes referred to as “checkpoint” service, is considered an intermediate step between dial-a-ride, which targets transit dependent riders, and fixed route service, which is more efficient in larger cities having significant volumes of transit ridership. A deviated fixed route service stops at scheduled “time points”—or “checkpoints”—much as a fixed route service does. However, the route taken between points can vary from trip to trip. This “connect-the-dots” approach offers the best of both worlds: Passengers wishing to catch the bus at the last minute can wait at a time point; at the same time, the driver can receive a pick-up request from a dispatcher and “deviate” from the route accordingly. Hence, deviated fixed route trips can take longer than fixed route trips. At the same time, the service is more visible to the public than one that operates on strictly a demand-response basis.

**Fixed Route Buses:** A service that operates on a route that never varies, although alternate routes may be used on Saturday or Sunday. Fixed route buses typically operate on headways of 60 minutes or less—with even more frequent service offered during peak travel periods. All passengers board at posted bus stops. Some of these are “time points” that appear in published timetables, but intermediate stops not listed in schedules may also be served. The new Douglas Rides service is an example of a fixed route service operating on loop routes.

**Regional Commuter Service:** Commuter services typically offer several departures in the morning, timed to arrive at the employment center at the beginning of the work day, and afternoon departures scheduled at the end of the work day. Such services do not necessarily operate on weekends, but may offer weekend schedules timed to accommodate shoppers and tourists. The existing Cochise Commuter is such a service, and could be operated with any of the types of vehicles shown, or with full size over-the-road coaches, as demand warrants.

### Douglas Rides

It should be noted that the Douglas Rides, a transit service operated by Catholic Community Services and funded in part through the FTA Section 5311 Program administered by ADOT, began operation in December 2006 as this planning study was nearing completion. Douglas Rides provides fixed route service on three loop routes that cover most of the study area as described in Chapter 2 of this report. Three vehicles are needed to service the three loop routes. Currently, vehicles already owned by CCS are being used; however two new vehicles have been ordered especially for Douglas Rides use and will be placed in service during 2007. CCS personnel report that ridership continues to grow. A total of 326 passengers were carried in December 2006, and over 400 were carried during the first three weeks of January 2007. The service has facilitated patronage of Douglas merchants by residents of Agua Prieta and both the merchants and the transit users are reported to be pleased with the new service. The provision of the Douglas Rides service is consistent with, and directly addresses several of the transit service recommendations made in this report.

**EXHIBIT 7-6  
TYPES OF TRANSIT VEHICLES**

Wheelchair-accessible vans are commonly used for both paratransit and dial-a-ride services, and may also be employed by vanpools that include mobility-limited participants.



**—American Public Transit Association photo**



**—Lima & Associates photo**

This “cutaway” vehicle, comprising a minibus body constructed on a recreational vehicle chassis, is used by Valley Metro for paratransit services. However, similar vehicles are typically used in both deviated fixed route and downtown or neighborhood circulator services.

Heavy-duty transit buses such as this Flagstaff Mountain Line Transit vehicle resemble those used in the Phoenix and Tucson metro areas but are shorter and have less passenger capacity. These vehicles can be made fully accessible and typically have long useful lives. They are suitable for both fixed and deviated fixed route services in smaller cities. Vista Transit in Sierra Vista operates similar vehicles.



**—Lima & Associates photo**

## **Transportation Demand Management Alternatives**

Transportation Demand Management consists of a wide range of programs and services that enable people to get around without driving alone. Included are alternative transportation modes such as carpooling, vanpooling, transit, bicycling, and walking as well as programs that alleviate traffic and parking problems such as telecommuting, variable work hours, and parking management.

Transportation Demand Management can address the needs of those traveling long distances with rideshare options such as vanpools and carpools. These types of services are vital in moving people around large areas, whether for work or for traveling to regional centers that have special services, medical facilities, or retail stores.

## **Potential Sources of Transit Funding**

Significant federal sources of funding grants are overseen and managed by the Federal Transit Administration (FTA); these funds are administered in Arizona by the Public Transportation Division of ADOT (ADOT PTD). FTA funding levels are part of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the successor to the Transportation Equity Act for the 21st Century (TEA-21). The federal transit laws are contained in Title 49 of the United States Code (USC), Chapter 53. The key transit grant provisions applicable to Douglas are covered in the following sections of Chapter 53 of the USC:

- Section 5310: Formula Grants and Loans for Special Needs of Elderly Individuals and Individuals with Disabilities
- Section 5311: Formula Grants and Loans for rural and small urban public transportation
- Section 5313: State Planning and Research Programs

Typically, public agencies are the only transit operators considered as potential recipients of Section 5311 funds. However, in certain cases established private sector non-profit agencies may be eligible. The City and prospective operators should explore this option with the ADOT Public Transit Division.

Other federal sources of funding include the Temporary Assistance for Needy Families Program, Title III Funds of the Older Americans Act, and Surface Transportation Program funds.

State Sources of Funding include the LTAF and LTAF II funds, which are distributed directly to cities, towns, and counties in Arizona. Other sources of funding include farebox revenues, advertising and "in kind" revenues, local taxes or bonds, and the use of volunteers.

The Local Transportation Assistance Fund II, or LTAF II, program, which derives funds from the State's share of lottery "Power Ball" ticket receipts, has been one of the key sources for the local matching funds for these federal funds. Since the implementation of LTAF II, the legislature has provided that when these receipts reach a certain threshold amount in any fiscal year, the balance flows to the LTAF II program for apportioned distribution to councils of governments, county governments, and local governments. However, since the legislature has raised the threshold to \$37 million and Power Ball net receipts are not forecast to reach \$37 million in fiscal 2006, the LTAF II program is essentially unfunded. Agencies have the option of providing the local match from their general funds, but the lack of LTAF II monies is still likely to adversely impact the availability of funding for transit projects and programs.

## **Coordinating Local Human Services Transportation Programs**

**Arizona Rides** is a statewide effort to coordinate provision of human services transportation within counties or regions of counties to increase efficiency, limit service duplication and confusion, and save costs. Arizona Rides was initiated in response to the federal “United We Ride” program established in 2004. “Pinal Rides,” a pilot project of the program, funded a study of the concept in Central Pinal County. The Final Report of the pilot project was published in December 2005. Recommendations included the establishment of a transit coordinating council for the study area and the implementation of service along two regional corridors. The City should encourage current and future providers of human services transportation in the area to coordinate services and operations in order to limit duplication and save costs.

## **RECOMMENDED TRANSIT SERVICES**

Exhibit 7-7 depicts the transit service areas recommended for Douglas, based on the combined population and employment densities discussed previously. These service areas are very consistent with the service areas adopted for the new Douglas Rides service, except that Douglas Rides also serves the area north of SR 80 and west of Pan American Avenue.

Next steps recommended to be taken by the City are the following:

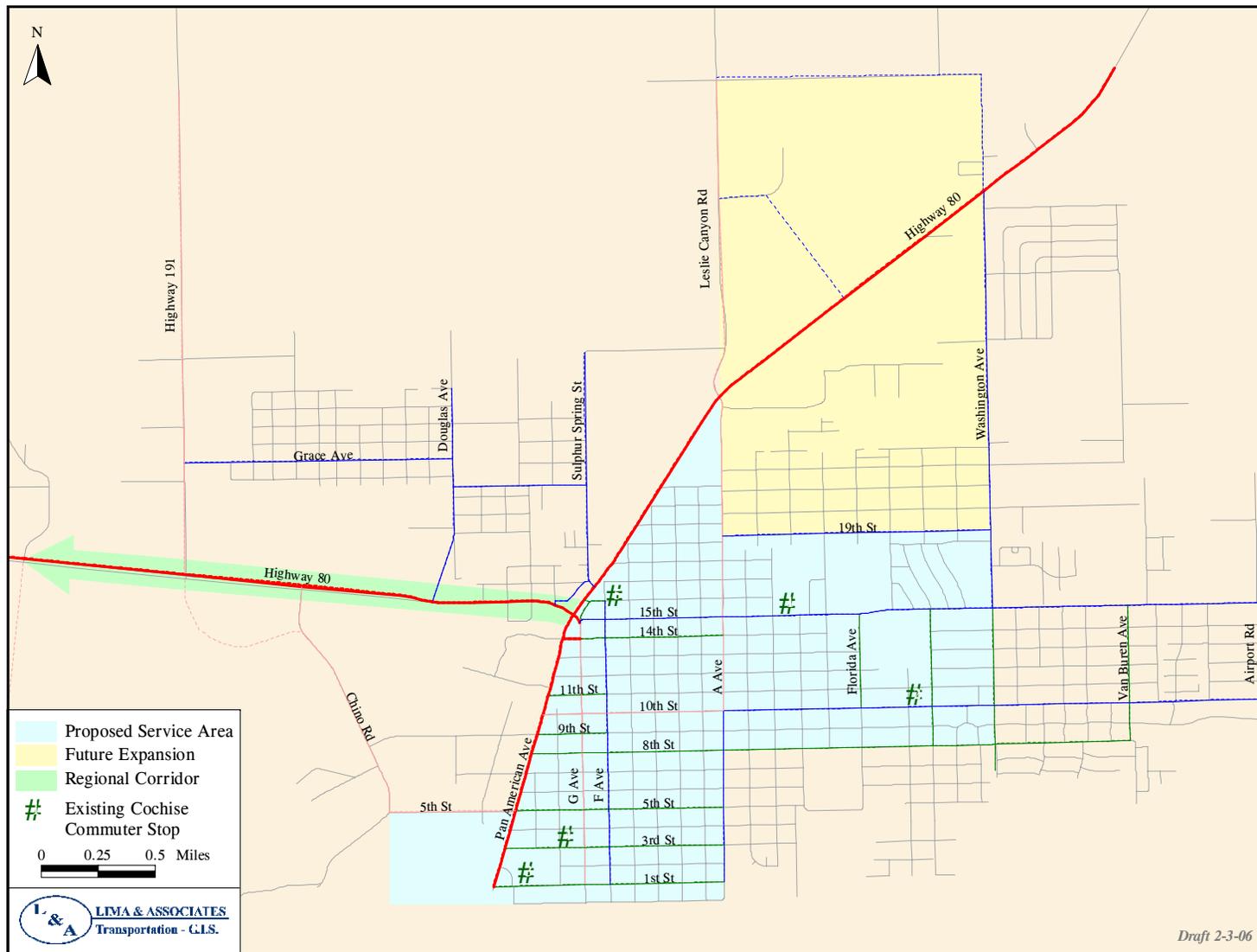
- Based on estimated 2005 combined population and employment densities, establishing a local transit circulator within the core area of the City of Douglas appears feasible. The City should encourage Catholic Community Services to collect ridership data on the new Douglas Rides operation including the place of residence, destination, age, and employment status of riders. After Douglas Rides has been operating long enough to produce significant ridership data, the City should coordinate with CCS in the conduct of an evaluation of the operation to identify any improvements needed to make the service more effective and efficient, as well as potential areas for service expansion.
- The level of LTAF II funding fluctuates from year to year and the City should evaluate additional options for generating local monies to be used as “local matches” for federal transit capital and operating funds.
- The City should also be prepared to step in and participate in the funding, operation, and expansion of the Douglas Rides and Cochise Commuter services as may be needed.
- The City should monitor the operations of other regional services such as the Douglas shuttle and get proactively involved if needed to ensure continued alternative mode service to Tucson, Phoenix, and other cities—avoiding unnecessary reliance on private automobiles for travel in an age of steadily increasing fuel costs.
- Rising fuel prices will also impact the costs of operating public transportation systems, and more public support may be needed to keep essential services in operation.
- Where feasible, the City should work together with Agua Prieta, Sonora to jointly address transit and other transportation issues and to explore any reasonable possibilities for partnering in the provision of transportation services to the metropolitan area.
- Currently, the forecasted increases in population and population density for Douglas indicate that bus service may adequately meet the region’s transit needs for the foreseeable future. However, the City should follow closely the developments in Tucson regarding the planned implementation of “Modern Streetcar” service in that city. If the population growth rate and traffic volumes in the area increase significantly, long-term planning for the future use of modern streetcars for a circulator connecting the port of

entry with the downtown area and key commercial areas may become appropriate, subsequent to the establishment of a comprehensive local bus system. Exhibit 7-8 shows the type of vehicle used in downtown Portland, Oregon.

### **Summary of Transit Findings**

- Forecasted concentrations of population and employment can be used to predict the origins and destinations of peak-hour trips including transit trips.
- Portions of a core area of the City currently exceed density thresholds used for implementing some types of public transportation.
- Catholic Community Services currently operates paratransit services, a deviated fixed-route “Cochise Commuter” service, and a “Douglas Rides” local circulator service on three loops. Future transit improvements could include the expansion of these operations as well as the implementation of a community ride-sharing program.
- Potential sources of funding include Federal Transit Administration program monies for metropolitan planning areas administered by the Arizona Department of Transportation (ADOT), as well as Local Transportation Assistance Fund (LTAF II) monies, farebox revenues, and local match funds.
- The City should discuss with the ADOT Public Transportation Division the conduct of a transit feasibility and implementation study.
- The City should plan for the provision of local funding monies and evaluate the available options.
- The City should monitor closely the operations of the Cochise Commuter and other services and be prepared to assist, if needed, to avoid service interruption.
- Rising fuel prices will also impact the costs of operating public transportation systems, and more public support may be needed to keep essential services in operation.
- Where feasible, the City should work together with Agua Prieta, Sonora to jointly address transit and other transportation issues and to explore any reasonable possibilities for partnering in the provision of transportation services to the metropolitan area.
- If the population growth rate and downtown traffic volumes in the Douglas area increase significantly, once a local bus system is in place, the City may want to consider, as a long-term option, a Port-of-Entry-downtown loop using “modern streetcars” like those being planned for Tucson.

## Exhibit 7-7 PROPOSED TRANSIT SERVICE AREAS



7-10

## Exhibit 7-8 MODERN PORTLAND STREETCAR



Source: [www.nwvirtualtransit.com](http://www.nwvirtualtransit.com)

### **FUTURE PEDESTRIAN AND BICYCLE ACTIVITY AND FEATURES**

There were only very limited pedestrian and bicycle counts available for this study. It is expected that pedestrian and bicycle travel demand will increase in direct relation to the population growth in the City of Douglas and across the border in Aqua Prieta.

The City of Douglas has several characteristics that make it a good environment for walking and bicycling. The City has a compact form where work, shopping and recreational activity locations are close to existing residential areas. Except during the hottest months, the climate is very suitable for walking or biking, and the terrain is relatively flat. The general grid pattern of the existing street network provides numerous travel route options for pedestrians and bicyclists. Traffic volumes on most streets are relatively low as are traffic speeds, and the roadway system does not present significant barriers to either walking or cycling. Most City streets south of SR 80 and east of Pan American Avenue have sidewalks. These factors, combined with the proximity of the POE to the downtown and the new Wal-Mart, suggest the pedestrian and bicycle activity will likely increase in the future, if these activities are encouraged.

There are factors in the City that work against bicycling. The major and minor collector streets are relatively narrow, with narrow lanes and on-street parking. The downtown area has predominately angle parking on the streets, which may be more dangerous for cyclists than parallel parking because it is more difficult for motorists backing out of these spaces to see on-coming cyclists. There are no designated bicycle features on any of the existing roadways, and there is no system of designated bike routes.

The following recommendations are provided for the development of future pedestrian and bicycle features:

- Develop a comprehensive bicycle system plan for the City. The bicycle system plan should include the following:
  - A route plan and map designating bicycle facilities that interconnect the existing and future activity centers such as the downtown, the POE, the new commercial district

- west of Pan American Avenue along 5<sup>th</sup> Street, the schools along 15<sup>th</sup> Street, and the residential areas of the City.
- A list of prioritized bicycle system projects and costs to implement the system.
  - Design standards and typical cross-sections for the various elements of the bicycle system, including on-street bicycle lanes and shared-use paths.
  - Signing, striping, and traffic control standards required for the provision of on-street and off-street elements of the system.
  - Guidelines for policies and procedures necessary to implement the plan.
  - Recommendations for funding plan implementation.
  - Provide a bicycle connection between the new commercial district on 5<sup>th</sup> Street west of Pan American Avenue to the new shared use path along Pan American Avenue.
  - Extend the shared-use path on the west side of Pan American Avenue south from 3<sup>rd</sup> Street to the POE.
  - Develop a lighted and landscaped pedestrian pathway from the POE and the City Park, just north of the POE on Pan American Avenue, to the east through Speer Park.
  - Provide bicycle racks in the downtown area and in the new commercial area on 5<sup>th</sup> Street west of Pan American avenue. Require that new commercial areas provide conveniently placed bicycle racks.
  - Connect the emerging residential areas developing north of SR 80 to the areas south of SR 80 with on-street bicycle facilities.
  - Inventory the City's sidewalk system to identify locations that do not meet ADA requirements and establish a plan to upgrade these locations.
  - Develop and implement a safe routes to school program for elementary school and junior high school students. The purpose of the safe routes to school initiative is to encourage students to walk or bicycle to school as part of a healthy lifestyle. Safe routes to school programs engage students, teachers, school administrators, and parents in the development of a plan that establishes specific safe routes of travel to and from school, develops educational materials to promote safe walking and bicycling, and establishes the policies and guidelines needed to implement the program.

## **8. SUMMARY OF TRANSPORTATION PLAN RECOMMENDED IMPROVEMENTS AND ACTIONS**

### **ROADWAY SYSTEM**

#### **Traffic Circulation and Operations Improvements**

In general, the current streets and intersections provide adequate capacity and level of service for existing and forecast year 2030 traffic. There are a few intersections that are beginning to experience, or are forecast to experience traffic operating conditions that may require attention if traffic volumes continue to increase. These intersections and the associated congestion issues are summarized below in Exhibit 8-1.

Several actions have been identified to address traffic operations, traffic safety, and parking issues. The recommended short, mid and long-term actions to improve traffic operations are provided in Exhibit 8-1 along with planning level cost estimates for these improvements. The cost estimates are in year 2006 dollars.

#### **Douglas, Arizona U.S. Port of Entry Feasibility Study 2006**

At the time that this planning study was nearing completion the United States General Services Administration *Douglas, Arizona U.S. Port of Entry Feasibility Study 2006* had completed its 75 percent submittal. The stated purpose of the feasibility study is to “address the issues of traffic congestion, pedestrian safety, and officer security while providing more efficient operations at the Port“, and to “resolve as many of the issues as possible or, at the least, mitigate their effects.”

The 75 percent submittal of the feasibility study contains five alternatives for the redesign and location of the Port for processing vehicles entering the US. The selected alternative may directly impact the need for some of the roadway system improvements identified in Exhibit 8-1.

Four of the feasibility study alternatives move the inbound and outbound commercial truck traffic west of Pan American Avenue. This would be consistent with, and benefit the City’s past and current efforts to provide pedestrian and bicycle facilities along Pan American Avenue and provide an attractive gateway for private vehicles, buses, pedestrians and bicyclists entering the city through the POE. If one of these four alternatives is implemented, the City of Douglas should not have to implement the recommended traffic operations improvements at the intersection of 9<sup>th</sup> Street and Pan American Avenue to improve truck access to the warehouses west of Pan American Avenue. This is because commercial trucks will then access the 9<sup>th</sup> Street warehouses from the west of Pan American Avenue. This would also provide the option for the City to eliminate or modify 9<sup>th</sup> Street access from the west to Pan American Avenue to prevent commercial trucks from using Pan American Avenue to access the warehouses.

#### **Safety Improvements**

A three-year crash history for six intersections was evaluated to identify improvements that could potentially improve traffic safety at these locations. Exhibit 8-2 contains a summary of the improvements recommended based on the crash analysis.

## **Downtown Parking**

A summary of recommended actions regarding downtown parking is provided in Exhibit 8-3. The review of parking in the downtown area identified the following issue that should be addressed as soon as possible:

- Not all handicapped designated parking spaces are located immediately adjacent to ramps leading to the sidewalk. This should be corrected as soon as possible by relocating the designated handicapped spaces such that they are adjacent to curb ramps. This will involve repainting parking spaces and curbs for handicapped use and relocating parking signs designating handicapped space location.

At the time the downtown parking inventory was conducted there was no indication that the demand for parking exceeded parking supply in the downtown area. However, the downtown parking inventory did not include a parking utilization and demand study. Such a study would help the City determine whether additional downtown parking was needed. It is recommended that the City conduct a downtown parking utilization and demand study during the peak parking demand season for the downtown area. The results of the parking demand and utilization study will help the City of Douglas establish whether additional parking is needed and guide the establishment of policies and programs to provide sufficient parking.

High curbs in the downtown area, designed to contain storm water runoff, make conversion of angle parking to parallel parking difficult, as the curb prevents opening of the passenger side door on most automobiles. This problem can be corrected by providing a terraced curb, accomplished by cutting a step into the existing curb, but this process can reduce the usable width of the sidewalk and it may be cost prohibitive. The conversion of the angle parking to parallel parking in the downtown area is not recommended at this time, as there do not appear to be any traffic operations issues associated with the existing angle parking.

One option to consider is the conversion of the existing downtown area angle parking to back-in angle parking. Back-in angle parking is generally safer for motorists and bicyclists because the vehicle is facing the street when pulling out of the space, but the spaces are slightly more difficult to access. The conversion would only require that the spaces be striped to angle opposite of the current direction and that the area be signed for back-in parking.

**Exhibit 8-1**  
**SUMMARY OF TRAFFIC ENGINEERING RECOMMENDED**  
**IMPROVEMENTS AND ACTIONS**

<b>Location</b>	<b>Existing Year 2005 Condition</b>	<b>Recommended Action</b>	<b>Estimated Cost in 2006 \$</b>
<b>Short Term</b>			
San Antonio Avenue / 15 <sup>th</sup> Street	NB LOS E in AM peak-hour.	1. Conduct 4-way stop control warrant analysis. 2. Convert to 4-way stop control if warranted.	1. Warrant Study - \$4,000. 2. Install 2 additional stop signs - \$1,000
14 <sup>th</sup> Street / Pan American Avenue	WB LOS D in PM peak-hour	Monitor peak-hour traffic conditions through periodic field observation.	
9 <sup>th</sup> Street / Pan American Avenue.  <b>Note that these improvements are unnecessary if the POE commercial truck facilities are moved to the west of Pan American Avenue.</b>	1. WB LOS E in PM peak-hour  2. Narrow westbound departure leg (9 <sup>th</sup> Street) and eastbound approach creates traffic operations problems for large trucks attempting access to and egress from warehouses along 9 <sup>th</sup> Street west of Pan American Avenue.	1. Monitor traffic conditions and consider converting EB and WB traffic to right-turn only.  2. Widen 9 <sup>th</sup> Street west of Pan American Avenue to accommodate large truck turn movements at this intersection. This will include utility relocation, right-of-way acquisition, and design.	2. \$400,000
Louis Avenue: 15 <sup>th</sup> Street to 19 <sup>th</sup> Street	Minor traffic congestion and conflicts associated with school traffic.	Re-stripe Louis Avenue to provide continuous two-way left-turn lane.	\$3,000
15 <sup>th</sup> Street: between Florida and San Antonio Avenues	Traffic conflicts associated with charter school traffic on south side of 15 <sup>th</sup> Street.	Provide new access to charter school parking lot.	\$10,000
Citywide	Inconsistent speed zoning, lack of appropriate traffic signing and roadway striping.	Conduct a comprehensive roadway signing and striping inventory and identify corrective measures required.	\$60,000
<b>Location</b>	<b>Forecast Year 2030 Condition</b>	<b>Recommended Action</b>	<b>Estimated Cost in 2006 \$</b>
<b>Mid to Long Term</b>			
San Antonio Avenue / 15 <sup>th</sup> Street	NB LOS F in AM peak-hour SB LOS D in PM peak-hour	Monitor traffic and install traffic signal when warranted.	\$170,000
Florida Avenue / 10 <sup>th</sup> Street	NB LOS D in AM peak-hour NB LOS F in PM peak-hour	Monitor traffic and install traffic signal when warranted.	\$170,000
9 <sup>th</sup> Street / Pan American Avenue	EB LOS E in AM peak-hour EB and WB LOS E in PM peak-hour	Install EB and WB channelizing islands to allow right-turn only.	\$100,000
US Port of Entry	Commercial truck use of Pan American Avenue	Implement recommendations of the US Port of Entry Feasibility Study (2007).	To be determined.

**Exhibit 8-2**  
**SUMMARY OF RECOMMENDED IMPROVEMENTS RESULTING**  
**FROM THE CRASH ANALYSIS**

Intersection Location	Existing Year 2005 Condition	Recommended Action	Estimated Cost in 2006 \$
<b>Short Term</b>			
14 <sup>th</sup> Street / G Avenue	<ol style="list-style-type: none"> <li>1. Higher than expected number of collisions involving red-light running.</li> <li>2. Restricted sight distance on horizontal curve entering SB approach.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install longer mast arms and additional traffic signal heads for NB and SB traffic.</li> <li>2. Place advance traffic signal warning sign and 25 mph speed limit sign on curve entering SB approach.</li> </ol>	<ol style="list-style-type: none"> <li>1. \$100,000</li> <li>2. \$1,000</li> </ol>
16 <sup>th</sup> Street / Pan American Avenue (SR 80 / Pan American Avenue / G Avenue)	No crash related problems identified.	None	
9 <sup>th</sup> Street / Pan American Avenue	No crash related problems identified.	See Exhibit 8-1 regarding the west leg of this intersection and large truck operation problems.	
5 <sup>th</sup> Street / Pan American Avenue	No crash related problems identified. However, the eastbound approach does <u>not</u> have the appropriate signing and striping for the existing lane use.	Upgrade signing and pavement striping on the eastbound approach to indicate exclusive left-turn lane, one through lane, and exclusive right-turn lane.	\$2,000
10 <sup>th</sup> Street / A Avenue	<ol style="list-style-type: none"> <li>1. No crash related problems identified.</li> <li>2. On-street parking near intersection on NB approach and departure legs.</li> <li>3. Driveways to gas station/mini-mart on southbound approach and northbound departure leg are too close to the intersection.</li> </ol>	<ol style="list-style-type: none"> <li>1. None</li> <li>2. Provide parking pull-out area on northbound departure leg.</li> <li>3. Consider closing driveways on SB approach and WB departure leg that are closest to the intersection.</li> </ol>	<ol style="list-style-type: none"> <li>2. \$10,000</li> <li>3. \$5,000 to close driveways</li> </ol>
11 <sup>th</sup> Street / A Avenue	Five crashes involving vehicles on 11 <sup>th</sup> Street failing to stop for stop sign.	<ol style="list-style-type: none"> <li>1. Place advance stop ahead warning signs on the EB and WB 11<sup>th</sup> Street approaches.</li> <li>2. Use a Warning Beacon as a supplemental emphasis to the stop signs.</li> <li>3. Prohibit on-street parking on A Avenue near the intersection to maintain adequate cross-corner sight distance.</li> </ol>	<ol style="list-style-type: none"> <li>1. \$1,000</li> <li>2. \$15,000 for two beacons</li> <li>3. \$1,000 for signs and curb painting</li> </ol>

**Exhibit 8-3**  
**SUMMARY OF RECOMMENDED ACTIONS**  
**REGARDING DOWNTOWN PARKING**

Existing Condition	Recommended Action	Estimated Cost
<b>Short Term</b>		
Not all handicapped parking is immediately adjacent to curb ramps.	Relocate handicapped parking adjacent to curb ramps. Paint designated spaces, paint curbs, place signs.	\$7,500
<b>Mid Term</b>		
Parking space utilization and need for additional parking are not quantified.	Conduct parking demand and utilization study for the downtown area.	\$35,000

**Recommendations From Previous ADOT Studies**

The Arizona Department of Transportation, Traffic Engineering Group commissioned two studies in 2003 affecting the Douglas SATS planning area. These studies are:

- *Douglas Strategic Motor Carrier Safety Inspection Station Circulation Study*, Final Report August 2003.
- *SR 80 / US 191 Intersection Study*, Final Report August 2003.

In combination these two studies evaluate the traffic operations and safety impacts of locating a new ADOT truck inspection facility in the northeast quadrant of the intersection of SR 80 and US 191. To support the construction of this new ADOT facility at this location, these studies recommend several roadway system improvements to provide safe and efficient access to the site. These improvements, which would be paid for by ADOT, include the following:

- Construct new access driveways on US 191 and SR 80.
- Construct a southbound left-turn lane and a northbound right-turn lane on US 191 (the northbound approach is the realigned Chino Road).
- Construct a westbound right-turn lane on SR 80 to the two new access driveways.
- Construct a northbound right-turn lane and southbound left-turn lane on US 191 north of SR 80 to serve the site access driveways.
- Signalize the intersection of US 191 / SR 80.

It is assumed by these studies that Chino Road will be realigned to the west to intersect with SR 80 as the southern leg of the US 191 / SR 80 intersection. The *Douglas Strategic Motor Carrier Safety Inspection Station Circulation Study* makes the following statement:

“The City of Douglas Plans to realign Chino Road to the intersection of US 191 and SR 80, forming a south leg at the intersection. The purpose of the realignment is to provide an efficient route for trucks from Mexico entering the United States to access State Highways, and to relocate the truck traffic off of City of Douglas streets.”

The realignment of Chino Road is being funded through the Southeastern Arizona Governments Organization (SEAGO). A design concept report for the realignment of Chino Road has been completed along with a drainage report. The final design of the realignment has also been

completed, but is currently being discussed by the City for possible revisions before the project can go out for bid. The estimated cost of the project is \$1.3 million.

## **PEDESTRIAN SYSTEM IMPROVEMENTS AND ACTIONS**

The City of Douglas is a relatively pedestrian friendly and walkable community. The downtown area is conveniently located within walking distance from the surrounding residential areas and the grid pattern of streets provides good access. In general, the older sections of the City of Douglas have a well developed sidewalk system with sidewalks on both sides of most major and local streets. Many of the sidewalks along collector and local streets are set back from the curb. The downtown area includes wide sidewalks, shade trees, and street furniture to provide a good pedestrian environment and the angle parking in the downtown provides a buffer between the sidewalk and the traffic lanes.

Major pedestrian activity centers include the following:

- The Douglas Port of Entry (POE) and the area north of the POE along Pan American Avenue.
- The downtown area.
- 15<sup>th</sup> Street between A Avenue and Washington Avenue associated with the schools in this area.

The pedestrian related issues that should be addressed by the City as it continues to grow and develop include the following:

- Angle parking in the downtown area restricts pedestrian and motorist cross-corner sight-distance reducing pedestrian safety.
- There is no direct pedestrian connection between the POE and the newly developed commercial area north of the POE along 5<sup>th</sup> Street along the west side of Pan American Avenue.
- Pedestrians traveling from the POE currently use an unimproved pathway from the City Park on Pan American Avenue, just north of the POE, to travel east through Speer Park to access G Avenue and the downtown business district.
- There is no existing pedestrian plan providing the comprehensive guidance for the coordinated development of future pedestrian facilities for the study area. Such a plan would require a comprehensive inventory of existing pedestrian facilities and improvement needs within the study area, which was beyond the scope of this study. In addition, a comprehensive pedestrian plan should include policies for new commercial and residential development to include sidewalks and other pedestrian system features to implement the objectives of the plan.
- The following conditions were identified along 15<sup>th</sup> Street between A Avenue and Washington Avenue:
  - No sidewalk between Florida and San Antonio Avenues on the south side of 15<sup>th</sup> Street.
  - The asphalt sidewalk on the north side of 15<sup>th</sup> Street between Cochise Drive and Washington Avenue is in poor condition.
  - The sidewalk on the south side of 15<sup>th</sup> Street between San Antonio and Washington Avenues is narrow and immediately adjacent to the roadway.

- There are no sidewalks along Louis Avenue between of 15<sup>th</sup> and 19<sup>th</sup> Streets connecting to the schools north of 15<sup>th</sup> Street.
- There are drainage issues along 15<sup>th</sup> Street associated with the lack of curb and gutter in this area.

The following projects are recommended to improve pedestrian system planning and facilities within the study area.

- The City of Douglas should consider the implementation of corner curb extensions in the downtown where angle parking is used. The curb extensions provide pedestrians a protected area to stand, allowing a better view of the cross street while waiting to cross, and they shorten the crossing distance. Pedestrians standing on the curb extensions waiting to cross are also more visible to motorists on the cross street.

### **VIEW OF CURB EXTENSION WITH ANGLE PARKING IN DOWNTOWN TUCSON, ARIZONA**



- Extend the shared-use path on the west side of Pan American Avenue south from 3rd Street to the POE, as outlined in the Paseo de la Amistad Transportation Enhancement Project.
- Develop a lighted and landscaped pedestrian pathway from the POE and the City Park, just north of the POE on Pan American Avenue, to the east through Speer Park.
- Inventory the City's sidewalk system to identify locations that do not meet ADA requirements and establish a plan to upgrade these locations.
- Continue implementation of the City's Curbing and Sidewalk Master Plan.
- Develop a comprehensive pedestrian system plan for the urban area and the newly developing residential areas north of SR 80. The plan should contain City policies and regulations for new commercial and residential development regarding the provision of sidewalks and other pedestrian system features within the context of the pedestrian system plan.
- Develop a shared use path connecting the newly developing residential areas along Leslie Canyon Road north of SR 80 to the urban area south of SR 80. This path should

include a pedestrian / bicyclist activated traffic signal at the intersection of Leslie Canyon Road and SR 80. The path should continue south of SR 80 to a location that connects the path to a suitable existing pedestrian facility and bicycle facility.

- Develop and implement a Safe Routes to School Program for elementary and middle/junior high schools.

A pedestrian project summary is provided in Exhibit 8-4.

**Exhibit 8-4**  
**SUMMARY OF RECOMMENDED PEDESTRIAN SYSTEM PROJECTS AND ACTIONS**

<b>Recommended Action</b>	<b>Estimated Cost in 2006 \$</b>
<b>Short Term</b>	
Extend the shared-use path on the west side of Pan American Avenue south from 3rd Street to the POE - potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). This is also listed as a bicycle project.	\$450,000
Connect the new commercial district on 5th Street west of Pan American Avenue to the existing shared use path along Pan American Avenue -potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). Also listed as a bicycle project.	\$30,000
Develop a lighted and landscaped pedestrian pathway from the POE and the City Park, just north of the POE, to the east through Speer Park (approximately 1,300 linear feet). Potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities).	\$500,000
Construct 15 <sup>th</sup> Street sidewalk improvements from Florida Avenue to Washington Avenue (see also 15 <sup>th</sup> Street bicycle improvements in Exhibit 8-5).	\$25,000/mile
1. Inventory the City's sidewalk system for ADA improvement needs. 2. Implement ADA required improvements	1. \$30,000 2. To be determined.
Develop a comprehensive pedestrian system plan including policies and regulations for sidewalks and pedestrian features for new commercial and residential development.	\$50,000
Develop Safe Routes to School Program – potential funding source is the new Federal Safe Routes to School Program funding. Contact the new ADOT Safe Routes to School Program Coordinator, Brian Fellows at 602-712-8010.	\$50,000
<b>Long Term</b>	
Implement Leslie Canyon Road shared use path (north of SR 80) and pedestrian / bicycle signal at SR 80 (also listed as bicycle system project) - potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). Also listed as a bicycle project.	To be determined.

## **BICYCLE SYSTEM IMPROVEMENTS AND ACTIONS**

The City of Douglas provides an excellent community for bicycling. The community is relatively compact in size, and the major activity centers, such as the downtown, the POE, schools, and the new Wal-Mart commercial center are all located close to the residential areas. The terrain in the study area is relatively flat and the climate is conducive to bicycling for most months of the year. The grid network of streets provides good connectivity and accessibility between the residential, commercial, school, and government centers. The vast majority of the street system has posted speed limits of 35 miles-per-hour or less, providing relatively slow moving traffic on most streets. The shared use path along the west side of Pan American Avenue from 3<sup>rd</sup> Street to 14<sup>th</sup> Street is a notable bicycle feature provided by the City. All of the above factors enhance the bicycling environment.

Factors within the City that tend to discourage bicycling include the narrow arterial and collector streets with on-street parking, and the lack of designated bicycle facilities. The City does not have an adopted bicycle system plan providing long range guidance for the further development of bicycling within the City.

The following projects are recommended to improve bicycle system planning and facilities within the study area:

- The City should develop a comprehensive bicycle system plan to provide guidance for the short and long-range development of the bicycle system.
- Extend the shared-use path on the west side of Pan American Avenue south from 3<sup>rd</sup> Street to the POE.
- Develop a shared use path connecting the newly developing residential areas along Leslie Canyon Road north of SR 80 to the urban area south of SR 80. This path should include a pedestrian / bicyclist activated traffic signal at the intersection of Leslie Canyon Road and SR 80. The path should continue south of SR 80 to a location that connects the path to a suitable existing pedestrian facility and bicycle facility.
- Due to the location of schools along 15<sup>th</sup> Street, the City should design and implement a 5-foot bicycle lane on each side of 15<sup>th</sup> Street from at least A Avenue to Washington Avenue. This will involve roadway widening to accommodate the bicycle lanes. An option would be to develop a shared use path for pedestrians and bicycles on one or both sides of 15<sup>th</sup> Street through this area.
- Connect the new commercial district on 5<sup>th</sup> Street west of Pan American Avenue to the new shared use path along Pan American Avenue by either extending the shared use path west along 5<sup>th</sup> Street or by developing a 5-foot bike lane on both sides of 5<sup>th</sup> Street.
- Provide bicycle racks in convenient locations within the downtown shopping area and at the City of Douglas City Hall on 10<sup>th</sup> Street. The number and location of these facilities should be established as part of the bicycle system plan.

A project summary for bicycle system improvements is provided in Exhibit 8-5.

**Exhibit 8-5  
SUMMARY OF RECOMMENDED BICYCLE SYSTEM PROJECTS AND ACTIONS**

<b>Recommended Action</b>	<b>Estimated Cost in 2006 \$</b>
<b>Short Term</b>	
Develop comprehensive bicycle system plan	\$70,000
Extend the shared-use path on the west side of Pan American Avenue south from 3rd Street to the POE - potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). This is also listed as a pedestrian project.	\$450,000
Connect the new commercial district on 5th Street west of Pan American Avenue to the existing shared use path along Pan American Avenue – potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). This is also listed as a pedestrian project.	\$30,000
Reconstruct 15 <sup>th</sup> Street to provide bike lanes and drainage improvements from A Avenue to Washington Avenue – potential funding sources include STP funds, HURF (within roadway ROW only), Transportation Enhancement grant (also see 15 <sup>th</sup> street pedestrian improvements in Exhibit 8-4). This project involves roadway widening to accommodate the bicycle lanes.	\$200,000/mile
Provide bicycle racks in the downtown area and at the City Hall – potential funding includes Transportation Enhancement grant.	\$30,000
<b>Long Term</b>	
Implement Leslie Canyon Road shared use path (north of SR 80) and pedestrian / bicycle signal at SR 80 (also listed as pedestrian system project) - potential funding sources include STP funds, Transportation Enhancement grant, Parks and Recreation/Flood Control funds (typically for sidewalks and shared use paths along drainage facilities). Also listed as a pedestrian project.	To be determined

## TRANSIT SYSTEM IMPLEMENTATION AND FUNDING

This section presents a summary of transit implementation and funding recommendations from this study. A transit project list derived from the transit-related recommendations is shown in Exhibit 8-6.

### Exhibit 8-6 TRANSPORTATION IMPROVEMENT PLAN TRANSIT PROJECT LIST

Project	Estimated Cost	Funding Source
<b>Short Term</b>		
Appoint City Transportation Coordinator	\$35,000/Year	City of Douglas
Establish Citywide Ride Sharing Program	TBD	City of Douglas
Conduct Operations Analysis of New Douglas Rides service and identify service improvements needed	\$85,000	80% FTA 20% Local match
Participate in funding the acquisition of additional vehicles for future expansion of the Douglas Rides and Cochise Commuter Services.	\$300,000 Capital	80% FTA 20% Local match
Participate in funding the operation of future expansions of the Douglas Rides and Cochise Commuter services.	\$140,000 Annual Operating	50% FTA 50% Local match
<b>Long Term</b>		
Conduct Douglas-Agua Prieta Regional Mobility Study	\$250,000	City of Douglas, ADOT, other sources to be determined.

Now that Douglas Rides has begun providing local transit service in Douglas, the City should consider designating a City Transportation Coordinator to monitor the operation and to assist the operator, Catholic Community Services, in determining when modification or expansion of the service is needed. The Transportation Coordinator's duties would include the establishment of a Douglas area ridesharing program, oversight—together with the Public Works Director—of the conduct of an Operations Analysis of New Douglas Rides service, and the establishment of additional local circulator bus service if indicated by the study.

In the short term, regional service such as the Cochise Commuter and the privately-operated shuttles to Tucson and Phoenix are also important to Douglas. The City Transportation Coordinator would also act as a liaison between these operations and the City and, where appropriate, provide guidance with respect to the funding and implementation of service improvements or expansion.

The capital and annual operating costs of the local circulator bus service were developed with the assistance of a "Small Transit Vehicle Economics" estimating tool included in TCRP Report 61, *Analyzing the Costs of Operating Small Transit Vehicles*, published by the Transit Cooperative Research Program. Monies such as LTAF II and STP "FLEX" funds may be used for part of the local match for both capital and operating costs when available. The assumptions made for the variables in the estimating tool are shown in Exhibit 8-7.

## **Public Transit Funding**

The Federal Government funds transit capital and operating assistance programs for systems in both urban and rural areas. Two federal public transit programs administered by ADOT primarily fund Arizona's small urban and rural transit services. One is the Section 5311 program for general public service in rural areas. The other transit program is the Section 5310 program which funds vehicles for organizations providing specialized transportation services for the elderly or disabled. These programs were summarized in the previous working paper.

SAFETEA-LU significantly increases funding levels for these programs. A new formula based on land area addresses the needs of low-density states. Indian tribes are now eligible recipients of Section 5311 funds, and a portion of funding is set aside each year for Tribal projects. Currently, the total funding in Arizona for general public systems in rural and small urban areas is approximately \$4.9 million annually.

The Rural Transit Assistance Program (RTAP), a part of FTA Section 5311, provides funding to assist in the design and implementation of training and technical assistance projects and other support services for transit operators in non-urbanized areas. The ADOT Public Transportation Division administers the RTAP program in coordination with the Section 5311 distributions. There is no Federal requirement for a local match.

Additional sources of revenue available for transit services include the following:

- Welfare to Work Act
- Older American Act Title III funds, Department of Economic Security
- Division of Developmental Disability funds
- Transportation funding through Medicaid administered through the Arizona Health Care Cost Containment System
- Head Start, Behavioral Health Funding
- Temporary Assistance for Needy Families (TANF)
- Transit fares

A total of \$40 million nationally in small urban and rural transit revenue is expected to be generated in the next decade.

**Exhibit 8-7**  
**SMALL TRANSIT VEHICLE ECONOMICS**  
**ESTIMATING TOOL VARIABLES**

**Service assumptions used in cost estimate:**

- Start-up circulator route would consist of a 4.5 mile loop
- Service would operate once per hour in each direction
- Service would operate 250 days per year
- Service would operate 8 hours per day
- Assume four “deadhead miles” per day per vehicle
- Annual vehicle mileage would be  $((4.5 \times 2 \times 8) + 8) \times 250$  or 20,000 miles per year.
- A total of three vehicles would be purchased, two vehicles would be used to protect the service and one would serve as a back-up.

**Vehicle assumptions:**

- Gasoline-powered van-cutaway minibus
- 12-passenger capacity, including 2 wheelchair positions (10 + 2)
- Vehicles placed into service in 2008
- Bulk price paid for gasoline = \$2.85

**Financial assumptions**

- Mechanics’ hourly wage = \$16.00
- Mechanics’ fringe benefit percentage = 40
- Vehicle purchase price = \$54,800 each.
- Percentage of vehicle purchase to be funded by local government (including LTAF) = 50
- Percentage of mechanical and maintenance to be funded by local government = 20
- Percentage rate of interest for the time-value of money = 10

**Operating Assumptions**

- Service Miles = 20,000
- Service Hours – Annual 4,000
- Service Hours – Daily 16
- Drivers – FTE 2
- Manager/Dispatcher – FTE ½
- Vehicle Life = 5 years

**Forecasted Operating expenses**

- Operating and Maintenance =  $\$3961 \times 3 = \$11,883$
- Drivers’ Wages and Fringe Benefits = \$47,600
- Manager/Dispatcher’s Wages and Fringe Benefits = \$17,500
- Annual Vehicle Replacement Cost =  $11,240 \times 3 = 33,720$
- Administration = \$35,000 / year (Transportation Coordinator)

Source: Lima & Associates, Inc.



## **9. SUMMARY OF PUBLIC INVOLVEMENT ACTIVITIES AND RESPONSES**

### **INTRODUCTION**

Two public open houses were conducted as part of the development of this plan. The first open house was conducted early in the study to present initial findings and preliminary concepts for improving the transportation system within the study area. The second open house was conducted to present the draft recommendations for the long-range transportation plan. Each open house was held in the City Hall Council Chambers. The following materials provide a summary of the public involvement activities for the development of this transportation plan.

### **PUBLIC OPEN HOUSE #1**

#### **Meeting Purpose**

The purpose of this Public Open House included the following:

- Introduce the project to the stakeholders in the Douglas, Arizona area.
- Present the initial findings and recommendations as documented in Working Paper #1 of the project.
- Solicit comments and concerns from the stakeholders in the Douglas, Arizona area.

#### **Meeting Schedule and Location**

This Open House was held on June 28, 2006, 6:00 PM to 7:00 PM. The Open House was held in the City Hall Council Chambers, 425 10<sup>th</sup> Street, Douglas, Arizona.

#### **Meeting Notice**

A public meeting notice was prepared by City of Douglas staff and posted at City Hall on June 13, 2006. The meeting notice was published in the local newspaper on June 15<sup>th</sup>, 22<sup>nd</sup>, and 27<sup>th</sup>, 2006. A copy of the meeting notice is provided in Appendix D.

#### **Meeting Materials**

Meeting materials and information available at the Open House were the following:

- Presentation boards summarizing the findings of Working Paper #1.
- A copy of Working Paper #1 for reference and review.
- An Attendee Sign In Sheet to record the names and addresses of attendees.
- A questionnaire to solicit comments and concerns from the attendees at the Open House (a copy of the questionnaire provided to the attendees is contained in the appendix).

Project Team, City of Douglas staff, and Project Technical Advisory Committee (TAC) members were also available at the meeting to explain the presentation materials, respond to questions from the public, and encourage public comment on the project.

#### **Meeting Attendance**

A copy of the Open House Sign-In Sheet is provided in Appendix D. Three names appear on the Sign-In Sheet. One of these names is a member of the Project Team. The two other

names are attendees from the general public. Only two stakeholders from the general public attended the Open House.

### **Comments Received from the Public**

One Open House attendee completed and returned the questionnaire. A copy of the completed questionnaire is provided in Appendix D. A summary of the questionnaire responses is provided below.

1. Problem areas or concerns identified:
  - No bicycle paths
  - No public transportation
2. Improvements and additions cited:
  - Bicycle paths
  - Public transportation

### **PUBLIC OPEN HOUSE #2**

#### **Meeting Purpose**

The purpose of this Public Open House included the following:

- Present the findings and recommendations of the Final Report.
- Solicit comments and concerns from the stakeholders in the Douglas, Arizona area.

#### **Meeting Schedule and Location**

This Open House was held on May 23, 2007, 5:30 PM to 7:30 PM. The Open House was held in the City Hall Council Chambers, 425 10<sup>th</sup> Street, Douglas, Arizona.

#### **Meeting Notice**

A public meeting notice was prepared by City of Douglas staff and posted at City Hall on May 3, 2007. The meeting notice was published in the local newspaper on May 10<sup>th</sup>, 17<sup>th</sup> and 22<sup>nd</sup>, 2007. A copy of the meeting notice is provided in Appendix D.

#### **Meeting Materials**

Meeting materials and information available at the Open House were the following:

- Presentation boards summarizing the findings and recommendations of the study.
- A copy of the Draft Final Report for reference and review.
- An Attendee Sign In Sheet to record the names and addresses of attendees.
- A questionnaire to solicit comments and concerns from the attendees at the Open House (a copy of the questionnaire provided to the attendees is contained in the appendix).

Project Team, City of Douglas staff, and Project Technical Advisory Committee (TAC) members were also available at the meeting to explain the presentation materials, respond to questions from the public, and encourage public comment on the project.

**Meeting Attendance**

A copy of the Open House Sign-In Sheet is provided in Appendix D. Four names appear on the Sign-In Sheet. All four of these names are for members of state and local government agencies, with three of these individuals being members of the project Technical Advisory Committee. No one from the general public attended this meeting.

**Comments Received from the Public**

No comments were received from the general public at the final public open house for the study.



## ***APPENDIX A***



**Exhibit A-1**  
**POPULATION, HOUSING UNITS, AND OCCUPIED HOUSING UNITS**  
**1990 AND 2000 CENSUS AND 2005 ESTIMATES**

<b>TAZ Number</b>	<b>Population 1990</b>	<b>Population 2000</b>	<b>Population 2005</b>	<b>Total Housing 2000</b>	<b>Total Housing 2005</b>	<b>Housing (Occupied) 2000</b>	<b>Housing (Occupied) 2005</b>
1	25	101	107	34	34	33	32
2	67	103	109	45	50	32	36
3	689	776	639	221	221	192	192
4	82	113	123	45	45	37	37
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	26	242	16	88	12	80
9	57	165	178	64	64	59	59
10	86	99	103	36	36	23	31
11	0	0	0	0	0	0	0
12	62	62	63	26	26	21	21
13	55	58	60	22	23	19	20
14	0	0	0	0	0	0	0
15	420	408	402	133	133	133	133
16	470	590	568	200	200	184	188
17	1440	1261	1259	480	480	400	417
18	938	914	915	341	341	297	303
19	44	49	48	18	18	16	16
20	3	91	211	71	71	21	70
21	5	5	3	1	1	1	1
22	0	0	0	0	0	0	0
23	448	425	492	188	188	151	163
24	158	156	154	53	53	51	51
25	846	747	779	287	287	251	258
26	350	338	335	113	113	111	111
27	726	675	673	231	235	220	223
28	351	302	272	98	98	90	90
29	1107	993	1003	361	361	324	332
30	0	0	0	0	0	0	0
31	461	463	462	169	169	148	153
32	268	290	308	108	108	102	102
33	167	168	163	56	56	54	54
34	929	887	888	382	382	294	294
35	164	304	309	101	101	89	93
36	3	3	3	1	1	1	1
37	0	0	0	0	0	0	0
38	212	223	266	110	110	85	88
39	458	601	613	217	221	196	203
40	63	104	103	40	40	34	34
41	406	435	444	152	152	143	147
42	694	736	716	232	241	228	237
43	1074	1305	1284	457	457	425	425
44	176	209	196	69	69	65	65
45	31	122	214	47	78	40	71
46	237	427	438	154	154	144	145
47	382	479	462	160	163	150	153
48	52	86	121	36	44	33	40
49	0	3	3	1	1	1	1
<b>TOTAL</b>	<b>15741</b>	<b>17284</b>	<b>17592</b>	<b>6294</b>	<b>6431</b>	<b>5499</b>	<b>5777</b>

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census and Aerial Flight of Douglas, Arizona, 2000*

**Exhibit A-1**  
**POPULATION, HOUSING UNITS, AND OCCUPIED HOUSING UNITS**  
**1990 AND 2000 CENSUS AND 2005 ESTIMATES**  
**(Continued)**

<b>TAZ Number</b>	<b>Population 1990</b>	<b>Population 2000</b>	<b>Population 2005</b>	<b>Total Housing 2000</b>	<b>Total Housing 2005</b>	<b>Housing (Occupied) 2000</b>	<b>Housing (Occupied) 2005</b>
<b>50</b>	430	878	728	276	276	241	241
<b>51</b>	500	397	456	187	187	133	151
<b>52</b>	262	361	317	120	120	104	105
<b>53</b>	47	61	60	22	22	20	20
<b>54</b>	199	181	190	71	71	57	57
<b>55</b>	97	104	110	42	42	34	33
<b>TOTAL</b>	<b>15741</b>	<b>17284</b>	<b>17592</b>	<b>6294</b>	<b>6431</b>	<b>5499</b>	<b>5777</b>

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census and Aerial Flight of Douglas, Arizona, 2000.*

**Exhibit A-2**  
**2005 RETAIL, OFFICE/SERVICE, AND**  
**GENERAL COMMERCIAL EMPLOYEES BY TAZ<sup>1</sup>**

<b>TAZ Number</b>	<b>Retail Employees 2005</b>	<b>Office/Service Employees 2005</b>	<b>General Commercial Employees 2005</b>
2	0	0	3
3	0	0	0
4	0	0	0
9	12	17	60
12	0	20	14
14	9	0	20
15	0	0	2
16	0	0	6
17	6	18	66
18	0	0	0
20	0	0	8
23	6	28	27
24	0	0	0
25	0	0	0
27	0	0	4
28	24	2	13
29	6	0	12
34	11	33	32
35	0	0	5
36	0	7	0
37	11	10	12
38	76	48	43
41	0	0	0
42	0	0	0
43	0	0	10
44	2	28	19
51	75	18	51
52	3	0	5
54	0	6	0
<b>TOTAL</b>	<b>241</b>	<b>235</b>	<b>412</b>
<b>Total Workers (Retail, Office, General)</b>			<b>888</b>

Source: City of Douglas Land Field Survey, 2005.

1. Only TAZs with an employee population are shown in the table.

**Exhibit A-3**  
**2001-2005 EMPLOYEES WORKING FOR MAJOR EMPLOYERS BY TAZ**

TAZ Number	Major Employers	Employees 2001	Employees 2002	Employees 2003	Employees 2004	Employees 2005
Outside of Study Area	US Border Patrol/DHS <sup>1</sup>	850	800	804	596	1,046
Outside of Study Area	Cochise Community College	835	164	166	361	327
Outside of Study Area	Arizona State Prison <sup>2</sup>	700	659	666	674	674
Various TAZ	Douglas Unified School District <sup>3</sup>	423	422	399	378	405
51	City of Douglas	250	234	220	235	235
14	Wal-Mart	224	245	235	230	408
4	Southeast Arizona Medical Center	141	160	105	104	104
37	Safeway	136	160	160	110	84
9	Basha's/Food City	0	120	117	110	110
51	Gadsden Hotel	65	65	70	48	70
28	US Customs/US Immigration <sup>4</sup>	57	106	141	39	39
37	J.C. Penney	0	45	48	46	46
<b>2005 Total Employees Working for Major Employers</b>						<b>3,548</b>

Source: Major Employers, Douglas, Arizona, Cochise College Center for Economic Research, 2005.

<sup>1</sup> In 2004, The US Border Patrol merged with DHS (Department of Homeland Security)

<sup>2</sup> Regional employer located outside of the Small Area Transportation Study area.

<sup>3</sup> Employer has multiple locations. Number of employees per school and number of students per school by TAZ are provided in Exhibit 4-67 and 4-69, respectively.

<sup>4</sup> In 2004, The US Customs and the US Immigration became the Bureau of Immigration and Customs Enforcement.

**Exhibit A-4**  
**2001-2005 EMPLOYEES WORKING FOR**  
**DOUGLAS UNIFIED SCHOOL DISTRICT BY TAZ**

<b>TAZ Number</b>	<b>School Name</b>	<b>Total Employees 2001</b>	<b>Total Employees 2002</b>	<b>Total Employees 2003</b>	<b>Total Employees 2004</b>	<b>Total Employees 2005</b>
<b>3</b>	Faras Elementary	23	27	26	24	25
<b>18</b>	Joe Carlson Elementary	39	39	32	31	43
<b>24</b>	Douglas High School	111	104	108	99	102
	DHS East Campus	5	3	3	4	4
<b>25</b>	Sarah Marley Elementary	37	36	33	31	30
<b>27</b>	Clawson Elementary	37	36	33	31	36
<b>29</b>	Early Learning Center	17	17	13	13	25
<b>34</b>	Ray Borane Middle School	47	51	45	44	44
<b>41</b>	Paul Huber Middle School	61	60	58	55	50
<b>42</b>	Stevenson Elementary	33	35	33	33	34
	Maryvale School	13	14	15	13	12
<b>Total Employees</b>		<b>423</b>	<b>422</b>	<b>399</b>	<b>378</b>	<b>405</b>

*Source: Douglas Unified School District Superintendent Office, 2005.*

**Exhibit A-5**  
**2001-2005 NUMBER OF STUDENTS**  
**DOUGLAS UNIFIED SCHOOL DISTRICT BY TAZ**

<b>TAZ Number</b>	<b>School Name</b>	<b>Total Students 2001</b>	<b>Total Students 2002</b>	<b>Total Students 2003</b>	<b>Total Students 2004</b>	<b>Total Students 2005</b>
3	Faras Elementary	265	239	269	236	243
18	Joe Carlson Elementary	390	368	338	300	458
24	Douglas High School	1071	1075	1059	1047	1142
24	DHS East Campus	47	40	59	34	53
25	Sarah Marley Elementary	326	297	281	292	286
27	Clawson Elementary	420	410	390	387	408
29	Early Learning Center	252	203	244	202	236
34	Ray Borane Middle School	460	444	428	413	402
41	Paul Huber Middle School	578	586	589	569	565
42	Stevenson Elementary	404	401	416	405	413
42	Maryvale School	26	32	34	43	31
<b>Total Students</b>		<b>4239</b>	<b>4095</b>	<b>4107</b>	<b>3928</b>	<b>4237</b>

*Source: Douglas Unified School District Superintendent Office, 2005.*

**Exhibit A-6  
2000 CENSUS AND 2005 ESTIMATES  
HISPANIC POPULATION BY TAZ**

<b>TAZ Number</b>	<b>Total Population 2000</b>	<b>Total Population 2005</b>	<b>Hispanic Population 2000</b>	<b>Hispanic Percent of Total Population 2000</b>	<b>Hispanic Population 2005</b>
1	101	107	86	85	91
2	103	109	77	75	82
3	776	639	732	94	601
4	113	123	73	65	80
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	26	242	16	62	150
9	165	178	131	79	141
10	99	103	93	94	97
11	0	0	0	0	0
12	62	63	24	40	25
13	58	60	32	55	33
14	0	0	0	0	0
15	408	402	388	95	382
16	590	568	523	89	506
17	1261	1259	1144	91	1146
18	914	915	770	84	769
19	49	48	22	45	22
20	91	211	56	62	131
21	5	3	0	0	0
22	0	0	0	0	0
23	425	492	374	88	433
24	156	154	147	94	145
25	747	779	712	95	740
26	338	335	299	88	295
27	675	673	663	98	660
28	302	272	294	97	264
29	993	1003	922	93	933
30	0	0	0	0	0
31	463	462	385	83	383
32	290	308	232	80	246

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts.*

**Exhibit A-6**  
**2000 CENSUS AND 2005 ESTIMATES**  
**HISPANIC POPULATION BY TAZ**  
**(Continued)**

<b>TAZ Number</b>	<b>Total Population 2000</b>	<b>Total Population 2005</b>	<b>Hispanic Population 2000</b>	<b>Hispanic Percent of Total Population 2000</b>	<b>Hispanic Population 2005</b>
33	168	163	142	85	139
34	887	888	287	32	284
35	304	309	14	5	15
36	3	3	3	100	3
37	0	0	0	0	0
38	223	266	205	92	245
39	601	613	136	23	141
40	104	103	72	69	71
41	435	444	317	73	324
42	736	716	574	78	558
43	1305	1284	880	82	1053
44	209	196	153	73	143
45	122	214	94	77	165
46	427	438	362	85	372
47	479	462	59	12	55
48	86	121	59	69	83
49	3	3	0	0	0
50	878	728	370	42	306
51	397	456	349	88	401
52	361	317	307	85	269
53	61	60	55	90	54
54	181	190	179	99	188
55	104	110	97	93	102
<b>Total</b>	<b>17284</b>	<b>17592</b>	<b>12909</b>	<b>75</b>	<b>13325</b>

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts.*

**Exhibit A-7**  
**2000 CENSUS AND 2005 AGE 65 AND OVER ESTIMATES BY TAZ**

<b>AZ Number</b>	<b>2000 Census Population Counts</b>	<b>2000 Census Population 65 and Over</b>	<b>2000 Census Percent 65 and Over</b>	<b>2005 Population Estimates</b>	<b>2005 65 and Over Population Estimates</b>
1	101	26	26	107	28
2	103	3	3	109	3
3	776	84	11	639	69
4	113	84	74	123	91
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	26	4	15	242	37
9	165	15	9	178	16
10	99	3	3	103	3
11	0	0	0	0	0
12	62	10	16	63	10
13	58	5	9	60	5
14	0	0	0	0	0
15	408	49	12	402	48
16	590	50	8	568	48
17	1261	170	13	1259	170
18	914	124	14	915	124
19	49	0	0	48	0
20	91	51	56	211	118
21	5	0	0	3	0
22	0	6	0	0	0
23	425	78	18	492	90

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts.*

**Exhibit A-7**  
**2000 CENSUS AND 2005 AGE 65 AND OVER ESTIMATES BY TAZ**  
**(Continued)**

<b>TAZ Number</b>	<b>2000 Census Population Counts</b>	<b>2000 Census Population 65 and Over</b>	<b>2000 Census Percent 65 and Over</b>	<b>2005 Population Estimates</b>	<b>2005 65 and Over Population Estimates</b>
24	156	25	16	154	25
25	747	131	18	779	137
26	338	30	9	335	30
27	675	90	13	673	90
28	302	50	17	272	45
29	993	181	18	1003	183
30	0	0	0	0	0
31	463	58	13	462	58
32	290	46	16	308	49
33	168	0	0	163	0
34	887	155	17	888	155
35	304	32	11	309	33
36	3	0	0	3	0
37	0	1	0	0	0
38	223	40	18	266	48
39	601	36	6	613	37
40	104	25	24	103	25
41	435	86	20	444	88
42	736	95	13	716	92
43	1305	114	9	1284	112
44	209	22	11	196	21
45	122	9	7	214	16
46	427	33	8	438	34
47	479	44	9	462	42
48	86	9	10	121	13
49	3	1	33	3	1
50	878	54	6	728	45
51	397	71	18	456	82
52	361	45	12	317	40
53	61	0	0	60	0
54	181	27	15	190	28
55	104	12	12	110	13
<b>TOTAL</b>	<b>17284</b>	<b>2284</b>	<b>13</b>	<b>17592</b>	<b>2400</b>

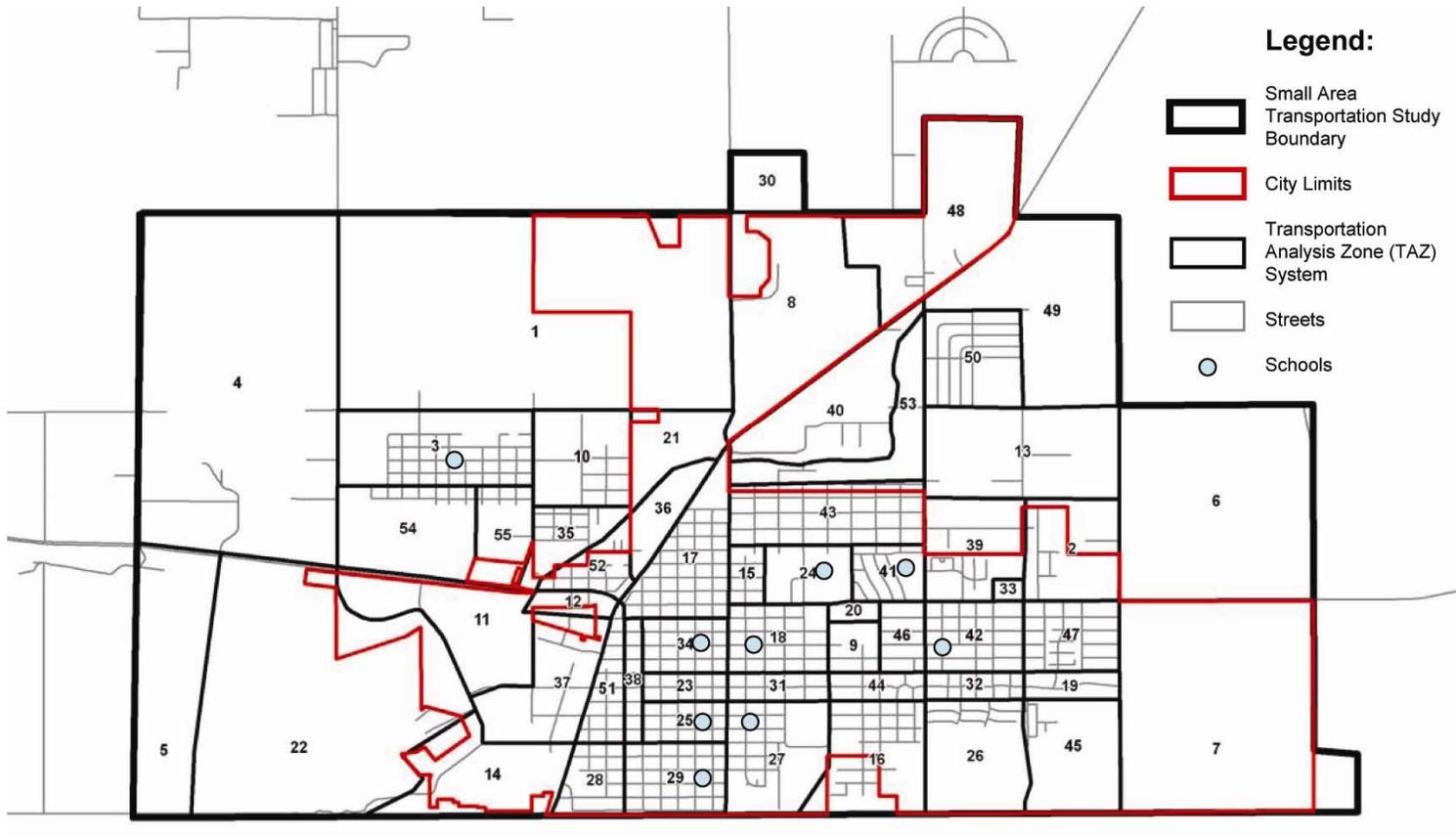
*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts.*

## Exhibit A-8 LOCATION OF MAJOR EMPLOYERS



1. Major Employer symbol represents generalized location of 1 or 2 major employers.
2. Major employers located outside of the SATS boundary are not shown.

## Exhibit A-9 LOCATIONS OF DOUGLAS AREA SCHOOLS



1. School symbol represents generalized location

## ***APPENDIX B***



**Exhibit B-1**  
**POPULATION, HOUSING UNITS, AND OCCUPIED HOUSING**  
**UNITS 2010, 2020, AND 2030 PROJECTIONS BY TAZ**

TAZ Number	Population 2010	Population 2020	Population 2030	Housing Units 2010	Housing Units 2020	Housing Units 2030	Housing (Occupied) 2010	Housing (Occupied) 2020	Housing (Occupied) 2030
1	120	167	208	40	59	76	37	54	71
2	119	132	147	55	65	75	40	46	53
3	624	593	563	221	221	221	192	192	192
4	133	139	144	50	55	60	41	45	49
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	309	445	573	116	173	230	104	155	207
9	175	169	163	64	64	64	59	59	59
10	101	96	91	36	36	36	31	31	31
11	0	0	0	0	0	0	0	0	0
12	62	60	58	26	26	26	21	21	21
13	62	63	66	24	26	28	21	22	24
14	0	0	0	0	0	0	0	0	0
15	395	382	368	133	133	133	133	133	133
16	564	603	612	212	224	236	190	210	221
17	1238	1197	1155	480	480	480	417	417	417
18	900	870	839	341	341	341	303	303	303
19	48	46	44	18	18	18	16	16	16
20	247	324	393	85	115	145	83	113	142
21	3	3	3	1	1	1	1	1	1
22	0	0	0	0	0	0	0	0	0
23	484	468	452	188	188	188	163	163	163
24	151	146	141	53	53	53	51	51	51
25	766	740	715	287	287	287	258	258	258
26	350	362	371	121	129	137	118	126	134
27	695	706	712	247	259	271	234	246	257
28	267	258	249	98	98	98	90	90	90
29	986	953	920	361	361	361	332	332	332
30	0	0	0	0	0	0	0	0	0
31	454	439	424	169	169	169	153	153	153
32	303	293	283	108	108	108	102	102	102
33	160	155	150	56	56	56	54	54	54
34	873	844	814	382	382	382	294	294	294
35	302	287	272	101	101	101	93	93	93
36	3	3	3	1	1	1	1	1	1
37	0	0	0	0	0	0	0	0	0

Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census and Aerial Flight of Douglas, Arizona, 2000

**Exhibit B-1**  
**POPULATION, HOUSING UNITS, AND OCCUPIED HOUSING**  
**UNITS 2010, 2020, AND 2030 PROJECTIONS BY TAZ**  
**(Continued)**

<b>TAZ Number</b>	<b>Population 2010</b>	<b>Population 2020</b>	<b>Population 2030</b>	<b>Housing Units 2010</b>	<b>Housing Units 2020</b>	<b>Housing Units 2030</b>	<b>Housing (Occupied) 2010</b>	<b>Housing (Occupied) 2020</b>	<b>Housing (Occupied) 2030</b>
<b>38</b>	261	253	244	110	110	110	88	88	88
<b>39</b>	636	657	673	233	249	265	214	229	243
<b>40</b>	101	98	94	40	40	40	34	34	34
<b>41</b>	437	422	407	152	152	152	147	147	147
<b>42</b>	704	680	656	241	241	241	237	237	237
<b>43</b>	1262	1220	1117	457	457	457	425	425	425
<b>44</b>	193	187	180	69	69	69	65	65	65
<b>45</b>	297	453	596	110	174	237	100	158	215
<b>46</b>	431	416	402	154	154	154	145	145	145
<b>47</b>	463	462	463	166	172	178	156	161	167
<b>48</b>	582	1461	2277	214	554	894	196	509	822
<b>49</b>	3	3	3	1	1	1	1	1	1
<b>50</b>	716	692	668	276	276	276	241	241	241
<b>51</b>	448	433	418	187	187	187	151	151	151
<b>52</b>	312	301	291	120	120	120	105	105	105
<b>53</b>	59	57	55	22	22	22	20	20	20
<b>54</b>	185	176	167	71	71	71	57	57	57
<b>55</b>	107	102	97	42	42	42	33	33	33
<b>TOTAL</b>	<b>18,091</b>	<b>19,016</b>	<b>19,741</b>	<b>6,739</b>	<b>7,320</b>	<b>7,898</b>	<b>6,047</b>	<b>6,587</b>	<b>7,118</b>

*Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census and Aerial Flight of Douglas, Arizona, 2000*

**Exhibit B-2**  
**RETAIL, OFFICE/SERVICE, AND GENERAL COMMERCIAL EMPLOYEES**  
**2010, 2020, AND 2030 PROJECTIONS BY TAZ**

TAZ Number	Retail 2010	Office 2010	General 2010	Retail 2020	Office 2020	Office 2020	Retail 2030	Office 2030	General 2030
2	0	0	3	0	0	3	0	0	3
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
9	12	17	62	13	18	65	13	19	67
12	0	21	14	0	22	15	0	22	16
14	9	0	21	10	0	22	10	0	22
15	0	0	2	0	0	2	0	0	2
16	0	0	6	0	0	6	0	0	7
17	6	19	68	6	19	71	7	20	74
18	0	0	0	0	0	0	0	0	0
20	0	0	8	0	0	9	0	0	9
23	6	29	28	6	30	29	7	31	30
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
27	0	0	4	0	0	4	0	0	4
28	25	2	13	26	2	14	27	2	15
29	6	0	12	6	0	13	7	0	13
34	11	34	33	12	36	35	12	37	36
35	0	0	5	0	0	5	0	0	6
36	0	7	0	0	8	0	0	8	0
37	11	10	12	12	11	13	12	11	13
38	78	49	44	82	52	46	85	54	48
41	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0
43	0	0	10	0	0	11	0	0	11
44	2	29	20	2	30	21	2	31	21
51	77	19	52	81	19	55	84	20	57
52	3	0	5	3	0	5	3	0	6
54	0	6	0	0	6	0	0	7	0
<b>TOTAL</b>	<b>248</b>	<b>242</b>	<b>424</b>	<b>261</b>	<b>254</b>	<b>445</b>	<b>270</b>	<b>264</b>	<b>462</b>

Sources: Census 1990 and 2000 Summary File 1 (SF 1) 100-Percent Data at Block Level for Douglas, Pirtleville, and Cochise County portion within the Study Area, American Fact Finder, US Bureau of the Census 2000 Population Counts and City of Douglas Commercial Land Use Inventory, 2005.



## ***APPENDIX C***



**TABLE 4 - 2  
GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S  
AREAS TRANSITIONING INTO URBANIZED AREAS OR  
AREAS OVER 5,000 NOT IN URBANIZED AREAS\***

UNINTERRUPTED FLOW HIGHWAYS						FREEWAYS					
Lanes Divided	Level of Service					Lanes	Level of Service				
	A	B	C	D	E		A	B	C	D	E
2 Undivided	2,100	6,900	12,900	18,200	24,900	4	23,500	38,700	52,500	62,200	69,100
4 Divided	18,600	30,200	43,600	56,500	64,200	6	36,400	59,800	81,100	96,000	106,700
6 Divided	27,900	45,200	65,500	84,700	96,200	8	49,100	80,900	109,600	129,800	144,400
						10	61,800	101,800	138,400	163,800	182,000

STATE TWO-WAY ARTERIALS						BICYCLE MODE					
Class I (>0.00 to 1.99 signalized intersections per mile)						(Note: Level of service for the bicycle mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of bicyclists using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)					
Lanes Divided	Level of Service					Paved Shoulder/ Bicycle Lane Coverage	Level of Service				
	A	B	C	D	E		A	B	C	D	E
2 Undivided	**	4,000	13,100	15,500	16,300	0-49%	**	1,900	3,300	13,600	>13,600
4 Divided	4,600	27,900	32,800	34,200	***	50-84%	**	2,500	4,000	>4,000	***
6 Divided	6,900	42,800	49,300	51,400	***	85-100%	3,200	7,100	>7,100	***	***

Class II (2.00 to 4.50 signalized intersections per mile)						PEDESTRIAN MODE					
Class III (more than 4.5 signalized intersections per mile)						(Note: Level of service for the pedestrian mode in this table is based on roadway geometric at 40 mph posted speed and traffic conditions, not number of pedestrians using the facility.) (Multiply motorized vehicle volumes shown by number of directional roadway lanes to determine two-way maximum service volumes.)					
Lanes Divided	Level of Service					% Sidewalk Coverage	Level of Service				
	A	B	C	D	E		A	B	C	D	E
2 Undivided	**	**	10,500	14,500	15,300	0-49%	**	**	**	6,300	15,400
4 Divided	**	3,700	24,400	30,600	32,200	50-84%	**	**	**	9,800	18,800
6 Divided	**	6,000	38,000	46,100	48,400	85-100%	**	2,200	11,200	>11,200	***

NON-STATE ROADWAYS						ARTERIAL/NON-STATE ROADWAY ADJUSTMENTS					
Major City/County Roadways						DIVIDED/UNDIVIDED					
Lanes Divided	Level of Service					Lanes	Median	Left Turn Lanes	Adjustment Factors		
	A	B	C	D	E						
2 Undivided	**	**	7,000	13,600	14,600	2	Divided	Yes	+5%		
4 Divided	**	**	16,400	29,300	30,900	2	Undivided	No	-20%		
6 Divided	**	**	25,700	44,100	46,400	Multi	Undivided	Yes	-5%		
						Multi	Undivided	No	-25%		

Other Signalized Roadways (signalized intersection analysis)						ONE-WAY FACILITIES					
Lanes Divided	Level of Service					Decrease corresponding two-directional volumes in this table by 40% to obtain the equivalent one directional volume for one-way facilities.					
	A	B	C	D	E						
2 Undivided	**	**	4,400	9,400	12,000						
4 Divided	**	**	10,300	20,200	24,000						

Source: Florida Department of Transportation Systems Planning Office  
605 Suwannee Street, MS 19  
Tallahassee, FL 32399-0450  
<http://www11.myflorida.com/planning/systems/sm/los/default.htm> 02/22/02

\*This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Values shown are two-way annual average daily volumes (based on K<sub>100</sub> factors) for levels of service and are for the automobile/truck modes unless specifically stated. Level of service letter grade thresholds are probably not comparable across modes and, therefore, cross modal comparisons should be made with caution. Furthermore, combining levels of service of different modes into one overall roadway level of service is not recommended. The table's input value defaults and level of service criteria appear on the following page. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle LOS Model, and Pedestrian LOS Model, respectively for the automobile/truck, bicycle and pedestrian modes.  
\*\*Cannot be achieved using table input value defaults.  
\*\*\*Not applicable for the level of service letter grade. For automobile/truck modes, volumes greater than level of service D become F because intersection capacities have been reached. For bicycle and pedestrian modes, the level of service letter grade (including F) is not achievable, because there is no maximum vehicle volume threshold using table input value defaults.

Source: State of Florida, Department of Transportation, 2002 *Quality/Level of Service Handbook*.

## 2005 AM Peak-Hour Traffic Used in Operation Analysis

### AM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
10th St & A Ave	11	108	93	28	178	52	34	204	24	92	271	54
10th St & San Antonio	13	81	13	4	82	124	114	114	10	8	235	33
8th St & Washington	7	14	0	5	1	43	100	44	13	0	74	27
10th St & Van Buren	8	12	4	0	16	20	13	21	21	4	75	0
15th St & Washington	90	171	39	27	108	45	150	153	38	23	213	52
15th St & Florida	65		219					208	52	120	293	
15th St & A Ave	20	195	68	42	291	18	8	122	35	35	53	12
SR80 & Pan American	151	136	3	17	133	92	59	123	86	0	164	24
14th St & F Ave	19	24	0	12	47	4	13	50	4	8	42	4
5th St & G Ave	7	35	10	11	52	35	22	87	8	4	77	10
1st St & F Ave	0	0	0	4	0	16	13	29	0	0	25	4
5th St & A Ave	0	102	4	8	178	65	38	22	0	9	50	9
10th St & G Ave	0	49	0	29	24	0	0	89	0	28	129	61
Grace & US191		49	5	5	98					23		8
Grace & Douglas	0	123			124	0	0		13			
Merritt & Sulphur Spring	38	17			25	14	22		82			
8th St & Pan American		259	23	21	392					21		33
SR80 & US191				58		33	14	202			319	85
SR80 & Chino	61		9					224	54	15	351	
5th St & Chino				114		3	5	19			3	51
5th St & US191B	125	238	19	10	257	146	59	50	100	40	63	18
3rd St & US191B		350	14	37	360					52		33
10th St & US191B		268	104	26	352					138		21
SR80 & Leslie Canyon	0	49	18	10	70	40	46	21	0	6	44	6
SR80 & Washington	35	16	1	2	17	11	3	51	35	5	22	1
SR80 & Douglas				99		66	48	185			305	102
Merritt & Douglas		112	37	14	123					42		10

## 2005 AM Peak-Hour Traffic Used in Operation Analysis

### AM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
US191B & Sulphur Spring				11		96	51	169			143	8
14th St & US191B	7	270	15	11	197	11	12	16	12	45	15	15
11th St & US191B		274	14	13	242					113		17
1st St & US191B		314	10	0	204							
1st St & G Ave				43	0	29	1	8	1	4	33	4
3rd St & G Ave	1	6	1	6	51	6	5	41	5	16	89	57
8th St & G Ave	7	54	7	7	55	7	4	35	4	35	57	10
9th St & G Ave	24	49	8	5	42	5	11	74	21	7	57	7
11th St & G Ave	11	88	11	19	56	50	3	22	3	9	69	9
14th St & G Ave	10	67	19	14	114	14	4	33	4	7	52	7
15th St & F Ave	4	33	4	19	38	19	14	114	14	9	72	9
11th St & F Ave	23	45	8	6	30	24	5	41	5	5	40	5
10th St & F Ave	15	30	5	4	32	4	12	94	12	83	217	33
9th St & F Ave	18	36	6	13	102	13	9	48	30	5	40	5
8th St & F Ave	7	46	18	39	77	13	5	39	5	10	82	10
5th St & F Ave	3	26	3	9	74	9	32	49	27	11	92	11
3rd St & F Ave	2	15	0	45	34	34	5	36	5	16	127	16
1st St & A Ave	2	8			12	28	30		3			
3rd St & A Ave	8	30	0	19	37	130	54	30	0	3	21	36
8th St & A Ave	15	128	6	7	214	25	38	49	8	30	63	26
14th St & A Ave	5	186	5	90	249	22	12	47	4	5	25	70
19th St & A Ave		151	151	25	225					113		38
10th St & Florida	5	44	6	3	67	101	98	215	13	11	309	52
8th St & San Antonio	15	52	33	60	15	25	19	39	5	12	77	33
15th St & San Antonio	180	51	69	3	24	3	11	288	128	115	224	9
19th St & Washington	186	186			52	5	10		44			
10th St & Washington	61	67	14	8	12	131	84	37	11	21	72	10
15th St & Van Buren	60	6	14	0	20	60	35	59	57	8	161	0
8th St & Van Buren				7		63	24	24			36	4
9th St & US191B	7	278	7	98	377	15	4	32	4	2	32	52
Customs Ave & US191B		314			204					12		49
1st St & Customs Ave								10				62

## 2005 PM Peak-Hour Traffic Used in Operation Analysis

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
10th St & A Ave	23	210	50	14	184	80	42	273	28	96	361	23
10th St & San Antonio	16	63	16	21	47	90	65	171	34	28	138	24
8th St & Washington	8	12	0	8	20	20	31	85	4	4	78	0
10th St & Van Buren	22	19	11	0	11	18	14	87	9	0	36	6
15th St & Washington	45	109	56	64	149	135	88	92	65	43	73	40
15th St & Florida	208		76					148	23	12	195	
15th St & A Ave	20	175	40	24	93	8	16	39	16	54	74	41
SR80 & Pan American	170	182	0	46	168	67	87	237	160	3	108	36
14th St & F Ave	19	43	31	0	90	55	23	60	23	4	20	0
5th St & G Ave	11	74	15	4	62	69	28	48	20	15	111	18
1st St & F Ave	0	4	0	0	4	14	21	29	0	4	21	9
5th St & A Ave	0	106	0	11	76	51	33	29	8	9	51	4
10th St & G Ave	20	76	76	97	57	16	15	166	23	82	185	45
Grace & US191		105	23	4	88					3		14
Grace & Douglas	59	86			52	0	0		53			
Merritt & Sulphur Spring	60	20			12	8	0		50			
8th St & Pan American		473	68	96	439					22		41
SR80 & US191				121		16	29	293			239	119
SR80 & Chino	109		43					308	111	26	258	
5th St & Chino				114		3	5	19			1	60
5th St & US191B	177	238	35	14	265	183	280	119	245	22	77	22
3rd St & US191B		356	20	42	489					21		94
10th St & US191B		429	199	21	432					209		17
SR80 & Leslie Canyon	1	47	19	7	62	32	26	57	2	13	52	9
SR80 & Washington	29	18	5	0	24	6	10	20	59	5	23	0
SR80 & Douglas				71		30	35	316			259	86
Merritt & Douglas		85	36	11	95					7		61
US191B & Sulphur Spring				31		31	61	243			248	28
14th St & US191B	45	360	45	33	285	10	4	32	4	93	12	12
11th St & US191B		401	45	38	341					91		49
1st St & US191B		332	10	0	460							
1st St & G Ave				42	8	27	4	5	1	4	29	4

## 2005 PM Peak-Hour Traffic Used in Operation Analysis

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
3rd St & G Ave	1	9	1	10	58	29	25	31	6	13	59	59
8th St & G Ave	12	97	12	15	120	15	16	131	16	9	54	27
9th St & G Ave	16	131	16	16	130	16	18	144	18	6	51	6
11th St & G Ave	14	109	14	24	171	49	8	66	8	10	78	10
14th St & G Ave	12	98	12	28	226	28	8	62	8	10	76	10
15th St & F Ave	7	46	13	12	42	6	5	20	25	80	12	10
11th St & F Ave	46	80	14	12	93	12	10	83	10	5	40	5
10th St & F Ave	7	60	7	11	87	11	34	271	34	46	371	46
9th St & F Ave	7	52	7	17	133	17	17	139	17	5	40	5
8th St & F Ave	5	41	5	15	119	15	16	127	16	9	69	9
5th St & F Ave	4	34	4	14	86	43	7	54	7	10	82	10
3rd St & F Ave	3	30	0	31	10	62	5	37	5	8	66	8
1st St & A Ave	2	8			8	31	26		3			
3rd St & A Ave	5	21	0	9	28	56	49	20	7.6	3	21	36
8th St & A Ave	14	115	14	31	246	31	44	88	15	10	42	52
14th St & A Ave	14	220	41	8	146	8	9	23	59	38	8	5
19th St & A Ave		29	263	8	69					48		32
10th St & Florida	19	23	8	30	23	98	81	222	34	36	177	31
8th St & San Antonio	8	64	8	11	88	11	13	106	13	11	85	11
15th St & San Antonio	46	15	91	3	24	3	7	152	65	83	157	13
19th St & Washington	189	47			117	13	54		216			
10th St & Washington	17	22	4	43	107	107	156	45	7	4	64	8
15th St & Van Buren	17	14	9	0	15	25	27	168	18	0	116	21
8th St & Van Buren				14		56	47	47			24	16
9th St & US191B	15	447	51	128	494	19	4	32	4	33	17	33
Customs Ave & US191B		332			460					11		44
1st St & Customs Ave								10				56

## 2030 AM Peak-Hour Traffic Used in Operation Analysis

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
10th St & A Ave	12	127	110	34	215	62	37	221	25	95	280	56
10th St & San Antonio Ave	19	119	19	4	87	131	124	124	10	8	238	34
8th St & Washington Ave	7	14	0	6	2	50	169	74	21	0	133	49
10th St & Van Buren Ave	9	13	4	0	18	22	15	25	24	4	75	0
15th St & Washington Ave	102	193	44	32	127	53	168	172	42	26	241	59
15th St & Florida Ave	76		256					258	64	150	366	
15th St & A Ave	24	239	83	55	380	23	9	127	36	43	65	15
SR 80 & Pan American Ave	211	191	4	29	228	157	71	148	103	0	178	27
14th St & F Ave	22	26	0	13	51	4	15	60	5	8	43	4
5th St & G Ave	7	36	11	11	55	37	24	92	9	5	111	14
1st St & F Ave	0	0	0	5	0	18	15	34	0	0	29	5
5th St & A Ave	0	121	5	12	279	102	49	27	0	9	50	9
10th St & G Ave	0	52	0	31	26	0	0	93	0	30	136	64
Grace Ave & US 191		59	6	6	118					23		8
Grace Ave & Douglas Ave	0	129			130	0	0		13			
Merritt Ave & Sulphur Spring St	44	20			29	17	22		83			
8th St & Pan American Ave		375	33	26	499					30		50
SR 80 & US 191				69		40	17	242			386	103
SR 80 & Chino Rd	70		10					272	65	18	425	
>>5th St & Chino Rd				131		4	5	19			4	60
5th St & Pan American Ave	166	316	25	13	329	187	70	60	120	51	81	23
3rd St & Pan American Ave		456	19	46	453					81		51
10th St & Pan American Ave		346	134	37	492					143		22
Pan American Ave & Leslie Canyon Rd	0	86	32	15	103	58	96	44	0	18	130	18

## 2030 AM Peak-Hour Traffic Used in Operation Analysis

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
SR 80 & Washington Ave	44	20	1	2	17	11	10	150	103	29	128	6
SR 80 & Douglas Ave				106		71	58	224			410	137
Merritt Ave & Douglas Ave		146	49	14	129					49		12
Pan American Ave & Sulphur Spring St				11		101	89	297			293	15
14th St & Pan American Ave	9	341	18	17	297	17	12	16	12	50	17	17
11th St & Pan American Ave		349	18	18	342					128		19
1st St & Pan American Ave		418	13	0	535							
1st St & G Ave				51	0	34	1	10	1	5	38	5
3rd St & G Ave	1	7	1	7	55	7	7	52	7	23	124	79
8th St & G Ave	7	58	7	8	64	8	6	47	6	45	74	13
9th St & G Ave	28	55	9	6	44	6	14	96	28	8	61	8
11th St & G Ave	11.6	92.8	11.6	24	71	63	4	29	4	9	73	9
14th St & G Ave	11	74	21	18	145	18	5	41	5	7	55	7
15th St & F Ave	4	35	4	19	38	19	16	126	16	11	90	11
11th St & F Ave	25	51	8	6	32	26	6	51	6	5	40	5
10th St & F Ave	18	37	6	4	35	4	12	99	12	89	230	35
9th St & F Ave	23	45	8	14	109	14	11	61	39	5	40	5
8th St & F Ave	9	56	22	44	88	15	6	50	6	14	109	14
5th St & F Ave	5	37	5	11	86	11	34	51	29	15	121	15
3rd St & F Ave	2	17	0	52	39	39	6	47	6	23	185	23
1st St & A Ave	2	8			18	42	35		4			
3rd St & A Ave	9	34	0	29	58	201	63	36	0	3	21	36
8th St & A Ave	18	153	7	10	291	34	46	60	9	40	85	35
14th St & A Ave	5	209	5	115	317	28	14	55	4	5	25	70
19th St & A Ave		185	185	33	293					113		38
10th St & Florida Ave	5	44	6	4	83	126	109	241	15	12	322	54

## 2030 AM Peak-Hour Traffic Used in Operation Analysis

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
8th St & San Antonio Ave	15	52	33	63	16	26	23	48	6	19	119	51
15th St & San Antonio Ave	203	58	78	3	24	3	13	346	154	130	255	10
19th St & Washington Ave	210	210			137	12	10		44			
10th St & Washington Ave	100	109	23	8	12	131	94	41	12	21	74	11
15th St & Van Buren Ave	60	6	14	0	20	60	57	97	94	11	208	0
>>8th St & Van Buren Ave				7		63	40	40			36	4
9th St & Pan American Ave	11	404	11	127	490	19	4	32	4	2	35	56
Customs Ave & Pan American Ave		418			535					14		57
1st St & Customs Ave								13				72

## 2030 PM PEAK-HOUR TRAFFIC USED IN OPERATION ANALYSIS

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
10th St & A Ave	27	248	59	17	223	97	45	294	30	99	371	24
10th St & San Antonio Ave	23	91	23	23	50	95	69	183	37	29	140	25
8th St & Washington Ave	8	12	0	8	20	20	31	85	4	4	78	0
10th St & Van Buren Ave	24	20	12	0	12	19	15	96	10	0	36	6
15th St & Washington Ave	51	123	63	75	176	159	98	103	72	49	82	45
15th St & Florida Ave	243		89					184	28	15	244	
15th St & A Ave	24	216	49	27	105	9	16	41	16	66	91	51
SR 80 & Pan American Ave	240	256	0	78	287	114	104	285	192	4	119	40
14th St & F Ave	21	47	34	0	97	60	29	77	29	4	21	0
5th St & G Ave	11	76	15	4	65	74	59	102	42	16	120	20
1st St & F Ave	0	4	0	0	4	17	24	34	0	5	24	10
5th St & A Ave	0	126	0	13	92	62	42	37	11	9	51	4
10th St & G Ave	59	58	92	105	61	68	16	173	24	87	195	48
Grace Ave & US 191		127	27	4	106					3		14
Grace Ave & Douglas Ave	62	90			55	0	0		53			
Merritt Ave & Sulphur Spring St	70	23			14	10	0		51			
8th St & Pan American Ave		605	86	127	576					33		60
SR 80 & US 191				145		19	35	351			289	144
SR 80 & Chino Rd	125		50					373	134	31	312	
>>5th St & Chino Rd				131		4	5	19			1	72
5th St & Pan American Ave	218	294	43	18	350	241	333	142	291	37	131	37
3rd St & Pan American Ave		460	26	54	624					21		94
10th St & Pan American Ave		553	257	29	605					306		16
Pan American Ave & Leslie Canyon Rd	2	83	33	10	91	47	54	119	4	38	156	26
SR 80 & Washington Ave	67	43	11	0	24	6	29	58	175	30	133	0
SR 80 & Douglas Ave				74		32	42	380			355	118
Merritt Ave & Douglas Ave		112	48	11	97					8		71
Pan American Ave & Sulphur Spring St				31		31	104	416			508	56
14th St & Pan American Ave	57	457	57	48	417	14	4	32	4	30	13	13
11th St & Pan American Ave		512	57	45	402					110		59

## 2030 PM PEAK-HOUR TRAFFIC USED IN OPERATION ANALYSIS

### PM Peak Hour

	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
1st St & Pan American Ave		441	14	0	612							
1st St & G Ave				54	10	34	5	7	1	4	33	4
3rd St & G Ave	1	10	1	12	74	37	32	40	8	15	69	69
8th St & G Ave	16	124	16	17	135	17	21	170	21	10	59	30
9th St & G Ave	21	165	21	17	137	17	25	199	25	7	15	45
11th St & G Ave	12	97	12	36	253	72	10	81	10	11	85	11
14th St & G Ave	12	94	12	36	290	36	11	84	11	60	7	35
15th St & F Ave	8	53	15	12	42	6	5	20	25	97	15	12
11th St & F Ave	53	92	16	13	104	13	13	104	13	5	40	5
10th St & F Ave	9	74	9	12	97	12	37	296	37	50	396	50
9th St & F Ave	8	64	8	18	147	18	24	190	24	5	40	5
8th St & F Ave	6	50	6	17	137	17	20	162	20	9	75	9
5th St & F Ave	5	39	5	17	100	50	12	97	12	11	90	11
3rd St & F Ave	4	34	0	37	12	74	5	43	5	9	75	9
1st St & A Ave	2	8			9	35	30		3			
3rd St & A Ave	6	24	0	11	33	67	49	20	7.6	3	21	36
8th St & A Ave	17	138	17	35	281	35	56	111	19	10	42	52
14th St & A Ave	16	254	48	9	169	9	11	28	72	38	8	5
19th St & A Ave		36	320	13	120					48		32
10th St & Florida Ave	19	23	8	30	23	98	89	244	37	38	186	33
8th St & San Antonio Ave	8	64	8	12	92	12	16	131	16	11	85	11
15th St & San Antonio Ave	56	19	111	3	24	3	8	185	79	96	181	15
19th St & Washington Ave	213	53			117	13	67		267			
10th St & Washington Ave	17	22	4	50	124	124	171	50	7	4	67	8
15th St & Van Buren Ave	17	14	9	0	15	25	30	192	20	0	116	21
>>8th St & Van Buren Ave				14		56	47	47			24	16
9th St & Pan American Ave	20	578	66	182	701	27	4	8	28	9	5	35
Customs Ave & Pan American Ave		441			612					13		54
1st St & Customs Ave								14				67

## 2005 AM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS

AM		SIGNALIZED INTERSECTIONS				
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION
1	10th St & A Ave	B	B	A	A	B
2	10th St & San Antonio Ave	A	A	B	B	A
3	8th St & Washington Ave			B	A	
4	10th St & Van Buren Ave			A	A	
5	15th St & Washington Ave	B	C	C	B	B
6	15th St & Florida Ave			B		
7	15th St & A Ave	B	B	A	B	B
8	SR 80 & Pan American Ave	B	B	C	B	B
9	14th St & F Ave	A	A	A	A	A
10	5th St & G Ave	B	B			
11	1st St & F Ave			A	A	
12	5th St & A Ave	B	B			
13	10th St & G Ave	B	B	B	B	B
14	Grace Ave & US 191		A			
15	Grace Ave & Douglas Ave	A				
16	Merritt Ave & Sulphur Spring St	A				
17	8th St & Pan American Ave		B			
19	SR 80 & US 191				B	
20	SR 80 & Chino Rd			B		
22	>>5th St & Chino Rd					
23	5th St & Pan American Ave	C	C	B	B	B
24	3rd St & Pan American Ave		B			
25	10th St & Pan American Ave		C			
26	Pan American Ave & Leslie Canyon Rd			B	B	
27	SR 80 & Washington Ave			A	A	
28	SR 80 & Douglas Ave				B	
29	Merritt Ave & Douglas Ave		B			
30	Pan American Ave & Sulphur Spring St				A	
31	14th St & Pan American Ave	B	B			
32	11th St & Pan American Ave		B			
33	1st St & Pan American Ave					
34	1st St & G Ave			A	A	
35	3rd St & G Ave	A	B			
36	8th St & G Ave	B	B			
37	9th St & G Ave	B	B	B	B	B
38	11th St & G Ave	A	B	B	B	B
39	14th St & G Ave	B	B	B	B	B
40	15th St & F Ave	B	B			
41	11th St & F Ave	A	A	A	A	A
42	10th St & F Ave	B	B	A	A	B
43	9th St & F Ave	A	A	A	A	A
44	8th St & F Ave	B	B			
45	5th St & F Ave	B	B			

## 2005 AM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS (Continued)

AM		SIGNALIZED INTERSECTIONS				
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION
46	3rd St & F Ave	B	B			
47	1st St & A Ave	A				
48	3rd St & A Ave	B	A			
49	8th St & A Ave	B	B			
50	14th St & A Ave	C	B			
51	19th St & A Ave		B			
52	10th St & Florida Ave			C	C	
53	8th St & San Antonio Ave			B	B	
54	15th St & San Antonio Ave			E	C	left lane is F
55	19th St & Washington Ave	B				
56	10th St & Washington Ave			C	A	
57	15th St & Van Buren Ave			B	B	
58	>>8th St & Van Buren Ave					
61	9th St & Pan American Ave	C	B			
87	Customs Ave & Pan American Ave		B			
93	1st St & Customs Ave	A	A			

## 2005 PM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS (Continued)

PM		SIGNALIZED INTERSECTIONS					
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION	
1	10th St & A Ave	B	B	A	A	B	
2	10th St & San Antonio Ave	A	A	B	B	A	
3	8th St & Washington Ave			B	B		
4	10th St & Van Buren Ave			B	A		
5	15th St & Washington Ave	B	A	B	B	B	
6	15th St & Florida Ave			B			
7	15th St & A Ave	B	B	A	A	A	
8	SR 80 & Pan American Ave	B	B	C	B	C	
9	14th St & F Ave	A	A	A	A	A	
10	5th St & G Ave	B	B				
11	1st St & F Ave			A	A		
12	5th St & A Ave	B	B				
13	10th St & G Ave	B	B	B	B	B	
14	Grace Ave & US 191		A				
15	Grace Ave & Douglas Ave	A					
16	Merritt Ave & Sulphur Spring St	A					
17	8th St & Pan American Ave		C				
19	SR 80 & US 191				B		
20	SR 80 & Chino Rd			B			
22	>>5th St & Chino Rd						
23	5th St & Pan American Ave	C	B	B	B	B	
24	3rd St & Pan American Ave		B				
25	10th St & Pan American Ave		F				
26	Pan American Ave & Leslie Canyon Rd			B	B		
27	SR 80 & Washington Ave			A	A		
28	SR 80 & Douglas Ave				B		
29	Merritt Ave & Douglas Ave		A				
30	Pan American Ave & Sulphur Spring St				B		
31	14th St & Pan American Ave	C	D				
32	11th St & Pan American Ave		C				
33	1st St & Pan American Ave						
34	1st St & G Ave			A	A		
35	3rd St & G Ave	B	A				
36	8th St & G Ave	B	B				
37	9th St & G Ave	B	B	B	B	B	
38	11th St & G Ave	B	B	B	C	B	
39	14th St & G Ave	B	B	B	B	B	
40	15th St & F Ave	A	B				
41	11th St & F Ave	A	A	A	A	A	
42	10th St & F Ave	B	B	A	A	B	
43	9th St & F Ave	B	A	A	A	A	
44	8th St & F Ave	B	B				
45	5th St & F Ave	B	B				
46	3rd St & F Ave	A	B				
47	1st St & A Ave	A					

## 2005 PM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS (Continued)

PM		SIGNALIZED INTERSECTIONS				
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION
48	3rd St & A Ave	B	A			
49	8th St & A Ave	C	B			
50	14th St & A Ave	B	B			
51	19th St & A Ave		B			
52	10th St & Florida Ave			C	B	
53	8th St & San Antonio Ave			B	B	
54	15th St & San Antonio Ave			B	B	
55	19th St & Washington Ave	B				
56	10th St & Washington Ave			C	C	
57	15th St & Van Buren Ave			B	B	
58	>>8th St & Van Buren Ave					
61	9th St & Pan American Ave	E	E			
87	Customs Ave & Pan American Ave		B			
93	1st St & Customs Ave	A	A			

## 2030 AM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS

AM		SIGNALIZED INTERSECTIONS				
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION
1	10th St & A Ave	B	B	A	A	B
2	10th St & San Antonio Ave	A	A	B	B	B
3	8th St & Washington Ave			C	B	
4	10th St & Van Buren Ave			A	A	
5	15th St & Washington Ave	B	C	C	B	C
6	15th St & Florida Ave			C		
7	15th St & A Ave	B	B	B	B	B
8	SR 80 & Pan American Ave	B	B	B	B	B
9	14th St & F Ave	A	A	A	A	A
10	5th St & G Ave	B	B			
11	1st St & F Ave			A	A	
12	5th St & A Ave	C	B			
13	10th St & G Ave	B	B	B	B	B
14	Grace Ave & US 191		A			
15	Grace Ave & Douglas Ave	A				
16	Merritt Ave & Sulphur Spring St	A				
17	8th St & Pan American Ave		B			
19	SR 80 & US 191				B	
20	SR 80 & Chino Rd			C		
22	>>5th St & Chino Rd					
23	5th St & Pan American Ave	C	C	B	B	B
24	3rd St & Pan American Ave		C			
25	10th St & Pan American Ave		B	A	A	A
26	Pan American Ave & Leslie Canyon Rd			B	B	
27	SR 80 & Washington Ave			B	B	
28	SR 80 & Douglas Ave				C	
29	Merritt Ave & Douglas Ave		B			
30	Pan American Ave & Sulphur Spring St				B	
31	14th St & Pan American Ave	B	C			
32	11th St & Pan American Ave		C			
33	1st St & Pan American Ave					
34	1st St & G Ave			A	A	
35	3rd St & G Ave	B	B			
36	8th St & G Ave	B	B			
37	9th St & G Ave	B	B	B	B	B
38	11th St & G Ave	B	B	B	B	B
39	14th St & G Ave	B	B	B	B	B
40	15th St & F Ave	B	B			
41	11th St & F Ave	A	A	A	A	A
42	10th St & F Ave	B	B	A	A	B
43	9th St & F Ave	A	A	A	A	A
44	8th St & F Ave	B	B			
45	5th St & F Ave	B	B			
46	3rd St & F Ave	B	B			
47	1st St & A Ave	A				
48	3rd St & A Ave	B	B			

## 2030 AM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS (Continued)

49	8th St & A Ave	C	C		
50	14th St & A Ave	D	C		
51	19th St & A Ave		C		
52	10th St & Florida Ave			C	C
53	8th St & San Antonio Ave			B	B
54	15th St & San Antonio Ave			F	D
55	19th St & Washington Ave	B			
56	10th St & Washington Ave			C	B
57	15th St & Van Buren Ave			C	B
58	>>8th St & Van Buren Ave				
61	9th St & Pan American Ave	E	C		
87	Customs Ave & Pan American Ave		B		
93	1st St & Customs Ave	A	A		

## 2030 PM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS

PM		SIGNALIZED INTERSECTIONS					
INTID	INTNAME	EB	WB	NB	SB	INTERSECTION	
1	10th St & A Ave	B	B	A	A	B	
2	10th St & San Antonio Ave	A	A	B	B	A	
3	8th St & Washington Ave			B	B		
4	10th St & Van Buren Ave			B	A		
5	15th St & Washington Ave	B	B	B	C	B	
6	15th St & Florida Ave			C			
7	15th St & A Ave	B	B	A	A	B	
8	SR 80 & Pan American Ave	B	B	B	B	B	
9	14th St & F Ave	A	A	A	A	A	
10	5th St & G Ave	B	B				
11	1st St & F Ave			A	A		
12	5th St & A Ave	B	B				
13	10th St & G Ave	B	B	B	B	B	
14	Grace Ave & US 191		A				
15	Grace Ave & Douglas Ave	A					
16	Merritt Ave & Sulphur Spring St	A					
17	8th St & Pan American Ave		C				
19	SR 80 & US 191				C		
20	SR 80 & Chino Rd			C			
22	>>5th St & Chino Rd						
23	5th St & Pan American Ave	C	B	C	C	C	
24	3rd St & Pan American Ave		B				
25	10th St & Pan American Ave		B	A	A	A	
26	Pan American Ave & Leslie Canyon Rd			B	B		
27	SR 80 & Washington Ave			B	B		
28	SR 80 & Douglas Ave				C		
29	Merritt Ave & Douglas Ave		A				
30	Pan American Ave & Sulphur Spring St				C		
31	14th St & Pan American Ave	D	D				
32	11th St & Pan American Ave		C				
33	1st St & Pan American Ave						
34	1st St & G Ave			A	A		
35	3rd St & G Ave	B	B				
36	8th St & G Ave	C	B				
37	9th St & G Ave	B	B	B	B	B	
38	11th St & G Ave	B	B	B	C	B	
39	14th St & G Ave	B	B	B	B	B	
40	15th St & F Ave	A	B				
41	11th St & F Ave	A	A	A	A	A	
42	10th St & F Ave	B	B	A	A	B	
43	9th St & F Ave	B	A	A	A	B	
44	8th St & F Ave	B	B				
45	5th St & F Ave	B	B				
46	3rd St & F Ave	B	B				
47	1st St & A Ave	A					
48	3rd St & A Ave	B	A				

## 2030 PM PEAK HOUR LEVEL OF SERVICE FOR ALL INTERSECTIONS (Continued)

49	8th St & A Ave	C	B		
50	14th St & A Ave	B	C		
51	19th St & A Ave		B		
52	10th St & Florida Ave			C	B
53	8th St & San Antonio Ave			B	B
54	15th St & San Antonio Ave			B	C
55	19th St & Washington Ave	C			
56	10th St & Washington Ave			C	C
57	15th St & Van Buren Ave			B	B
58	>>8th St & Van Buren Ave				
61	9th St & Pan American Ave	E	E		
87	Customs Ave & Pan American Ave		B		
93	1st St & Customs Ave	A	A		

***APPENDIX D***

***PUBLIC MEETING MATERIALS***



# **PUBLIC MEETING #1**

**CITY OF DOUGLAS**

**PUBLIC HEARING**

## **2006 SMALL AREA TRANSPORTATION STUDY**

Pursuant to A.R.S. Section 38-431.02, notice is hereby given to the general public that the CITY OF DOUGLAS will hold a **PUBLIC HEARING** on **WEDNESDAY, JUNE 28, 2006 at 6:00 p.m.** in the City Hall Council Chambers, 425 10<sup>th</sup> Street, Douglas, Arizona 85607 to seek public comment regarding Working Paper No. 1 of the Douglas Small Area Transportation Study.

The Douglas Small Area Transportation Study identifies and addresses current transportation issues for all travel modes, inventory, existing and projected land uses, travel characteristics and deficiencies, determines future transportation system needs, and analyzes alternative solutions. The study will develop a recommended multi-modal transportation improvements plan and provide an implementation guide to meet short, mid, and long-range transportation needs.

A copy of Working Paper No. 1 of the Small Area Transportation Plan can be viewed at City Hall, 425 Tenth Street, Douglas, Arizona, or contact Leticia Rodriguez, City Clerk at 364-1586.

The City Council Chambers is wheelchair accessible. Contact Melissa Grijalva at 364-1586 to make reasonable accommodations for persons with disabilities.

Posted at City Hall on Tuesday, June 13, 2006 at 10:00 a.m.

Published: 6/15/06, 6/22/06 & 6/27/06



**City of Douglas Small Area Transportation Study – 2005**  
**Public Open House**  
**June 28, 2006**

**We are extremely interested in getting your thoughts and ideas on the existing condition of the Douglas area transportation system, and potential improvements. Please take a moment to respond to the following questions, and make sure to leave your responses at the Open House. Thank you for your time and effort.<sup>1</sup>**

1. Please indicate any problem areas or concerns you may have about the condition of the existing transportation system roads and streets, public transit (taxi, shuttles, vans or other), pedestrian facilities (sidewalks and paths), bicycle facilities, traffic safety, parking or any other transportation related subject. Be as specific as possible and identify locations or areas where there are problems and the nature of the problem as you see it.

*no bicycle paths  
no public transportation*

2. What improvements or additions to the Douglas area transportation system would you most like to see in the future?

*bicycle paths  
public transportation*

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<sup>1</sup> Additional information on this project is available from Mr. Carlos de la Torre, Public Works Director and Project Manager, City of Douglas, Department of Public Works, 425 Tenth Street, Douglas, AZ 85607, Telephone 520-805-4077, Fax: 520-364-1585, email [Carlos.DLT@douglasaz.gov](mailto:Carlos.DLT@douglasaz.gov).

## **PUBLIC MEETING #2**

### **CITY OF DOUGLAS**

### **PUBLIC HEARING**

### **2007 SMALL AREA TRANSPORTATION STUDY**

Pursuant to A.R.S. Section 38-431.02, notice is hereby given to the general public that the CITY OF DOUGLAS will hold a **PUBLIC HEARING** on **WEDNESDAY, MAY 23, 2007 at 5:30 p.m.** in the City Hall Council Chambers, 425 10<sup>th</sup> Street, Douglas, Arizona 85607 to seek public comment regarding the Final Draft Report of the Douglas Small Area Transportation Study.

The Douglas Small Area Transportation Study identifies and addresses current transportation issues for all travel modes, inventory, existing and projected land uses, travel characteristics and deficiencies, determines future transportation system needs, and analyzes alternative solutions. The study will develop a recommended multi-modal transportation improvements plan and provide an implementation guide to meet short, mid, and long-range transportation needs.

A copy of the Final Draft Report of the Small Area Transportation Study can be viewed at City Hall, 425 Tenth Street, Douglas, Arizona, or contact Brenda Aguilar, Acting City Clerk at 364-1586.

The City Council Chambers is wheelchair accessible. Please contact Xenia Gonzalez at 364-1586 to make reasonable accommodations for persons with disabilities.

Posted at City Hall on Monday, May 3, 2007 at 11:00 a.m.

Published: 5/10/07, 5/17/07 & 5/22/07





