

# **EL PORTAL CIRCULATION STUDY**

**August 2006**

## **Executive Summary**

### ***Introduction***

The Gateway to the Americas Bridge (also known as Bridge One) in Laredo, Texas is currently undergoing construction that will result in the re-routing of traffic near this area of the city. Travelers headed to Mexico will be forced to access the bridge by way of Santa Maria Avenue rather than Salinas Avenue.

Additionally, the existing Riverside Mall, located at 1600 Water Street, is undergoing renovations and will be known as The El Portal Shopping Center. The mall is located near the base of the only pedestrian bridge between the United States and Mexico in Laredo, and will also be accessed primarily by way of Santa Maria Avenue.

Due to the fact that both of these major changes in the area will direct additional traffic on Santa Maria Avenue, the City of Laredo has commissioned this study to evaluate the traffic circulation of the network and determine the most efficient traffic circulation plan.

The study area is bounded by Santa Isabel Avenue on the west, Victoria Street on the north, San Dario Avenue to the east, and River Road to the south.

### ***Purpose of the Study***

The purpose of this study is to evaluate traffic circulation related to the Bridge One modifications near the El Portal Shopping Center in downtown Laredo. This study presents a circulation plan to address identified traffic circulation concerns.

Aside from the overall goal of efficient traffic circulation, there are several other related issues addressed in this study. These issues include:

- Determining the directional configuration of Santa Maria Avenue;
- Identifying the appropriate cross-section of Zaragosa Street;
- Identifying the appropriate cross-section of Salinas Avenue;
- Assessing the impacts of the Santa Ursula Avenue extension; and
- Evaluating the operational impacts of opening the Tatangelo Walkway to vehicular traffic;

### ***Findings***

Overall, the proposed roadway network is projected to operate at acceptable levels-of-service. For a downtown region with extensive pedestrian activity, this is excellent performance. After extensive analysis it was found that portions of three streets should either be converted to one-way operation or have their direction of travel reversed. Santa Maria Avenue is recommended to be one-way from Grant Street to Water Street, and the direction of travel is recommended to be reversed on Grant Street and Zaragosa Street between Convent Avenue and Santa Maria Avenue. A traffic signal is recommended at the intersection of Santa Cleotilde and Victoria along with new trailblazer signing directing traffic from I-35 to El Portal and back.

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# **EL PORTAL CIRCULATION STUDY**

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### **Section One: Study Methodology**

#### ***Overview***

The El Portal Circulation Study utilizes a four-step approach, which consists of data collection, analysis, determination of findings and development of recommendations. The following provides an overview of the data collected, analyses performed, findings and recommendations.

#### ***Data Collection***

The data collection task is the first and one of the most important tasks of an engineering study. Data collection focuses on existing conditions to provide a technical analysis of the area transportation system and provides insight into current roadway operation. Gathering relevant information permits an understanding of the operational characteristics of the roadway system and affords familiarity as to how the transportation system is being used.

#### ***Analysis***

Collected data were input into a series of traffic operation software. The traffic operation models used for this study include Synchro 6.0, SimTraffic and the Highway Capacity Software (HCS). The simulation models were used to analyze existing and projected performance of the roadway network. Analyses performed for this study were for current 2006 conditions as well as for projected 2008 conditions.

#### ***Determination of Findings***

The results of this analysis were used to develop a set of findings. These findings are conclusions made regarding the current issues facing traffic operations, as well as potential concerns for the future. The findings are key in determining what improvements may be necessary to accommodate future demands.

#### ***Recommendations***

Following the extensive analysis conducted, a set of recommendations was developed. These recommendations can be implemented by the City of Laredo, and conform to the objectives of the study. Recommendations are based on the physical attributes of the project and results of the analysis.

## Section Two: Data Collection

### *Inventory*

The first step of the data collection task is to take inventory of the study area. The study area is bounded by Santa Isabel Avenue on the west, Victoria Street on the north, San Dario Avenue to the east, and River Road to the south. The study area is shown in **Figure 1**.

Alliance Transportation Group, Inc., used its VideoGPS<sup>SM</sup> system to inventory transportation and land uses. VideoGPS<sup>SM</sup> records video while dynamically linking Global Positioning System (GPS) data. The video was reviewed using a Graphic Information System (GIS) interface that allows the analyst to view the video along with the true location of the video.

This was the methodology used to inventory the transportation system for this study. These efforts focused on number of lanes, intersection lane configurations and traffic control, directionality of the roadways, and general driver and pedestrian characteristics. **Figures 2.1 & 2.2** summarize the inventory of the network.

### *Turning Movement Counts*

Turning movement counts are also important in establishing baseline conditions for analysis. These counts provide turning movement volumes at an intersection. The combination of specific movements and their associated volumes are used to determine the Level-of-Service (LOS) of the intersection.

Turning movement counts are crucial because they provide insight of how the roadway network is operating. Counts were collected at several strategically chosen intersections. Using this information, overall traffic distributions on the roadway were determined. In addition, the turning movement counts provide the base volumes that are used to forecast future volumes of the network. For this study, turning movement counts were collected at the following intersections during the noon, afternoon and evening peak periods, and are provided in **Appendix A**. The peak periods are defined as Noon Peak 11:00 AM–1:00 PM, Afternoon Peak 4:00-6:00 PM, and Evening Peak 6:00-8:00 PM.

- Convent Avenue and Grant Street
- Convent Avenue and Zaragoza Street
- Santa Maria Avenue and Grant Street
- Santa Maria Avenue and Zaragoza Street
- Santa Maria Avenue and Water Street
- Santa Cleotilde Avenue and Water Street
- Salinas Avenue and Zaragoza Street
- Santa Maria Avenue and Houston Street
- Santa Isabel Avenue and Water Street
- Santa Isabel Avenue and Victoria Street
- Santa Cleotilde Avenue and Victoria Street
- Santa Ursula Avenue and Houston Street
- Santa Ursula Avenue and Victoria Street
- San Dario Avenue and Victoria Street
- San Dario Avenue and Houston Street

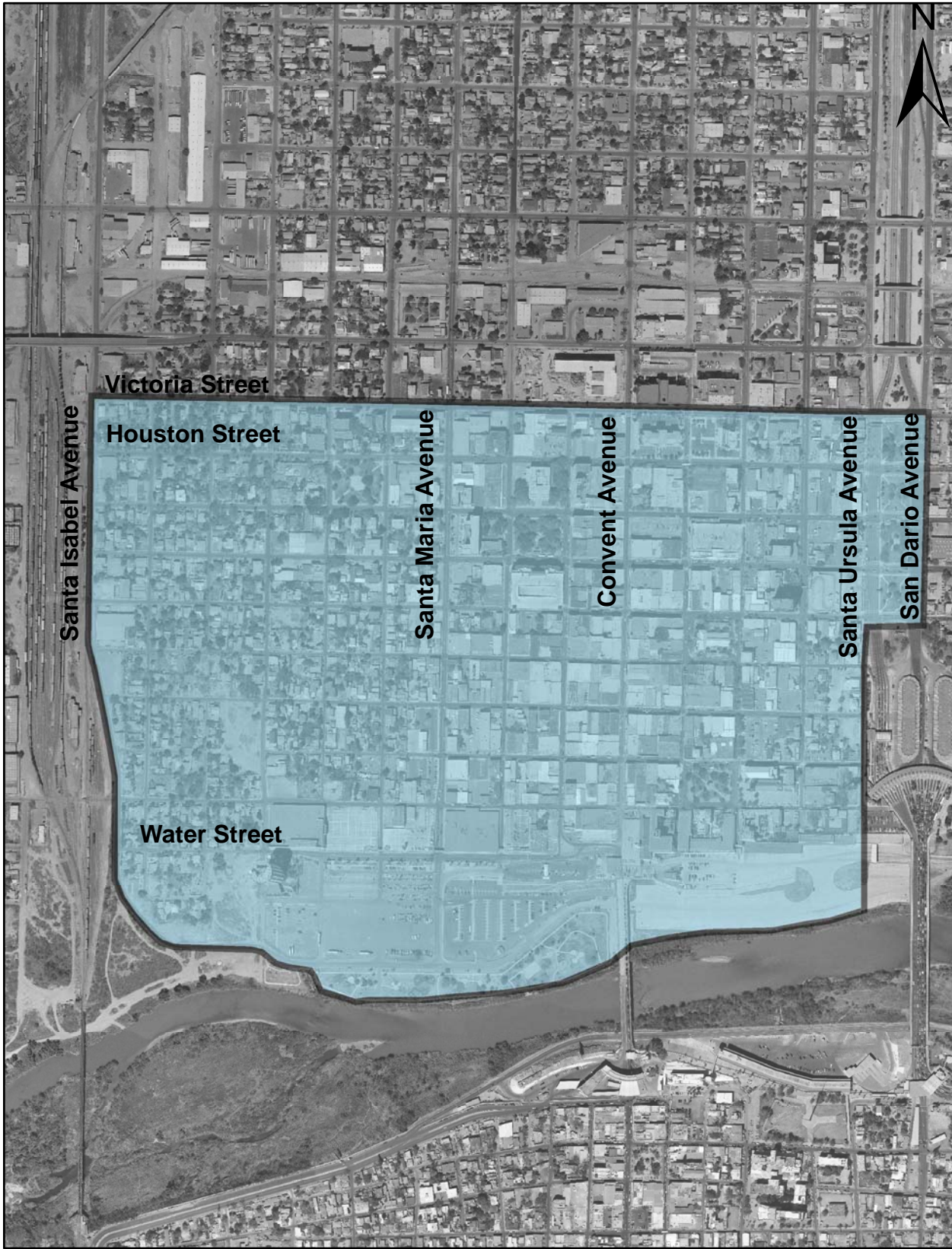


Figure 1. Study Area

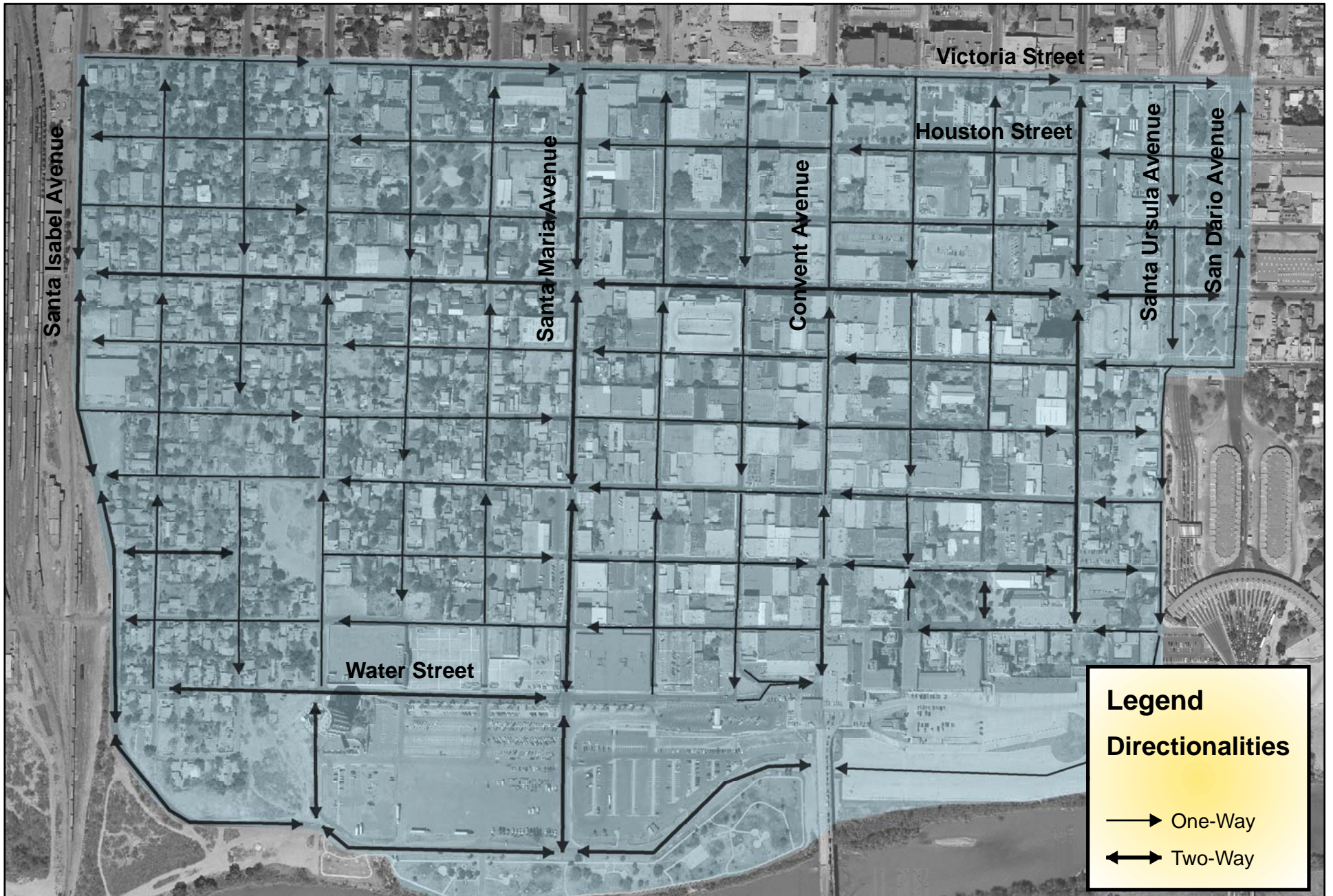


Figure 2.1. Network Inventory

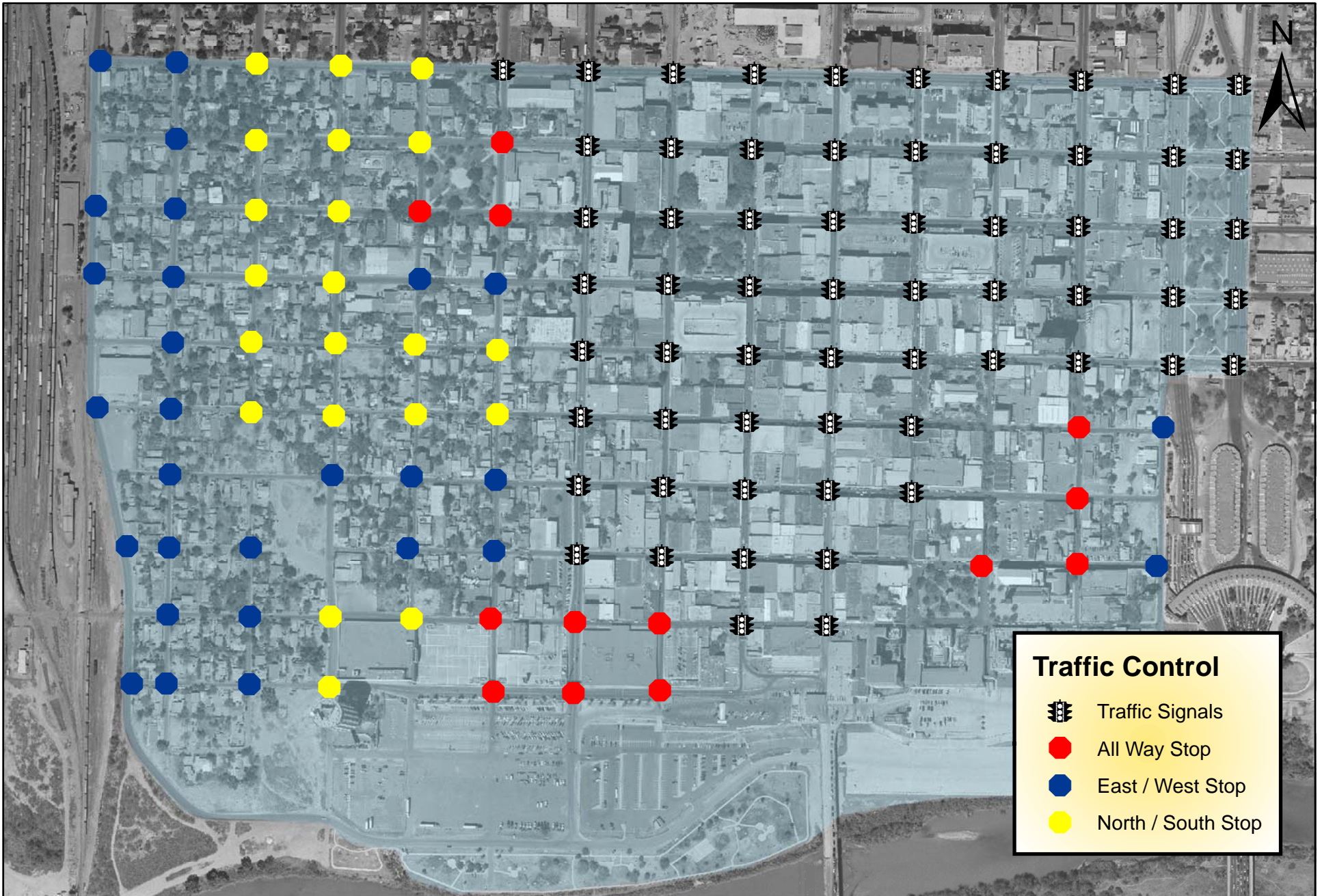


Figure 2.2. Network Inventory



## ***Pedestrian Counts***

The Gateway to the Americas Bridge is the only pedestrian bridge connecting Mexico with the United States in Laredo. For this reason along with the location of parking and proposed land uses, pedestrians significantly affect the operational characteristics of the roadway network.

It is anticipated that there will be significant changes in traffic circulation throughout the study area due to the completion of construction on the bridge. Furthermore, the renovation of the El Portal Shopping Center is expected to attract additional traffic. Therefore, due to the combination of pedestrian and vehicular usage of the bridge and the location of El Portal, pedestrian safety is an important concern of this study. This issue affects the operation of the roadways and recommendations made. Pedestrian counts were taken at the following intersections and are provided in **Appendix B**:

- Convent Avenue and Grant Street
- Convent Avenue and Zaragoza Street
- Santa Cleotilde Avenue and Water Street
- Santa Maria Avenue and Zaragoza Street
- Santa Maria Avenue and Water Street
- Santa Maria Avenue and Grant Street
- Salinas Avenue and Zaragoza Street

## Section Three: Analysis

### Roadway Level of Service

The *2000 Highway Capacity Manual*, <sup>(1)</sup> uses Level of Service (LOS) as the method by which the quality of traffic flow is described. LOS describes operational conditions in six levels based upon speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. These six levels are given the letters “A” through “F” and are given different descriptions and defining criteria depending on the roadway element analyzed.

LOS criteria for traffic signals are based on the average control delay per vehicle. Control delay includes deceleration and acceleration delay, queue move-up time, and stopped delay. These criteria are shown in **Table 1**. Thus, if the average control delay for vehicles at an intersection is fifty five seconds or less, the intersection is defined as operating at a LOS “D” or better. Control delay of fifty five through eighty seconds represent LOS “E”, and values greater than eighty seconds define LOS “F”.

For signalized intersection operation, LOS “A” represents very low delay; most vehicles do not stop at all. With LOS “B”, more vehicles stop than LOS “A”, increasing the average delay. Under LOS “C”, the number of vehicles stopping is significant; however, many still pass through the intersection without stopping. LOS “D” describes conditions where congestion is readily apparent with many vehicles stopping and individual cycle failures are noticeable. LOS “E” generally describes operations with poor progression, long cycle lengths and frequent cycle failures. LOS “F” describes unacceptable operations which include many cycle failures caused by arrival flows rates exceeding intersection capacity.

Stop controlled intersections are analyzed in a similar manner; however, LOS is based on total delay per vehicle. The values that define LOS for stop controlled intersection are more restrictive than those for signalized intersections because it is assumed that drivers stopped at signalized intersections are able to relax while drivers waiting at stop signs must remain alert and continue to move ahead in the queue. Total delay includes both stopped delay and time spent in the queue waiting to enter the intersection. Two-way stop controlled intersections with the minor street average total delay greater than thirty seconds identifies LOS “E” or worse.

Table 1: LOS Criteria for Signalized And Stop Controlled Intersections

Level of Service	Average Control Delay Signalized Intersections (sec./veh.)	Average Total Delay Stop Control (sec/veh)
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

## Existing 2006 Conditions

The current roadway network was analyzed to establish baseline conditions. This analysis calculates existing intersection Levels of Service and traffic flow within study area.

Intersection Levels of Service were calculated for intersections throughout the study area. A summary of the analysis results is shown in **Figures 3.1-3.15** and **Table 2**. Analysis sheets are provided in **Appendix C**.

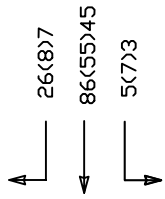
Table 2: Existing 2006 Levels of Service

Intersection	Type of Control	Level of Service		
		Noon	Afternoon	Evening
Convent Avenue and Grant Street	Signalized	B	B	B
Convent Avenue and Zaragoza Street	Signalized	A	A	A
Santa Maria Avenue and Grant Street	Signalized	A	A	A
Santa Maria Avenue and Zaragoza Street	Un-Signalized	A	A	A
Santa Maria Avenue and Water Street	Un-Signalized	A	A	A
Santa Cleotilde Avenue and Water Street	Un-Signalized	A	A	A
Salinas Avenue and Zaragoza Street	Signalized	B	A	A
Santa Maria Avenue and Houston Street	Signalized	B	A	A
Santa Isabel Avenue and Water Street	Un-Signalized	A	A	A
Santa Isabel Avenue and Victoria Street	Un-Signalized	A	A	A
Santa Cleotilde Avenue and Victoria Street	Un-Signalized	A	B	A
Santa Ursula Avenue and Houston Street	Signalized	B	B	B
Santa Ursula Avenue and Victoria Street	Signalized	C	B	B
San Dario Avenue and Victoria Street	Signalized	B	B	A
San Dario Avenue and Houston Street	Signalized	C	D	C

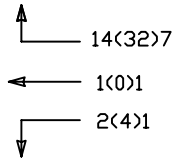
Several concerns were identified that negatively affected the flow of traffic along these corridors, and were accounted for by adjusting the Saturation Flow Rate. The concerns are listed below:

- Pedestrians often do not pay attention to “walk” and “don’t walk” signs;
- Pedestrians often cross the street at locations other than the cross walks;
- Drivers often stop in the ROW with hazard blinkers activated to perform personal tasks;
- Drivers often travel the wrong direction on one-way streets to access driveways.

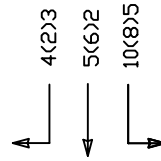
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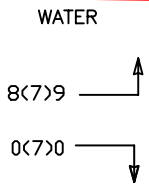
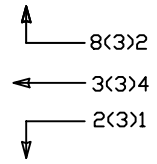
SANTA MARIA



3.10

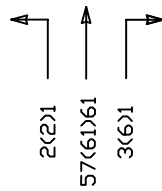


WATER



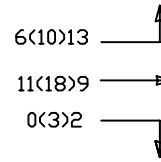
WATER

LEGEND:  
X(X)X - Noon(Afternoon)Evening

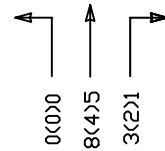


LDS:  
A(A)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening



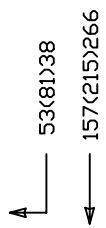
SANTA CLEOTILDE



LDS:  
A(A)A



3.11



CONVENT

ZARAGOZA

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
F(A)A

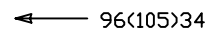
LEGEND:  
X(X)X - Noon(Afternoon)Evening

3.12



SALINAS

ZARAGOZA

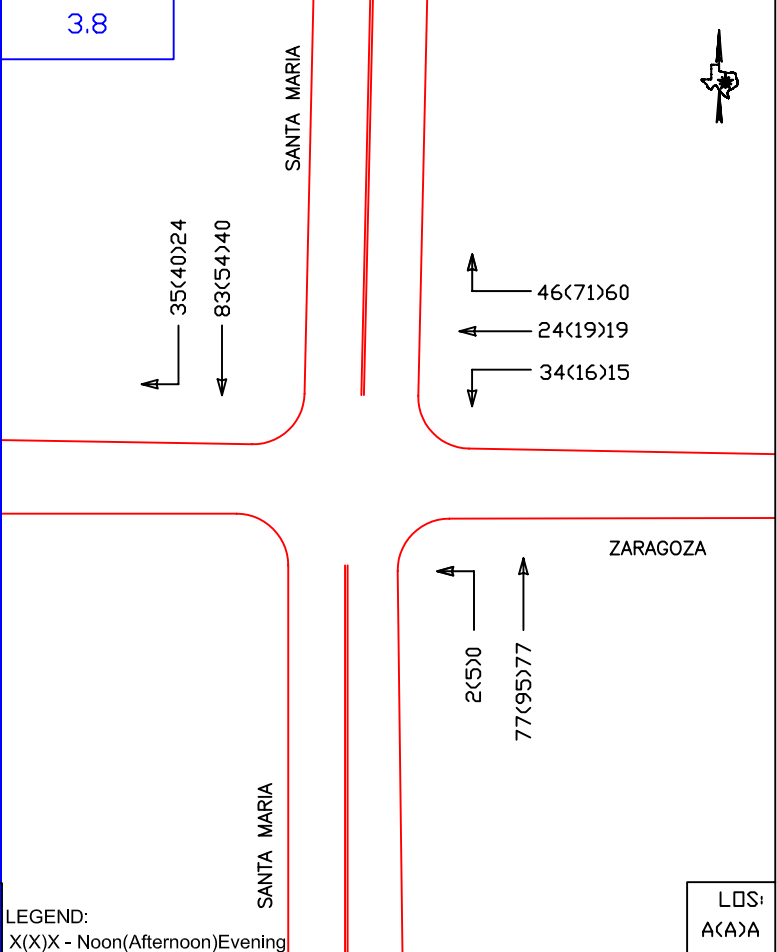
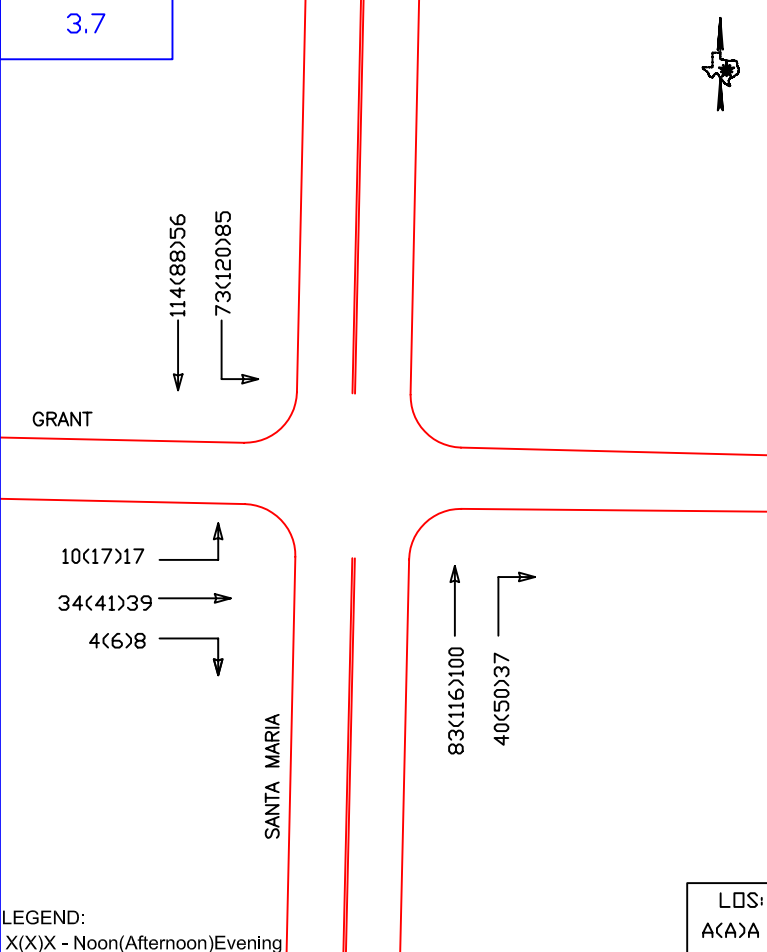
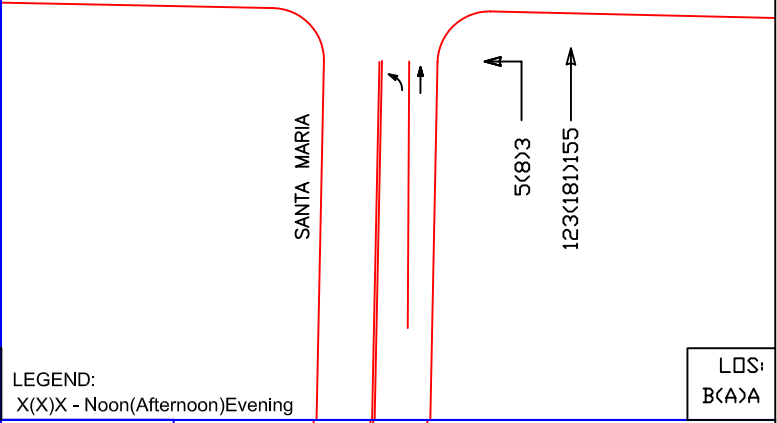
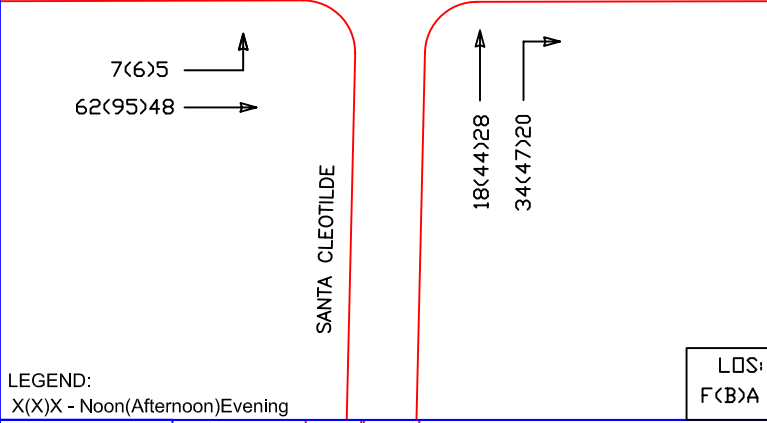
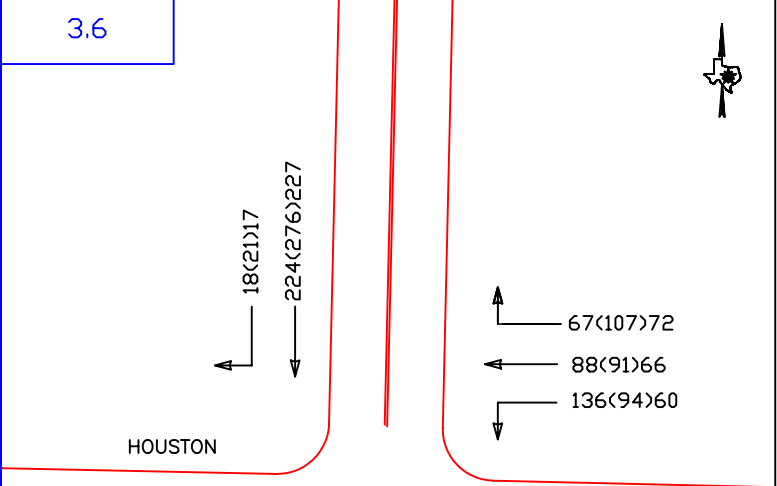
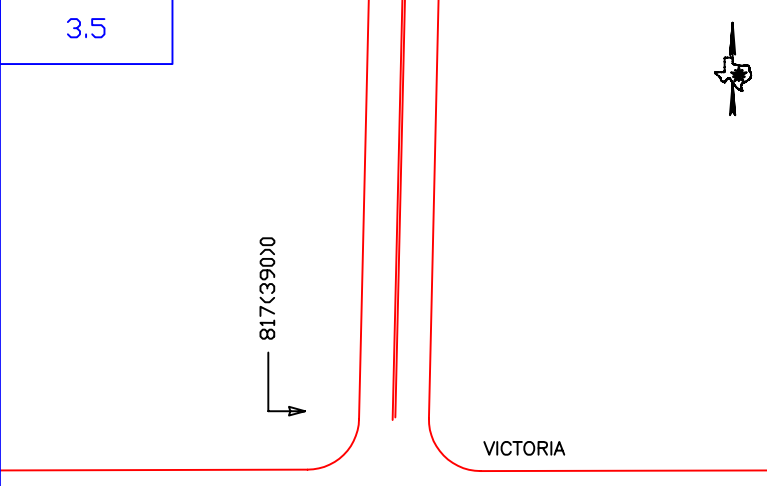


LDS:  
B(A)A



Figures 3.9-3.12  
2006 Existing Conditions

3.9 - Santa Maria & Water  
3.10 - Santa Cleotilde & Water  
3.11 - Convent & Zaragoza  
3.12 - Salinas & Zaragoza



LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
F(B)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
B(A)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening

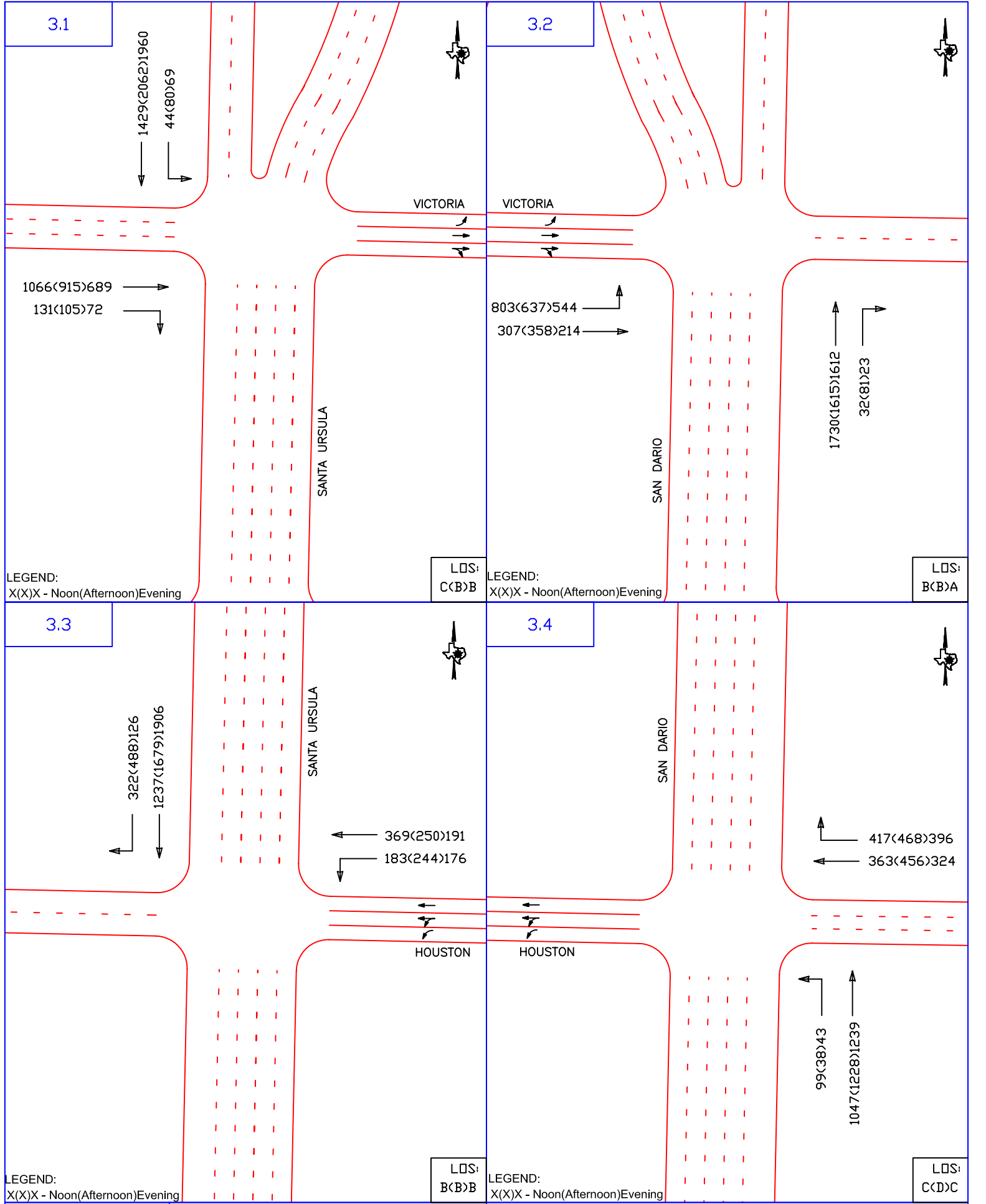
LDS:  
A(A)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

Figures 3.5-3.8  
2006 Existing Conditions

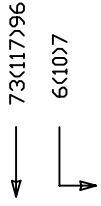
3.5 - Santa Cleotilde & Victoria  
3.6 - Santa Maria & Houston  
3.7 - Santa Maria & Grant  
3.8 - Santa Maria & Zaragoza



Figures 3.1-3.4  
 2006 Existing Conditions

3.1 - Santa Ursula & Victoria  
 3.2 - San Dario & Victoria  
 3.3 - Santa Ursula & Houston  
 3.4 - San Dario & Houston

3.13



SANTA ISABEL

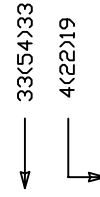
VICTORIA



LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

3.14



SANTA ISABEL

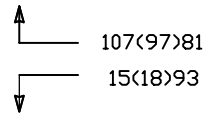
WATER



LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

3.15



GRANT

CONVENT



LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
B(C)E



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Figures 3.13-3.15  
2006 Existing Conditions

3.13 - Santa Isabel & Victoria  
3.14 - Santa Isabel & Water  
3.15 - Convent & Grant

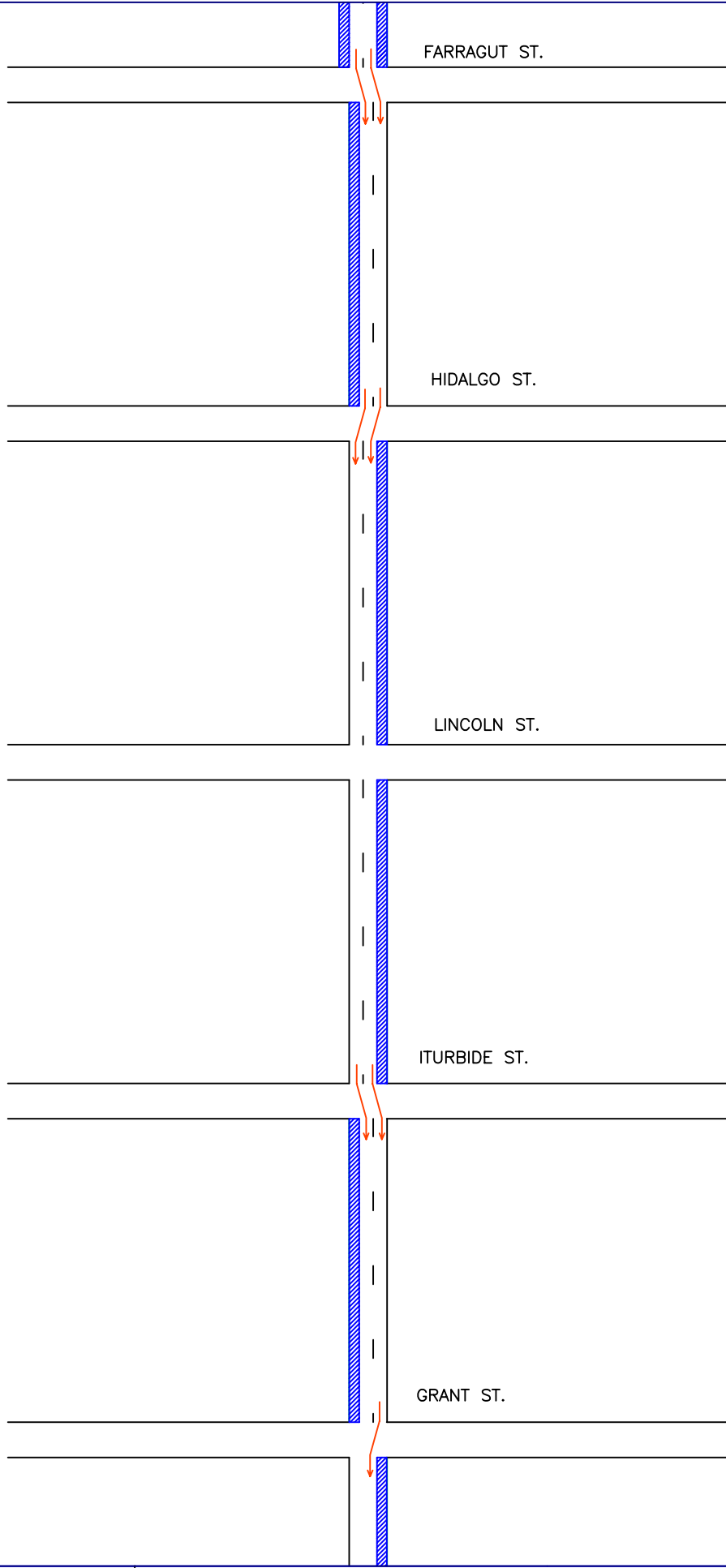
Each individual concern listed poses its own challenge to traffic flow and pedestrian safety. Drivers are often forced to wait while the problem is corrected resulting in queues. The corridor often experiences queue lengths that extend beyond the previous intersection causing the east/west traffic to wait through their green cycle because there are vehicles blocking the intersection.

Although the individual situations are challenging, it is a greater concern to consider that several of these problems often occur simultaneously. The combination of the above-mentioned concerns causes congested conditions that negatively impact the traffic flow. This is not only a concern because of the resulting vehicle delay, but also because of the pedestrian safety issues it presents.

The congested conditions described could cause a false sense of security to pedestrians. Pedestrians may feel that it is safe to cross although the sign says not to, or that they can cross at locations other than the cross walk because the vehicles are not moving. Not only does this compound the problem, but the inattentiveness of a single driver or pedestrian could have drastic consequences.

Another conclusion drawn about existing conditions was the difficulty of travel along Salinas Avenue. Parking along Salinas Avenue is allowed on different sides of the street between blocks. Between Farragut Street and Hidalgo Street, parking is allowed on the west side; but as the driver continues south between Hidalgo Street and Iturbide Street parking is allowed on the east. Following Iturbide Street, parking continues to change sides per block until the end of Salinas Avenue. This is illustrated in **Figure 4**. Thus, as drivers travel south on Salinas Avenue, they must continuously “zig-zag” to the left and right to remain in their desired lane.





 Parking Lanes

 Travel Path

Figure 4. Salinas Avenue

## Future 2008 Conditions

Before the analysis could be conducted for the future year 2008, it was necessary to obtain information regarding the changes that will occur within the study area. The 2008 analysis will include several sections:

- Proposed Changes in the Study Area;
- Configuration of Santa Maria Avenue;
- Cross-section of Zaragosa Street;
- Cross-section of Salinas Avenue;
- Tatangelo Walkway; and
- Overall Traffic Flow Optimization.

## Proposed Changes in the Study Area

Several geometric modifications are expected within the study area which would affect the operational characteristics of the roadway network. The most significant changes within the study area are those associated with the operation of the Gateway to the Americas Bridge. When construction on the bridge is complete, some street segments will be converted to one-way operation, including portions of Convent Avenue and Santa Maria Avenue.

Although bridge access was primarily from Salinas Avenue, the construction activity required vehicle traffic to use Convent Avenue. After construction is completed, Convent Avenue will be converted to one-way operation (northbound) between Zaragosa and Grant. All vehicle traffic headed into Mexico will access the bridge from Santa Maria Avenue.

To facilitate bridge access, a portion of Santa Maria Avenue will be converted to one-way southbound operation. The analysis of future operations provides a recommendation for the length of the one-way portion of Santa Maria Avenue

Another issue that will cause change in the area is the renovation of Riverside Mall. When complete, it will be a 400 KSF shopping center known as El Portal; and is expected to generate significant traffic. Peak hour trip generation for the shopping center was estimated using the Institute of Transportation Engineers (ITE) *Trip Generation, 7<sup>th</sup> Edition*. To remain conservative in analysis, only the highest weekday peak hour rates were used in this study. **Table 3** shows the *Trip Generation* rates. An annual growth rate of 2.8 percent was also applied to the existing traffic counts.

Table 3: ITE Trip Generation

ITE CODE	ITE DESCRIPTION	DAILY VOLS.	PEAK VOLS.		
		Total	Total	Enter	Exit
820	Shopping Center	16,722	1,563	750	813

An additional improvement which could affect the distribution of traffic would be the extension of Santa Ursula Avenue. Santa Ursula Avenue will be extended south to River Road. This will provide additional access to the El Portal area, notably to the City of Laredo parking facilities located south of Water Street.

**Figure 5** shows the proposed future roadway network.

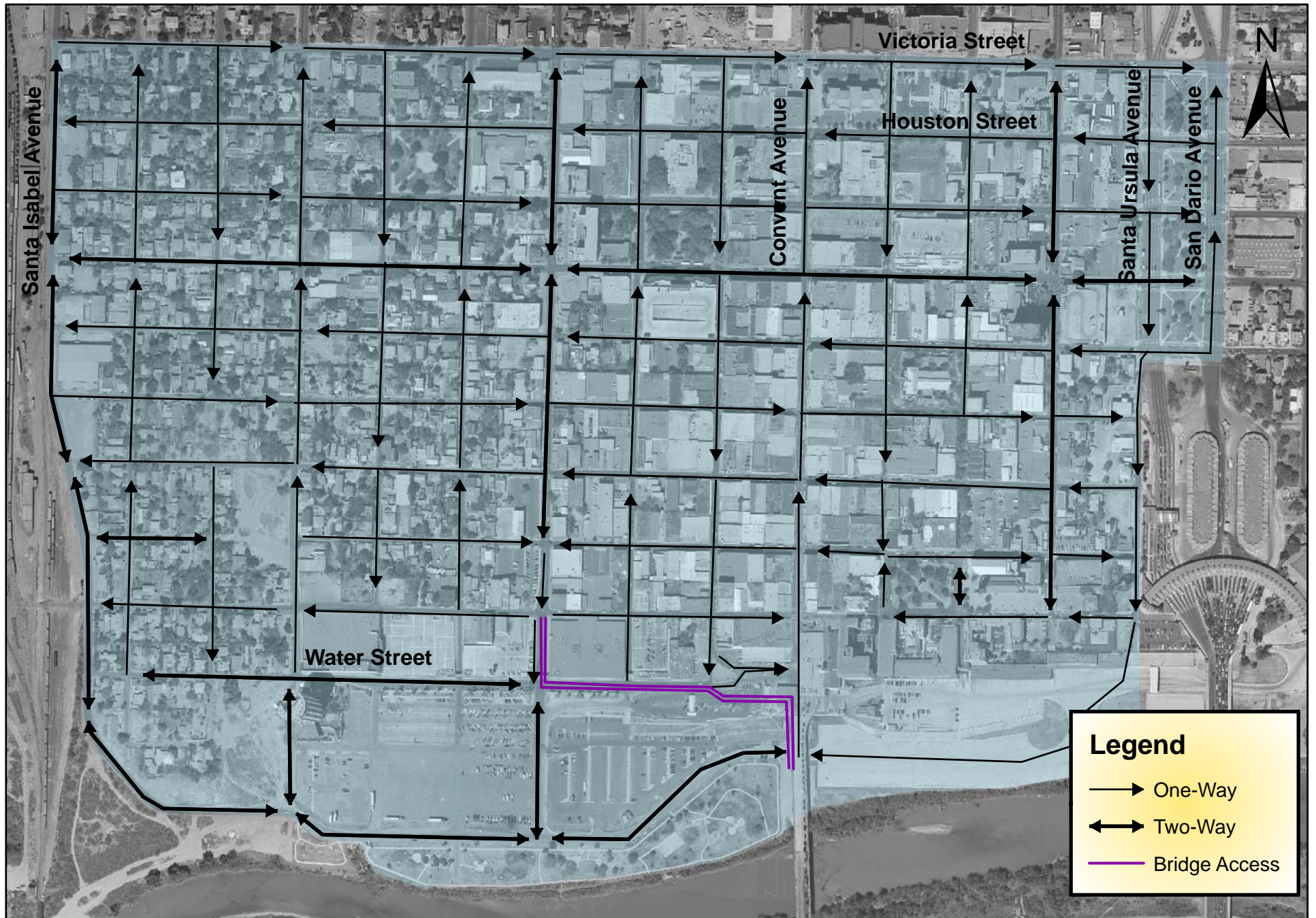


Figure 5. 2008 Roadway Configurations

## **Configuration of Santa Maria Avenue**

The modification of the access route to the Gateway to the Americas Bridge, along with the completed construction of the El Portal Shopping Center, will result in additional traffic southbound on Santa Maria Avenue. To facilitate traffic flow in the area, a portion of Santa Maria Avenue will be converted to one-way operation. At a minimum, the block of Santa Maria Avenue between Zaragosa Street and Water Street to facilitate bridge access. Additional analysis was performed to determine whether additional blocks should be converted to one-way operation.

The evaluation of the appropriate length was based on two criteria:

- 1) The queue lengths are less than the intersection spacing; and
- 2) All intersections operate at acceptable Levels-of-Service.

Several alternatives were investigated in this study. These analyses concluded that the most effective configuration would be to transition to one-way operation from Grant Street to Water Street. The block between Grant and Zaragosa is anticipated to be two lanes, and the block between Zaragosa and Water is proposed to be three lanes, with two dedicated lanes for bridge access and one lane to access parking areas and Water Street west of Santa Maria Avenue.

## **Zaragosa Street**

Zaragosa Street is currently one-way westbound within the study area. As mentioned previously, Convent Avenue will be converted to northbound one-way operation at the conclusion of the bridge project. Leaving Zaragosa one-way westbound would then make the block between Convent and Salinas inaccessible to vehicle traffic. This block is a designated taxi loading zone. In addition, concerns were raised about potential queuing along Zaragosa if drivers used Salinas and Zaragosa to reach the bridge as an alternative to Santa Maria.

To address these issues, it is proposed that Zaragosa Street be converted to one-way eastbound between Santa Maria and Convent, while remaining one-way westbound west of Santa Maria. To form a one-way couplet, it is also proposed that the existing one-way westbound section of Grant Street (between Flores and Convent) be extended to Santa Maria Avenue. This would also provide a solution to the potentially confusing intersection of Grant Street and Convent Avenue.

## **Salinas Avenue**

The alignment issues along Salinas Avenue could be addressed with a reduction in travel lanes from two to one south of Farragut Street. To the north of Grant Street, the curb-to-curb width of Salinas Avenue could accommodate one travel lane and a parking or loading lane on each side of the street. Within this section of Salinas, the curblines line up such that a minimum amount of weaving would be required. South of Grant Street, the roadway is only wide enough for one travel lane and one parking lane. Based on the projected traffic volumes on Salinas, one lane will provide sufficient capacity.

## **Tatangelo Walkway**

The Tatangelo Walkway is a two-block section of San Agustin Avenue between Lincoln Street and Grant Street, where vehicular traffic is prohibited. The walkway is in the southeast corner of the study area.

The opening of the walkway to vehicular traffic would benefit the network if it could help to alleviate the congestion on other northbound corridors. The walkway is in a portion of the study area that does not generally experience heavy traffic and there are easily accessible options within blocks in either direction. Therefore, it was determined that opening Tatangelo Walkway to vehicular traffic would have a minimal impact on traffic flow. It is believed that any benefit from opening the walkway would be minimal.

## **Overall Traffic Flow Operations**

Having identified all of the proposed changes to the roadway network, the next step was to analyze the operational characteristics of the network as a whole. This step will identify any concerns affecting the flow of traffic throughout the study area.

Traffic was re-distributed through the network for southbound access to the Gateway to the Americas Bridge according to the traffic flow plan. Traffic generated by the El Portal Shopping Center was distributed based on likely access routes. All intersections previously mentioned were analyzed for forecasted 2008 conditions. **Table 4** and **Figures 6.1-6.15** summarize the results of the analyses. Analysis sheets are available in **Appendix C**.

6.9

538(537)628  
105(58)113  
172(236)285

SANTA MARIA



6.10

4(2)3  
5(6)2  
11(8)5

8(3)2  
451(451)387  
2(3)1



WATER

WATER

0(7)0

26(26)25

15(18)23  
17(28)12  
0(3)2

SANTA CLEOTILDE

0(0)0  
8(4)5  
3(2)1

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
X(X)X

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

6.11

CONVENT



6.12

SALINAS

73(61)31



ZARAGOZA

150(147)121

314(264)311

ZARAGOZA

77(86)90

LEGEND:  
X(X)X - Noon(Afternoon)Evening

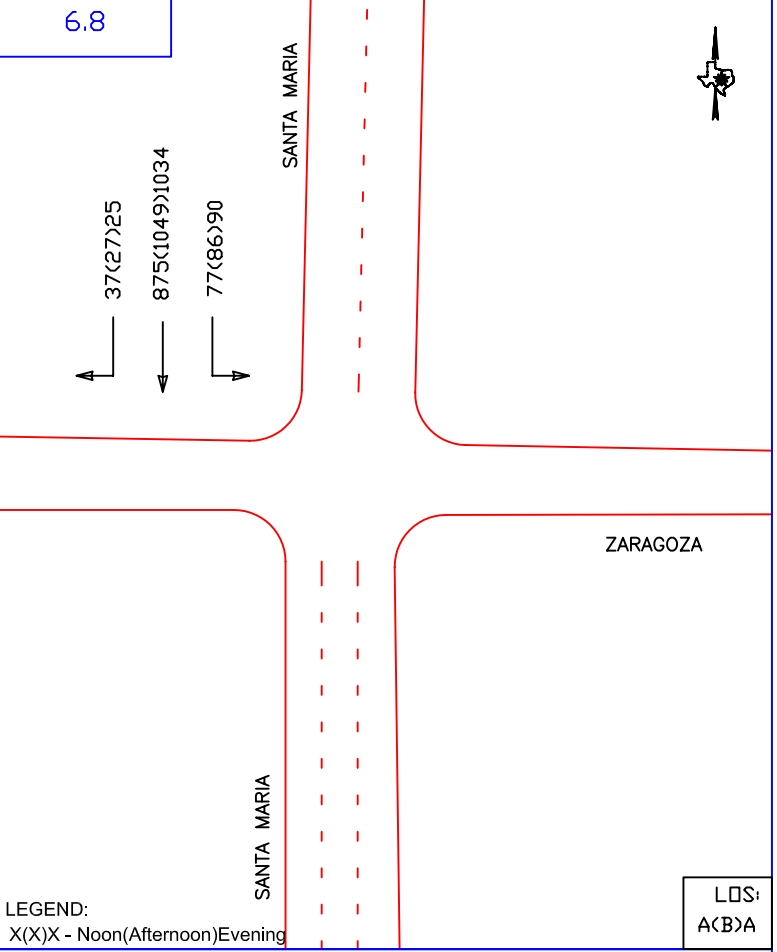
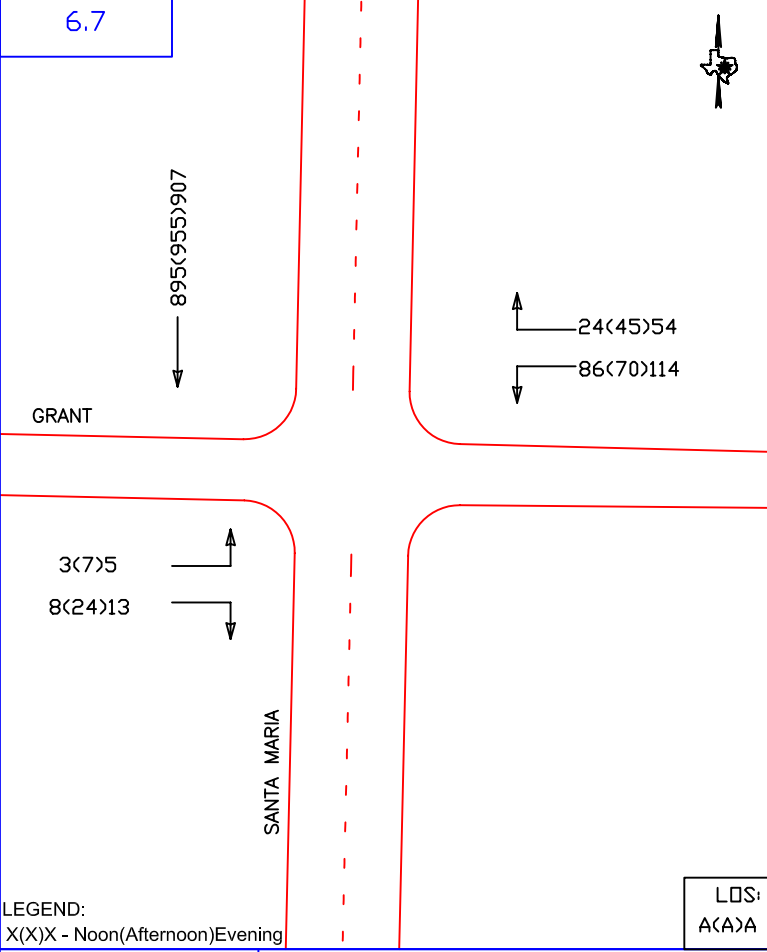
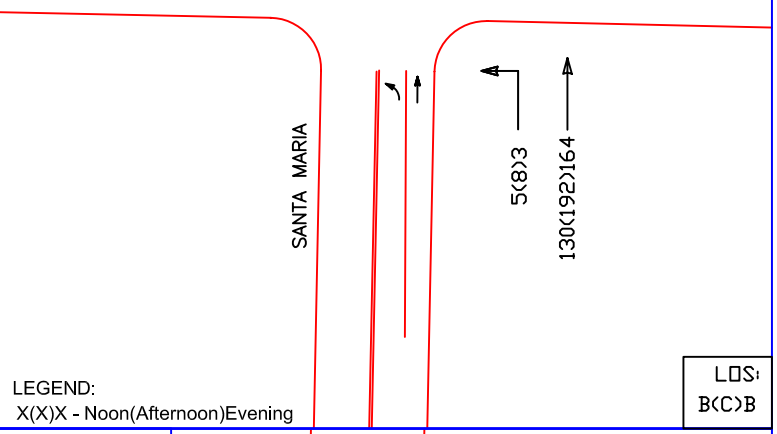
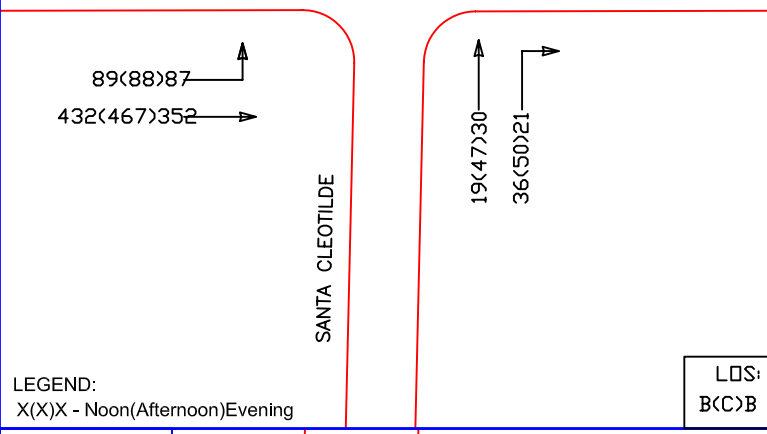
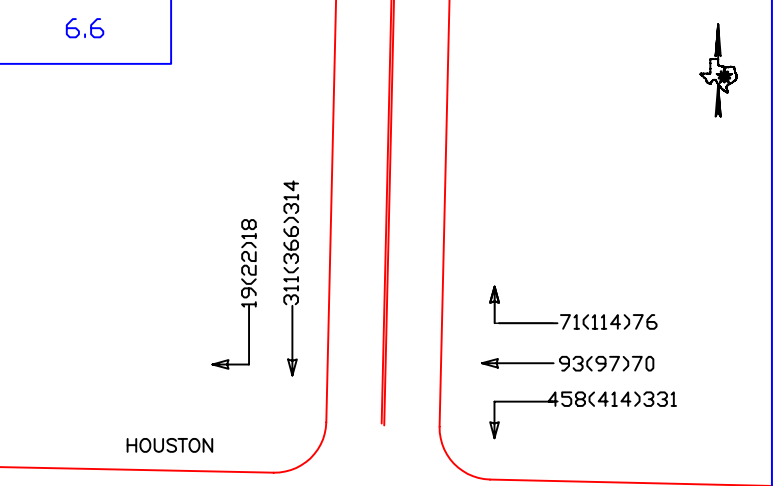
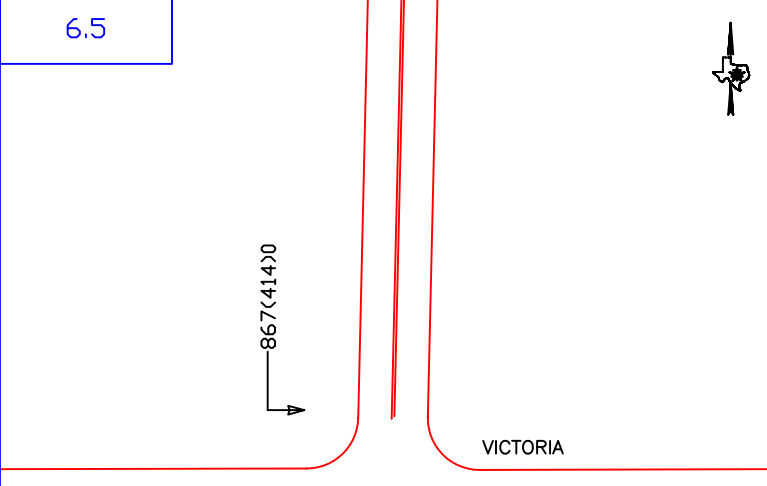
LDS:  
B(B)B

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

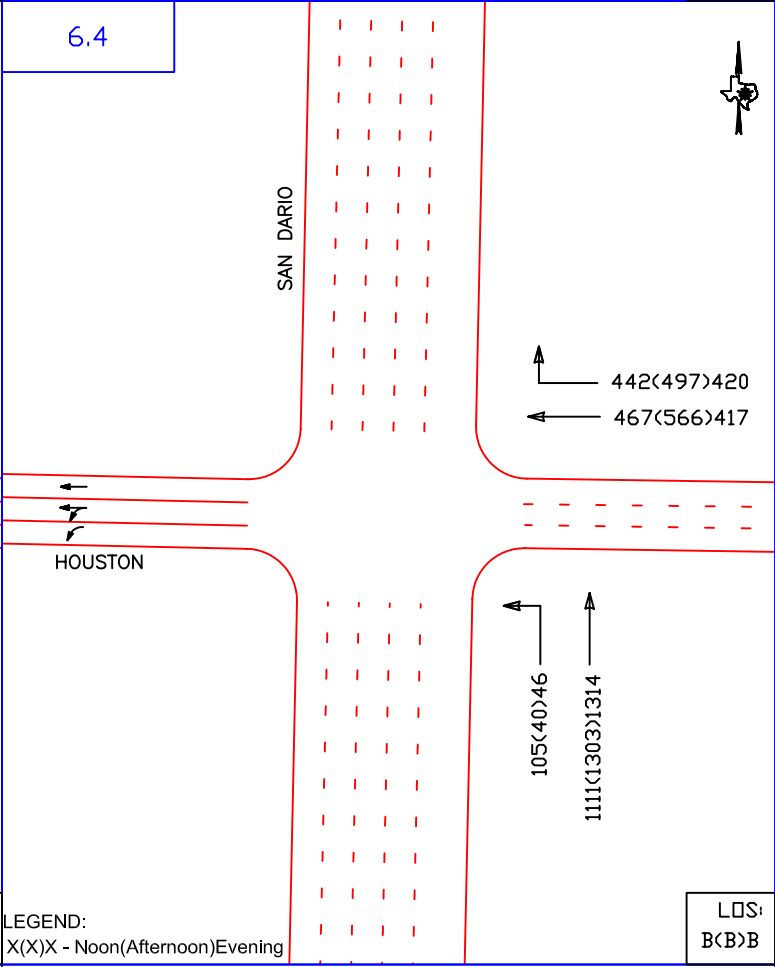
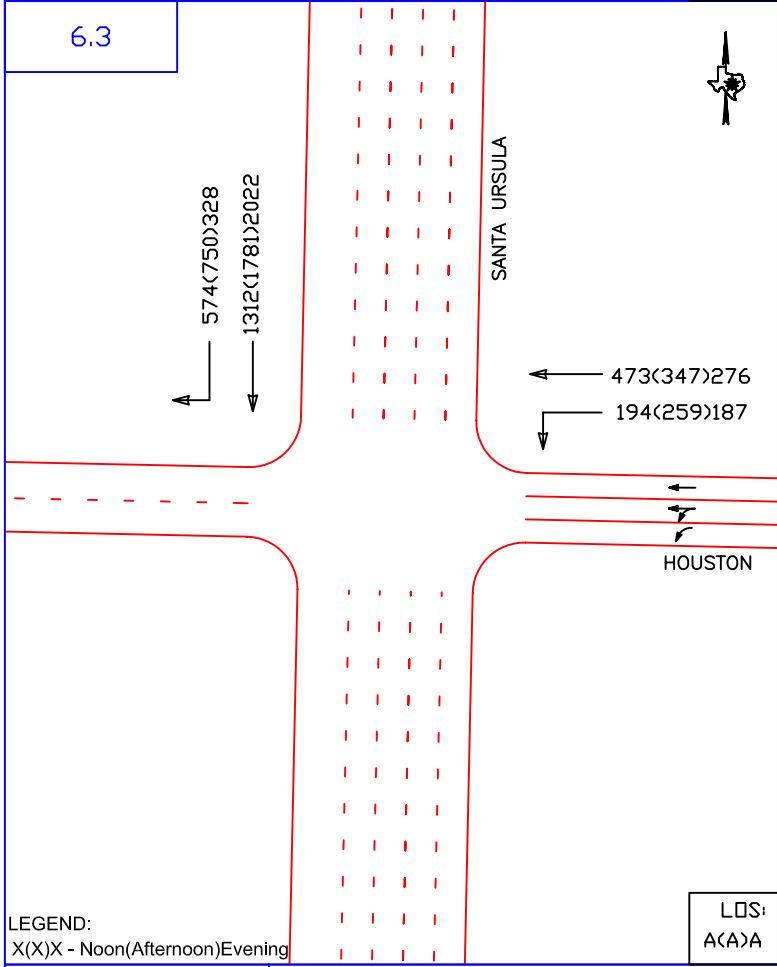
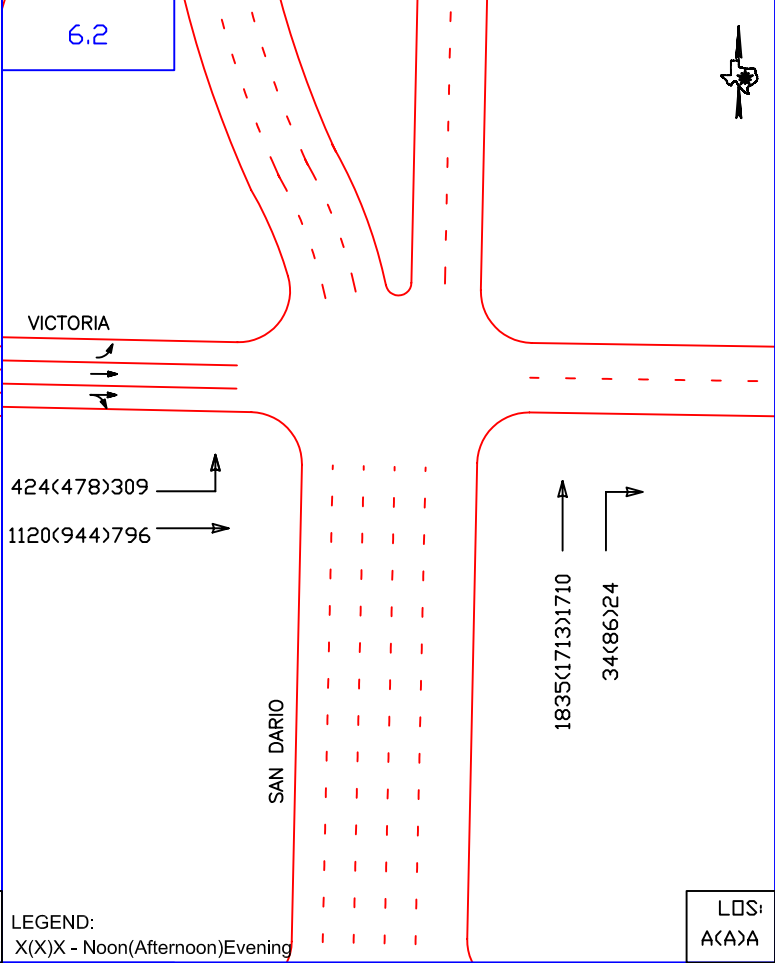
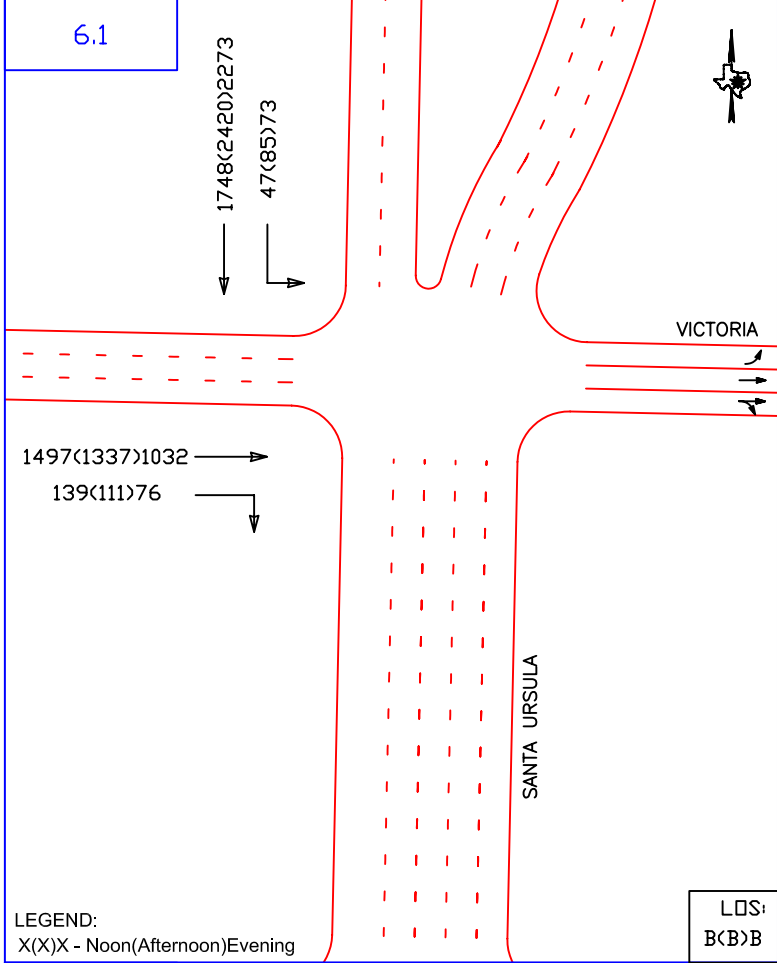
Figures 6.9-6.12  
2008 Total Traffic

6.9 - Santa Maria & Water  
6.10 - Santa Cleotilde & Water  
6.11 - Convent & Zaragoza  
6.12 - Salinas & Zaragoza



Figures 6.5-6.8  
2008 Total Conditions

6.5 - Santa Cleotilde & Victoria  
6.6 - Santa Maria & Houston  
6.7 - Santa Maria & Grant  
6.8 - Santa Maria & Zaragosa



Figures 6.1-6.4  
2008 Total Conditions

6.1 - Santa Ursula & Victoria  
6.2 - San Dario & Victoria  
6.3 - Santa Ursula & Houston  
6.4 - San Dario & Houston



6.13

77(124)102  
6(11)7

SANTA ISABEL

VICTORIA



6.14

35(57)35  
4(23)20

SANTA ISABEL

WATER



452(449)388  
0(0)0

102(101)83  
6(11)3

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening

LDS:  
A(A)A

6.15

GRANT

114(103)86  
42(44)58

CONVENT

68(71)110  
396(340)322

LDS:  
A(A)A

LEGEND:  
X(X)X - Noon(Afternoon)Evening



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Figures 6.13-6.15  
2008 Total Traffic

6.13 - Santa Isabel & Victoria  
6.14 - Santa Isabel & Water  
6.15 - Convent & Grant

Table 4: Forecasted 2008 Total Levels of Service

Intersection	Type of Control	Level of Service		
		Noon	Afternoon	Evening
Convent Street and Grant Street	Signalized	A	A	A
Convent Street and Zaragoza Street	Signalized	A	A	A
Santa Maria Avenue and Grant Street	Signalized	B	B	B
Santa Maria Avenue and Zaragoza Street	Un-Signalized	A	A	A
Santa Maria Avenue and Water Street	Un-Signalized	C	D	C
Santa Cleotilde Avenue and Water Street	Un-Signalized	A	A	A
Salinas Avenue and Zaragoza Street	Signalized	B	B	B
Santa Maria Avenue and Houston Street	Signalized	C	C	C
Santa Isabel Avenue and Water Street	Un-Signalized	A	A	A
Santa Isabel Avenue and Victoria Street	Un-Signalized	A	A	A
Santa Cleotilde Avenue and Victoria Street	Signalized	D*	C*	B*
Santa Ursula Avenue and Houston Street	Signalized	A	A	A
Santa Ursula Avenue and Victoria Street	Signalized	B	B	B
San Dario Avenue and Victoria Street	Signalized	A	A	A
San Dario and Houston Street	Signalized	B	B	B

\* Indicates LOS after proposed changes

## Section Four: Findings and Recommendations

Traffic circulation issues with respect to the Gateway to the Americas project and the development of the El Portal Center have been evaluated in this study. Based on the results of the analyses performed, modifications to the roadway network are proposed to accommodate the re-routing of bridge traffic and the additional traffic generated by the mall.

Santa Maria Avenue is proposed to be converted to one-way southbound operation between Grant Street and Water Street to facilitate bridge access. With this conversion, the intersections along Santa Maria are projected to operate at acceptable levels of service.

Zaragosa Street, currently one-way westbound, is proposed to be converted to one-way eastbound between Santa Maria and Convent. This will help to enforce the desired bridge routing along Santa Maria Avenue. As Convent will be converted to one-way northbound between Zaragosa and Grant, this eastbound conversion will maintain access to Zaragosa between Salinas and Convent. Further, to form a one-way couplet, Grant Street is proposed for conversion to one-way westbound between Convent and Santa Maria. This will allow for a direct route from San Agustin Plaza to access the bridge.

With the re-routing of bridge traffic, Salinas Avenue is expected to experience a reduction in traffic volumes. With this reduction in volume, it is proposed that the number of travel lanes be reduced from two to one between Farragut and Grant. This will reduce the weaving to the left and right as vehicles travel from block to block. North of Grant, sufficient pavement is available to allow a parking lane or a loading zone on each curb and to support one travel lane. This will require signing and striping modifications north of Farragut to designate the right hand lane as a right turn only lane.

An evaluation was performed to determine if opening the Tatangelo Walkway to vehicular traffic would benefit traffic operations within the study area. It was determined that opening the walkway to vehicle traffic would provide little benefit to traffic circulation around El Portal.

The preferred access route from the El Portal area to I-35 is via Santa Isabel Avenue and Victoria Street. Along this path, the intersection of Santa Cleotilde and Victoria is a stop controlled intersection, with northbound and eastbound traffic stopping. To facilitate traffic flow to I-35, a traffic signal is recommended for this intersection.

To provide guidance to and from the El Portal area, trailblazer signing is proposed designating Houston Street and Santa Maria Avenue as the route to access the bridge and Santa Isabel and Victoria as the route to return to I-35. The existing parking on the west curb of Santa Ursula north of Houston Street may be removed to allow for dual right turns onto Houston Street.

These recommendations are illustrated in Figures 7 and 8. Implementation of these recommendations will provide optimal traffic circulation within the study area.

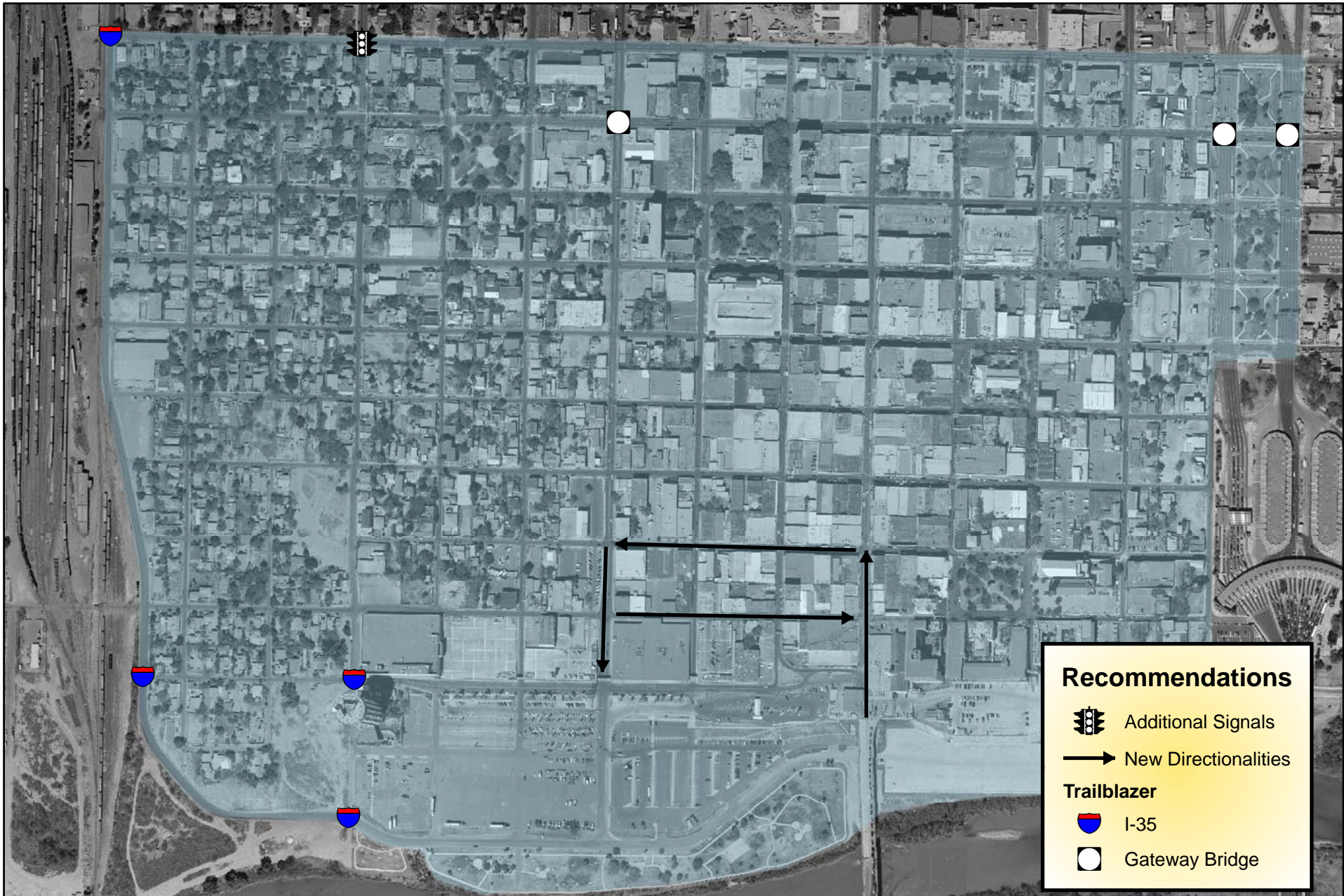
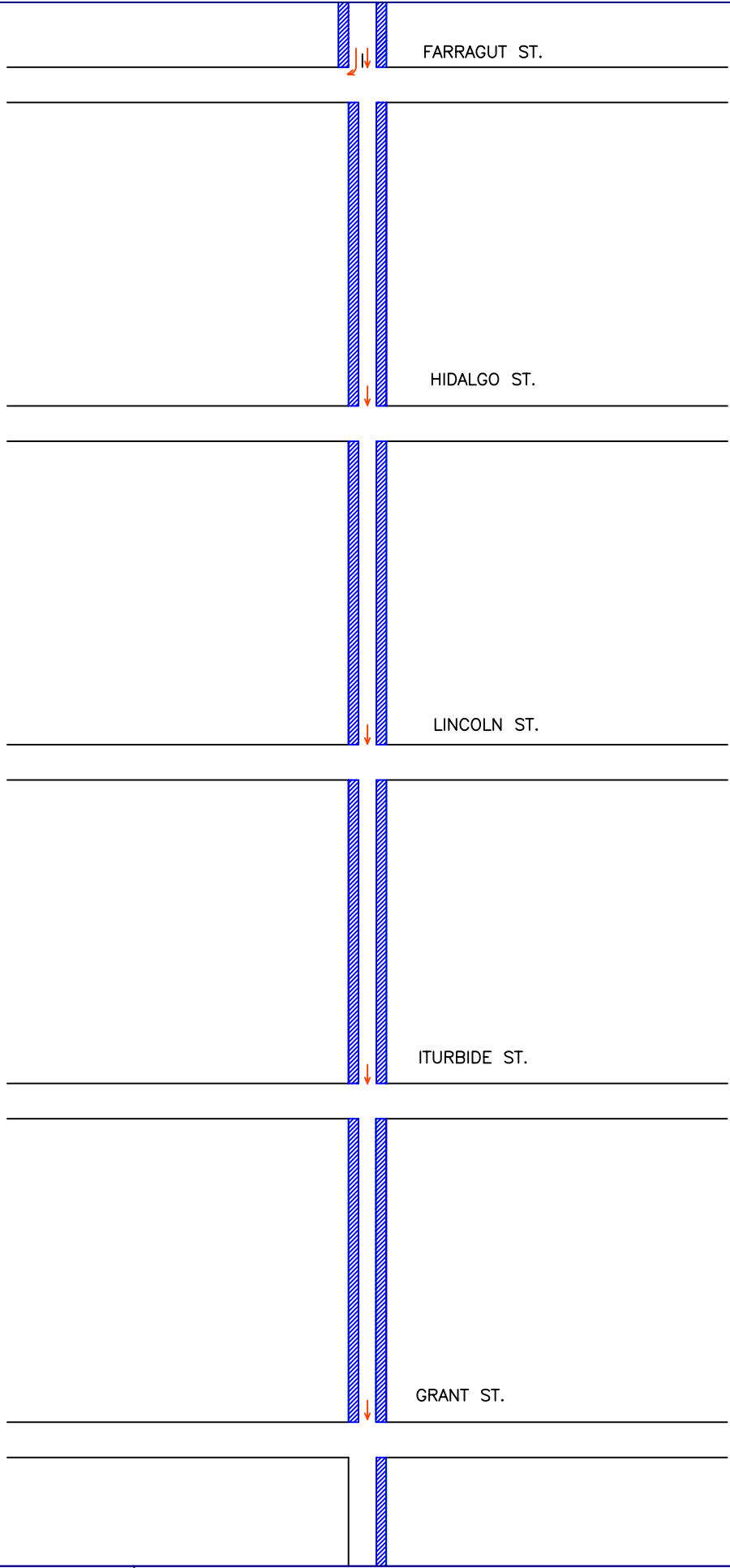


Figure 7. Recommended Improvements



 Parking / Loading Lanes

Figure 8. Salinas Avenue (Proposed)