

Bus Rapid Transit Feasibility Study

November 2011
 Prepared by ARCADIS





Bus Rapid Transit Feasibility Study

Prepared for:
Laredo Urban Transportation Study

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Our Ref.:
GA063941.0001

Date:
November 9th, 2011

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Table of Contents

Executive Summary	1
Scenarios Considered	1
Scenario 1	1
Scenario 2	1
Scenario 3	1
Implementation Phasing	2
Phase 1 (2011 – 2015)	2
Phase 2 (2016 – 2020)	2
Phase 3 (2021 – 2035)	2
Preferred Scenario Cost Estimates	3
Next Steps	5
Introduction	6
Purpose	6
Goals	6
Involvement and Coordination	6
Report Organization	7
Existing Conditions	8
Transit Network	8
Routes	8
Current Service Characteristics	10
Ridership	15
Expansion Plans	19
Roadway Network	19
Area Type and Functional Classification	19
Planned Improvements	22

Table of Contents

Land Use and Socioeconomic Conditions	22
Land Use	22
Existing Land Use	23
Future Land Use	25
Population	27
Employment	27
Future Travel and Transit Demand	27
Travel Demand Model	27
Transit Demand	29
Bus Rapid Transit System Goals and Objectives	30
Performance Measures	30
Identification of Transit Expansion Scenarios	31
Description of Scenarios	31
Transit Centers	31
Baseline Conditions	32
Scenario 1	32
Scenario 2	36
Scenario 3	41
Scenario Performance	45
Preferred Transit Scenario	49
Description of the Preferred Transit Scenario	49
Operating Costs	55
Capital Improvements and Costs	55
Environmental Justice	56
Safety and Security	56
Issues and Opportunities	56

Table of Contents

Implementation Plan	58
Phasing	58
Phase 1 (2011 – 2015)	58
Phase 2 (2016 – 2020)	58
Phase 3 (2021 – 2035)	59
Funding	59
Tables	
Table 1: Existing El Metro Weekday Bus Route Operating Characteristics (2010)	10
Table 2: Existing El Metro Saturday Bus Route Operating Characteristics (2010)	12
Table 3: El Metro Sunday Bus Route Operating Characteristics (2010)	13
Table 4: Existing El Metro Bus Ridership Summary (2009)	16
Table 5: Scenario Performance	45
Table 6: Ridership	47
Figures	
Figure 1: Existing El Metro Bus Routes and Stops (2010)	9
Figure 2: El Metro Weekday Ridership by Bus Stop (2009)	18
Figure 3: Laredo Roadway Network and Functional Classification (2010)	21
Figure 4: Laredo Existing Land Use (2010)	24
Figure 5: Laredo Future Land Use	26
Figure 6: Scenario 1 Modified Bus Routes	35
Figure 7: Scenario 2 Modified Bus Routes	40
Figure 8: Scenario 3 Modified Bus Routes	44
Figure 9: Preferred Transit Scenario Modified Bus Routes	54

Executive Summary

In August of 2010, Laredo Urban Transportation Study (LUTS) contracted with ARCADIS to assess the feasibility of implementing Bus Rapid Transit service (BRT). The study works in conjunction with Laredo's transit development plan and addresses recommendations presented for the city's existing transit system. A review of existing conditions was completed by the project team, focusing on transit, roadway networks, traffic, travel patterns, land use, socioeconomic conditions, and future travel and transit demand. Adding to the information gathered from existing conditions, input from stakeholders and LUTS staff was used to develop three potential BRT scenarios.

Scenarios Considered

As part of the process, goals and objectives for a potential BRT system were developed by LUTS with input from stakeholders. Guided by the goals and objectives, three transit scenarios were developed and examined within the context of the project. The operations plan for each scenario was derived from methodology that modified existing El Metro routes based on suggested new BRT facilities. The scenarios presented are products of testing performed using operation models unique to each scenario, as well as comparison against performance measures.

Scenario 1

This scenario was designed keeping minimum investment in mind. Its primary focus is on consolidation and reconfiguration of existing routes in order to prevent the need for the addition of vehicles and revenue hours.

Scenario 2

Scenario 2 takes the same ideas of consolidation and reconfiguration, but adds BRT service along the Bob Bullock Loop in hopes of improving service to the Laredo Medical Center. The additions make this the medium cost alternative.

Scenario 3

Significant additional BRT service along the Bob Bullock Loop was suggested by this scenario. Elements of consolidation and reconfiguration have been strengthened using this alternative, increasing the frequency of service presented by Scenario 1.

After careful consideration and examination of the three scenarios, the Preferred Transit Scenario was determined using combined elements of Scenarios 2 & 3 and stakeholder input. The implementation steps of the Preferred Transit Scenario are phased as follows.

Implementation Phasing

The **Preferred Transit Scenario** has been broken into three phases for implementation purposes.

Phase 1 (2011 – 2015)

- Acquire land and build the proposed **North Transit Center**.
- Modify Route 2A and consolidate the common portions of routes 2A and 2B.
- Consolidate the common segments of routes 12A, 12B, 16, and 17 and implement express bus along I-35.
- Acquire a suitable site for the **Southwest Transit Center**.

Phase 2 (2016 – 2020)

- Build the proposed **Southwest Transit Center**.
- Consolidate common portions of routes 9, 14, and 20 along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) as the south BRT.
- Explore options for enhancing the I-35 BRT, such as running buses on the shoulders during peak hours or partnering with other agencies to build HOV/transit lanes on I-35 (none are currently in the Metropolitan Transportation Plan (MTP))
- Implement signal priority at critical intersections along the south BRT.
- Begin acquiring right of way and building queue jumper lanes at critical intersections along the south BRT.
- Explore making one lane of US 83 (Chihuahua/Guadalupe Streets) bus only during peak hours when MTP projects R05 (add one lane to Chihuahua Street) and R06 (add one lane to Guadalupe Street) are completed.
- Implement increased service further out FM 1472 (Mines Road) to serve growth areas in the northern areas of the City of Laredo.
- Acquire a suitable site for the **East West Transit Center**.

Phase 3 (2021 – 2035)

- Build the **East West Transit Center**
- Implement the Loop 20 (Bob Bullock Loop) BRT

- Build a dedicated BRT lane or managed lane to better accommodate buses on I-35
- Explore adding dedicated BRT lanes on US-83
- Begin working on the BRT Loop South (Future) that continues south on US 83 (South Zapata Highway) from the proposed Southwest Transit Center and returns along Cuatro Vientos.

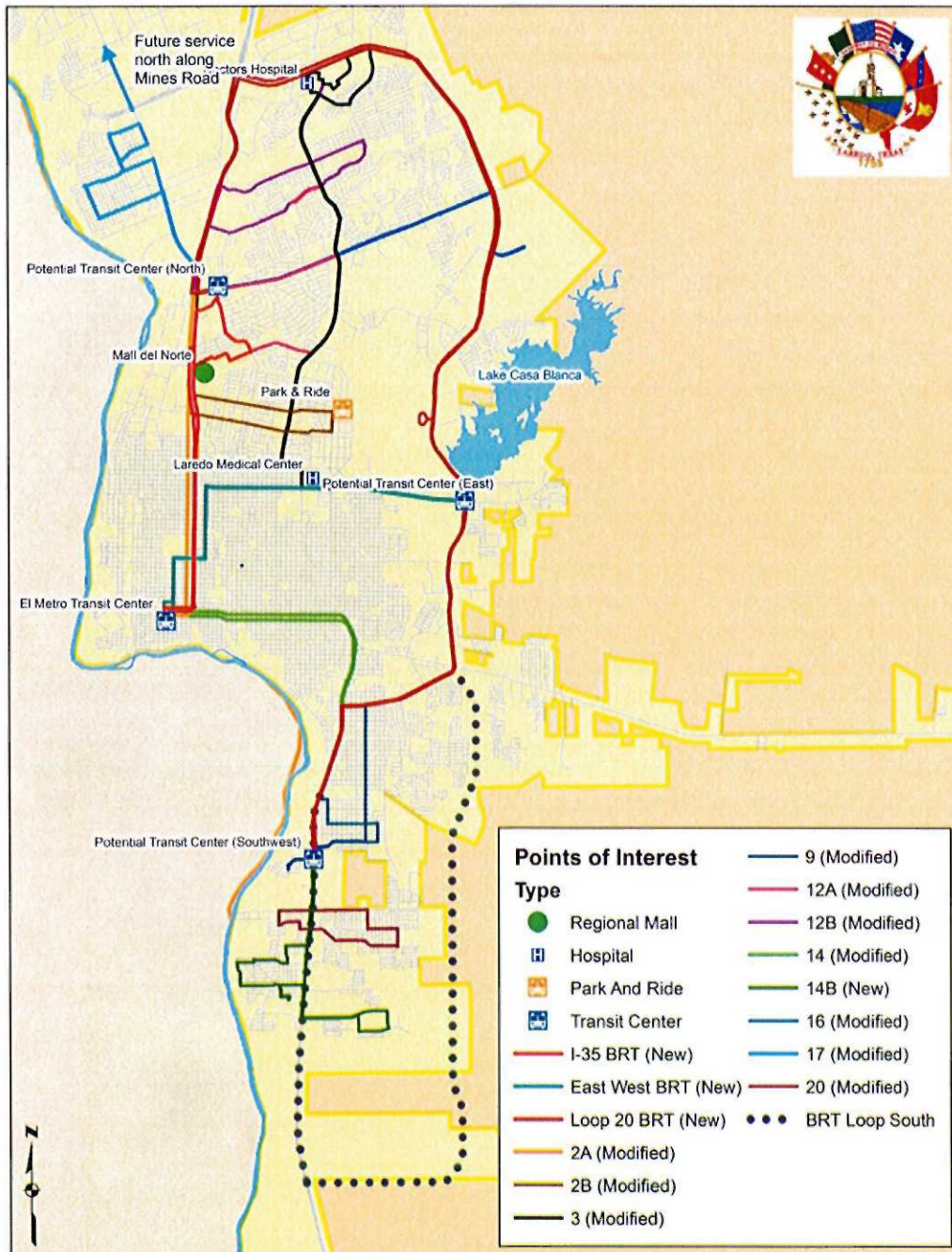
Preferred Scenario Cost Estimates

Annual transit system operating costs will increase slightly when Phase 1 is implemented and more substantially at build out of the Preferred Scenario as significant new service is added and coverage increased. With the implementation of Phase 1 (2011 – 2015), system operating costs are projected to increase by \$35,000 per year. When the Preferred Scenario is completely built out, system operating costs will increase by approximately \$2.2 million annually.

Capital costs were estimated for a high end BRT system with exclusive bus lanes in key corridors and a low cost system with transit improvements at critical intersections, but no dedicated lanes. As roadways become congested over time, dedicated lanes for the BRT system should be constructed. The estimated capital cost for Phase 1 is \$7 million. Phase 3 includes a recommendation to construct bus only lanes on I-35, which are estimated to cost an additional \$17.9 million. The system capital cost at build out is \$17.4 million, with no dedicated bus lanes or \$106 million, with all recommended bus only lanes.

The Preferred Transit Scenario is illustrated on the following page.

Map of the Preferred Transit Scenario



Next Steps

Moving forward, it will be necessary to incorporate the preferred scenario into Laredo's Metropolitan Transportation Plan. Phase 1, as described above, will need to be included in the Transportation Improvement Plan. Additional steps include building a northern transit center and consolidating existing bus routes into a BRT running in mixed traffic along I-35.

El Metro's new BRT routes and transit centers will require appropriate naming that will lead to easy identification in the community and foster a sense of local cohesion. Naming and facility design should also play an important part in the marketing strategy for the new transit features.

Introduction

The Laredo Bus Rapid Transit (BRT) Feasibility Study was developed under the direction of the Laredo Urban Transportation Study (LUTS) with collaboration from El Metro and stakeholders including Texas DOT, the City of Laredo, U.S. Border Patrol, Webb County Rural Transit, and the South Texas Development Council. The Laredo BRT Feasibility Study outlines short and long term strategies and local bus route modifications for implementing bus rapid transit in the City of Laredo, Texas, to address current needs and future system expansion to meet the needs of a growing area. This study developed and tested three different potential BRT scenarios. Based on scenario performance and the input of stakeholders, a preferred scenario for implementation was developed.

Purpose

The primary purpose of this study is to determine the feasibility of BRT in the City of Laredo and identify strategies for implementing the service. The City of Laredo has been growing and as development continues, pressures on the transportation system are increasing. Previous studies including the Metropolitan Transportation Plan (MTP) and Transit Development Plan (TDP), as well as the San Bernardo Renovation and Restoration Project have identified the potential need for BRT in Laredo and recommended further study.

Goals

Laredo Urban Transportation Study seeks to evaluate the feasibility of BRT in the City of Laredo and develop implementation strategies. To assist in developing and evaluating scenarios, specific goals for the potential BRT system were defined by LUTS and through stakeholder outreach. The BRT system goals are as follows:

- **GOAL:** Cost effectively improve the transit system
- **GOAL:** Enhance safety and security
- **GOAL:** Increase economic vitality

Involvement and Coordination

A stakeholder group was organized and met twice during the study to provide input and direction. Invitations were sent to a long list of entities from the MPO database, and entities that choose to participate included representatives from the City, MPO, El Metro, Texas DOT, Laredo Police, Webb County and US Border Patrol. The general

public was also invited to participate in these meetings. In addition, project team personnel displayed information, distributed flyers and spoke with El Metro riders at the El Metro transfer center. The input received through this outreach and coordination was helpful in understanding travel needs and in identifying potential solutions. Each of these activities is documented in separate meeting reports.

Report Organization

This report includes the following sections:

- Existing Conditions - provides an overview of the current El Metro transit system and a baseline for comparison with the proposed BRT system
- Goals and Objectives – description of BRT system goals, objectives and performance measures
- Identification of Transit Expansion Scenarios – includes a detailed description of each scenario
- Preferred Transit Scenario – detailed description of the preferred scenario as well as high level operating and capital cost estimates
- Implementation Plan – includes a discussion of system phasing and potential funding sources

Existing Conditions

This section provides an overview of the existing transit and roadway networks, traffic and travel patterns, land use and socioeconomic conditions, and future travel and transit demand in the Laredo BRT study area. This analysis creates a baseline against which the potential benefits of proposed BRT projects can be assessed. This analysis also provides a basis for developing the BRT scenarios.

Transit Network

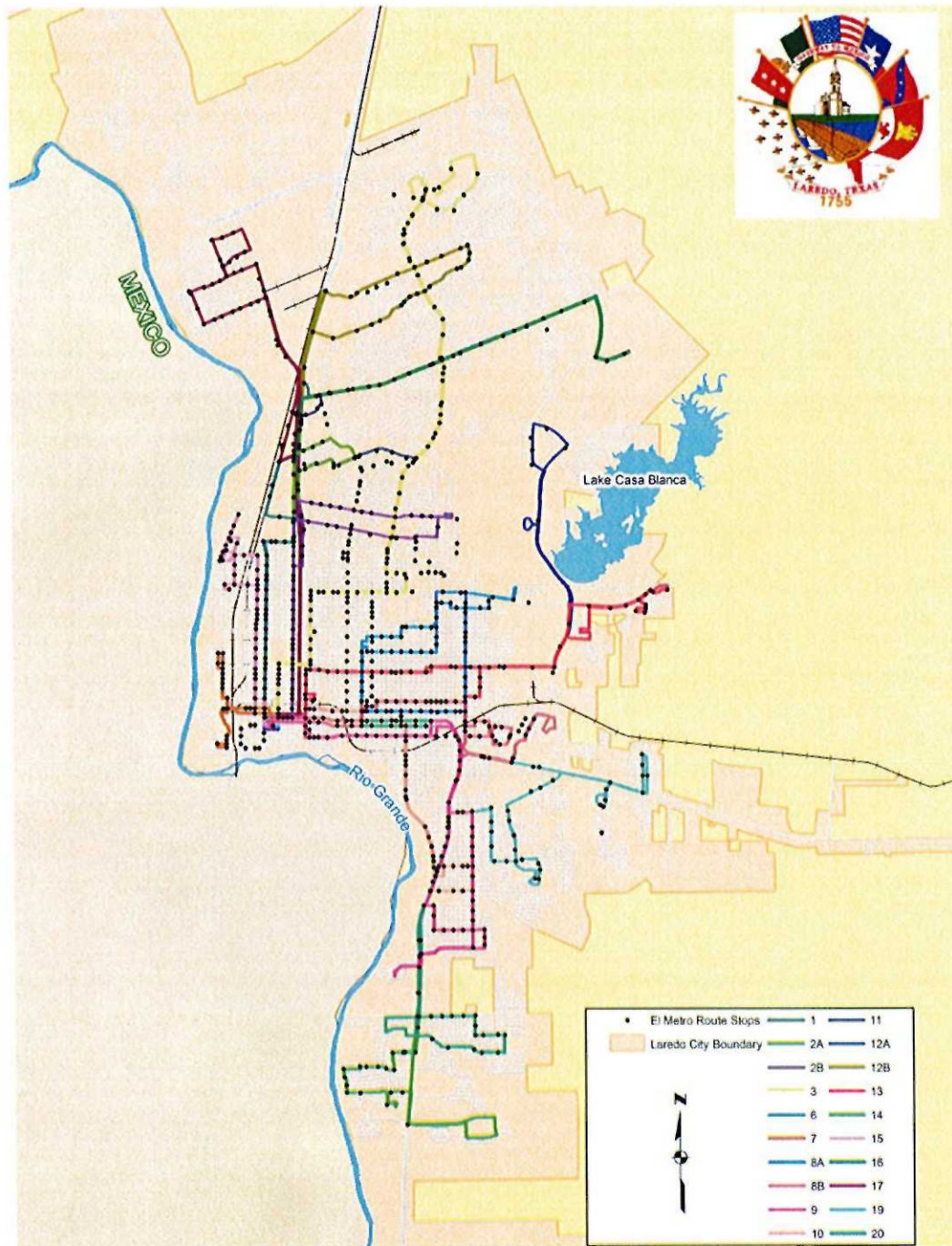
El Metro is the primary transit provider in Laredo and operates a fleet of buses, demand response vans, and trolleys. The service area of El Metro covers the City of Laredo. This section provides an overview of existing El Metro bus routes, service characteristics, ridership, and an overview of plans for expansion.

Areas outside the city limits are serviced by El Aguila and are not within the scope of the BRT Feasibility Study. However, during a public meeting, a stakeholder pointed out that El Aguila currently interfaces with El Metro at the downtown transit center. New transit centers constructed as part of the BRT recommendations may provide more convenient transfer points between El Metro and El Aguila and are discussed in more detail later.

Routes

Currently, El Metro operates 22 bus routes with scheduled service and El Lift paratransit service. Figure 1: Existing El Metro Bus Routes and Stops (2010) shows the existing routes and stops.

Figure 1: Existing El Metro Bus Routes and Stops (2010)



Current Service Characteristics

El Metro provides bus service seven days a week. Weekday service is generally provided from 6:00 a.m. to 10:00 p.m., with start and end times of individual routes varying. Headways range from 20 to 85 minutes, depending on the route. Generally, headways are shorter during the peak periods and longer during the mid-day and evening. Weekday bus service is detailed in Table 1: Existing El Metro Weekday Bus Route Operating Characteristics (2010). A total of 22 bus routes operate Monday through Saturday, while 21 routes are available on Sunday. Some Saturday routes do not run in the evening.

Table 1: Existing El Metro Weekday Bus Route Operating Characteristics (2010)

Weekday							
Route		Headway (in Minutes)				Hours of Operation	
Number	Name	A.M. Peak	Mid-Day	P.M. Peak	Evening	Start	End
1	Santa Maria	20	20	20	20 - 55	6:25 a.m.	9:55 p.m.
2A	San Bernardo	30	30	30	30 - 60	6:00 a.m.	9:55 p.m.
2B	San Bernardo	30	30	30	30 - 60	6:15 a.m.	9:40 p.m.
3	Convent	45	45	45	45	6:30 a.m.	10:20 p.m.
4	Springfield	37 - 38	37 - 38	37 - 38	37 - 38	6:05 a.m.	9:37 p.m.
5	Tilden	70	70	70	70	6:00 a.m.	9:40 p.m.
6	Cedar	30	60	30	60	6:30 a.m.	8:25 p.m.
7	LCC	30 - 60	30 - 60	30 - 60	30 - 60	6:45 a.m.	9:10 p.m.
8A	Guadalupe/Lane	70	70	70	70	7:00 a.m.	8:55 p.m.

Weekday							
Route		Headway (in Minutes)				Hours of Operation	
Number	Name	A.M. Peak	Mid-Day	P.M. Peak	Evening	Start	End
8B	Guadalupe/Villa del Sol	70	70	70	70	7:30 a.m.	7:05 p.m.
9	Market	45	45	45	45 - 90	6:30 a.m.	10:10 p.m.
10	Corpus Christi	30	30	30	30	6:30 a.m.	9:55 p.m.
11	Gustavus/ LEC	75	75	75	75	7:00 a.m.	9:45 p.m.
12A	Del Mar Express	30	60	30	60	7:30 a.m.	7:55 p.m.
12B	Express/ Shiloh	30	60	30	60	7:00 a.m.	7:25 p.m.
13	Heritage Park	75	75	75	n/s	7:00 a.m.	6:50 p.m.
14	Santa Rita	90	90	90	90	6:15 a.m.	9:55 p.m.
15	Main/ Riverside	60	60	60	60	6:30 a.m.	8:55 p.m.
16	TAMIU	30	60	30	60	7:00 a.m.	9:55 p.m.
17	Mines Road	37	75	37	75	7:00 a.m.	8:40 p.m.
19	Santo Niño	70	70	70	70	6:25 a.m.	8:55 p.m.
20	Los Angeles	85	85	85	85	6:10 a.m.	9:05 p.m.

Table 2: Existing El Metro Saturday Bus Route Operating Characteristics (2010) summarizes service characteristics for El Metro routes providing Saturday service.

Table 2: Existing El Metro Saturday Bus Route Operating Characteristics (2010)

Saturday					
Route		Headway (in Minutes)		Hours of Operation	
Number	Name	Day	Evening	Start	End
1	Santa Maria	20	20 - 55	6:25 a.m.	9:55 p.m.
2A	San Bernardo	30	30 - 60	6:00 a.m.	9:55 p.m.
2B	San Bernardo	30	30 - 60	6:15 a.m.	9:40 p.m.
3	Convent	45	45	6:30 a.m.	10:20 p.m.
4	Springfield	37 - 38	37 - 38	6:05 a.m.	9:37 p.m.
5	Tilden	70	70	6:00 a.m.	9:40 p.m.
6	Cedar	60	60	6:30 a.m.	8:25 p.m.
7	LCC	30 - 60	30 - 60	6:45 a.m.	9:10 p.m.
8A	Guadalupe/Lane	70	70	7:00 a.m.	8:55 p.m.
8B	Guadalupe/Villa del Sol	70	70	7:30 a.m.	7:05 p.m.
9	Market	45	45	6:30 a.m.	10:10 p.m.
10	Corpus Christi	30	30	6:30 a.m.	9:55 p.m.
11	Gustavus/ LEC	75	75	7:00 a.m.	9:45 p.m.
12A	Del Mar Express	60	60	7:30 a.m.	7:55 p.m.
12B	Express/ Shiloh	n/s	n/s	7:00 a.m.	7:25 p.m.

Saturday					
Route		Headway (in Minutes)		Hours of Operation	
Number	Name	Day	Evening	Start	End
13	Heritage Park	75	n/s	7:00 a.m.	6:50 p.m.
14	Santa Rita	90	90	6:15 a.m.	9:55 p.m.
15	Main/ Riverside	60	60	6:30 a.m.	8:55 p.m.
16	TAMIU	60	60	7:00 a.m.	9:55 p.m.
17	Mines Road	75	75	7:00 a.m.	8:40 p.m.
19	Santo Niño	70	70	6:25 a.m.	8:55 p.m.
20	Los Angeles	85	n/s	6:10 a.m.	9:05 p.m.

Operating characteristics for El Metro Sunday bus services are summarized in Table 3: El Metro Sunday Bus Route Operating Characteristics (2010).

Table 3: El Metro Sunday Bus Route Operating Characteristics (2010)

Sunday					
Route		Headway (in Minutes)		Hours of Operation	
Number	Name	Day	Evening	Start	End
1	Santa Maria	40 - 80	40	8:35 a.m.	8:22 p.m.

Sunday					
Route		Headway (in Minutes)		Hours of Operation	
Number	Name	Day	Evening	Start	End
2A	San Bernardo	60	60	7:30 a.m.	8:25 p.m.
2B	San Bernardo	60	60	8:00 a.m.	6:55 p.m.
3	Convent	60	60	8:30 a.m.	8:20 p.m.
4	Springfield	75	75	8:35 a.m.	8:22 p.m.
5	Tilden	70	70	8:20 a.m.	8:30 p.m.
6	Cedar	60	60	9:30 a.m.	7:55 p.m.
7	LCC	30 - 60	30 - 60	7:45 a.m.	7:40 p.m.
8A	Guadalupe/Lane	70	70	8:45 a.m.	6:35 p.m.
8B	Guadalupe/Villa del Sol	n/s	n/s	n/s	n/s
9	Market	90	90	7:15 a.m.	8:35 p.m.
10	Corpus Christi	60	60	8:00 a.m.	8:25 p.m.
11	Gustavus/ LEC	85	85	7:40 a.m.	6:50 p.m.
12A	Del Mar Express	60	60	11:15 a.m.	7:55 p.m.
12B	Express/ Shiloh	n/s	n/s	8:15 a.m.	6:10 p.m.
13	Heritage Park	85	85	7:40 a.m.	6:50 p.m.

Sunday					
Route		Headway (in Minutes)		Hours of Operation	
Number	Name	Day	Evening	Start	End
14	Santa Rita	90	90	7:00 a.m.	8:25 p.m.
15	Main/ Riverside	60	60	11:00 a.m.	5:55 p.m.
16	TAMIU	60	n/s	12:00 p.m.	6:55 p.m.
17	Mines Road	75	n/s	12:00 p.m.	7:25 p.m.
19	Santo Niño	70	n/s	11:05 a.m.	7:10 p.m.
20	Los Angeles	90	90	7:00 a.m.	8:25 p.m.

Ridership

Five routes that each carry over 1,000 weekday riders account for 40 percent of system ridership. These include Routes 1 (Santa Maria), 2A & 2B (San Bernardo), 3 (Convent), and 9 (Market). On Saturdays, these same routes account for 49 percent of system ridership, even though only 1 (Santa Maria) and 2A (San Bernardo) carry over 1,000 riders.

Ridership on El Metro routes on weekdays varies widely, from 251 boardings on Route 14 (Santa Rita) to 1,517 on Route 2A (San Bernardo). Saturday ridership exhibits an even wider range of variation, from 119 boardings on Route 13 (Heritage Park) to 1,796 on Route 2A (San Bernardo). Sunday ridership is substantially lower on most routes, although Route 1 (Santa Maria) still carries over 1,000 riders. Table 4: Existing El Metro Bus Ridership Summary (2009) summarizes weekday, Saturday, and Sunday El Metro fixed route ridership. Figure 2: El Metro Weekday Ridership by Bus Stop (2009) illustrates weekday ridership by stop.

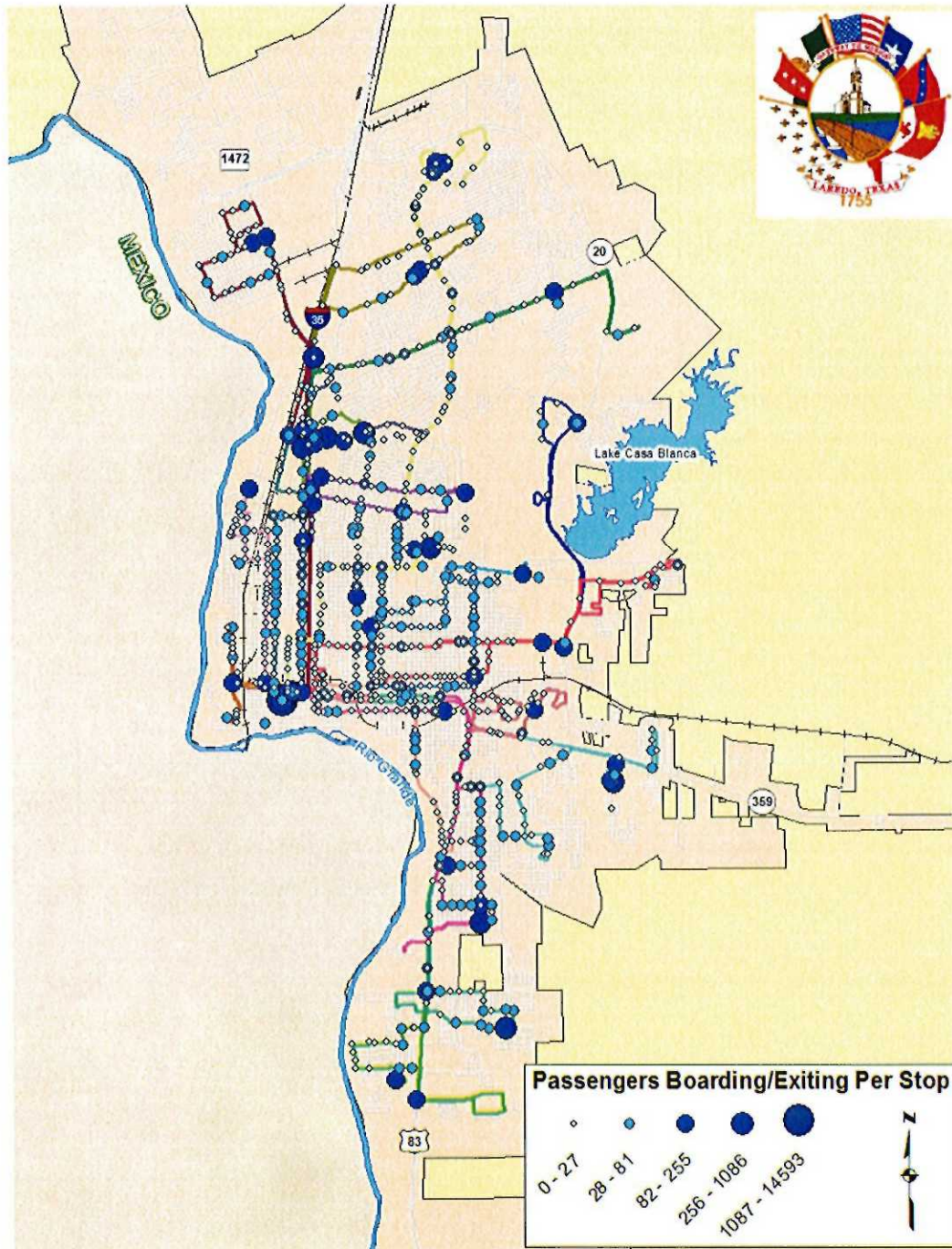
Table 4: Existing El Metro Bus Ridership Summary (2009)

Route		Boardings		
Number	Name	Weekday	Saturday	Sunday
1	Santa Maria	1,492	1,710	1,239
2A	San Bernardo	1,517	1,796	755
2B	San Bernardo	1,099	916	n/d
3	Convent	1,096	811	219
4	Springfield	933	667	325
5	Tilden	323	279	171
6	Cedar	963	475	310
7	LCC	282	175	98
8A	Guadalupe/Lane	547	374	331
8B	Guadalupe/Villa del Sol	283	214	n/s
9	Market	1,053	920	506
10	Corpus Christi	899	640	279
11	Gustavus/ LEC	333	304	179
12A	Del Mar Express	767	592	195
12B	Express/ Shiloh	791	277	n/d
13	Heritage Park	452	119	275

Laredo Urban Transportation Study
Bus Rapid Transit Feasibility Study

Route		Boardings		
Number	Name	Weekday	Saturday	Sunday
14	Santa Rita	251	258	460
15	Main/ Riverside	326	282	129
16	TAMIU	311	449	71
17	Mines Road	513	430	129
19	Santo Niño	681	439	206
20	Los Angeles	585	531	n/d

Figure 2: El Metro Weekday Ridership by Bus Stop (2009)



Expansion Plans

The following two projects are included in the 2011 – 2014 Transportation Improvement Program (TIP):

- South Laredo Hub: new hub and park and ride facility, \$3 million
- North Laredo Transit Hub – Bus Maintenance Facility: \$27.5 million

The San Bernardo Linear Hub is included in the MTP and will complement the recommendations of the *San Bernardo Avenue Renovation and Restoration Project*, dated 2008, along San Bernardo Avenue.

Roadway Network

An understanding of the roadway network in Laredo is essential to determine the best facilities for potential BRT corridors as well as proposed local bus route modifications.

Area Type and Functional Classification

Roadways are classified based on area type and functional classification. Area type is either urban or rural, with different design standards required for each. The area type for all roads in the study area is urban. Functional classification provides a hierarchical ranking based on the mobility and accessibility a street provides to users. Higher functional classifications provide more mobility and less access. Conversely, lower functional classifications provide less mobility and excellent access to adjacent land uses. Following are descriptions of functional classes, from the highest functional class to the lowest.

- Interstates are grade-separated facilities that provide the highest level of mobility, but no access to adjacent land uses and controlled access to the intersecting road network only at interchanges. Freeways and expressways provide similar mobility and access, but generally connect regional destinations and not multiple states. Examples in Laredo include I-35.
- Frontage roads run parallel to interstates or other controlled access roadways and provide excellent access to adjacent, usually commercial, land uses.
- Principal arterials carry traffic between regional activity centers, such as a central business district and bedroom communities. These facilities may have at-grade intersections and driveways. Examples in Laredo include US 83 and San Bernardo Avenue.

- Minor arterials also carry regional traffic, but have comparatively more at-grade intersections and driveways. North Meadows Avenue is an example in Laredo.
- Collector streets are the link between local roads and arterials. They have numerous at-grade intersections and driveways. An example in Laredo is International Boulevard.
- Local roads provide excellent access to land at the expense of mobility. Subdivision streets with driveways for each single-family home are a good example of local roads.

Generally, collector streets and higher functional classification are more appropriate for bus transit as the physical design of the streets can more easily accommodate larger vehicles.

Figure 3: Laredo Roadway Network and Functional Classification (2010) is a map illustrating the functional classification of the Laredo roadway network.

Figure 3: Laredo Roadway Network and Functional Classification (2010)



Planned Improvements

The following issues were identified in the MTP and solutions are likely to affect the proposed BRT positively:

- Upgrade Loop 20 to a freeway with grade separations at major intersections – positive impact on bus operations on both Loop 20 and the intersecting corridors
- Provide grade separations at railroads – reduction in bus delay and improved schedule reliability.
- Increase the number of main thoroughfares and arterials to distribute traffic over more roadways, especially in South Laredo – relieve pressure on US 83, improve bus operations, enhance bus routing flexibility
- New international bridge to accommodate increasing cross border traffic – coordinate with new transfer centers, as 40 percent of passenger journeys begin or end in Mexico.

Land Use and Socioeconomic Conditions

As transit riders are using the system to access housing, employment, retail, and services, an understanding of existing as well as predicted future land use and population and employment concentrations is necessary for designing potential BRT scenarios. This section describes existing and future land use as well as existing and forecasted population and employment.

Land Use

Although elements of historic land use patterns can still be seen in downtown Laredo, with a grid street system contributing to a compact and dense urban center, the areas extending away from the city center are more suburban in nature with single family homes and strip commercial developments along major roads. During the 1960s, design standards in suburban development caused a shift from the use of a grid street system to curvilinear streets in residential areas. Most residential development for the area has been within the Bob Bullock loop, with areas north of the loop being designated for industrial use. However, residential pockets can be found northwest of the loop adjacent to Mines Road as well as sizeable residential areas to the south and east of the city center along Highway 83 and Highway 359.

Existing Land Use

Beginning at the El Metro Transit Center, commercial uses extend to the south and east. A distinct corridor of commercial use extends north along San Bernardo and the I-35 frontage road to a commercial node at Mall del Norte. North of International Boulevard, land uses along I-35 change to industrial. West of the Mall del Norte commercial node, Old Santa Maria Road divides industrial uses to the west from commercial uses surrounding Mall del Norte.

Public/Institutional uses extend to the north of the El Metro Transit Center, followed by single family all the way to the Mall del Norte commercial node and industrial along Old Santa Maria Road. Generally west of Santa Rita Avenue industrial land use stretches to Madison Street where it becomes single family until Vidaurri Avenue. Here, the Old Santa Maria Road industrial zone starts and slightly further north the Mall del Norte commercial node begins.

To the east of I-35, land use is primarily single family with the exception of Mall del Norte, the surrounding commercial development, and the airport just inside of the Bob Bullock Loop.

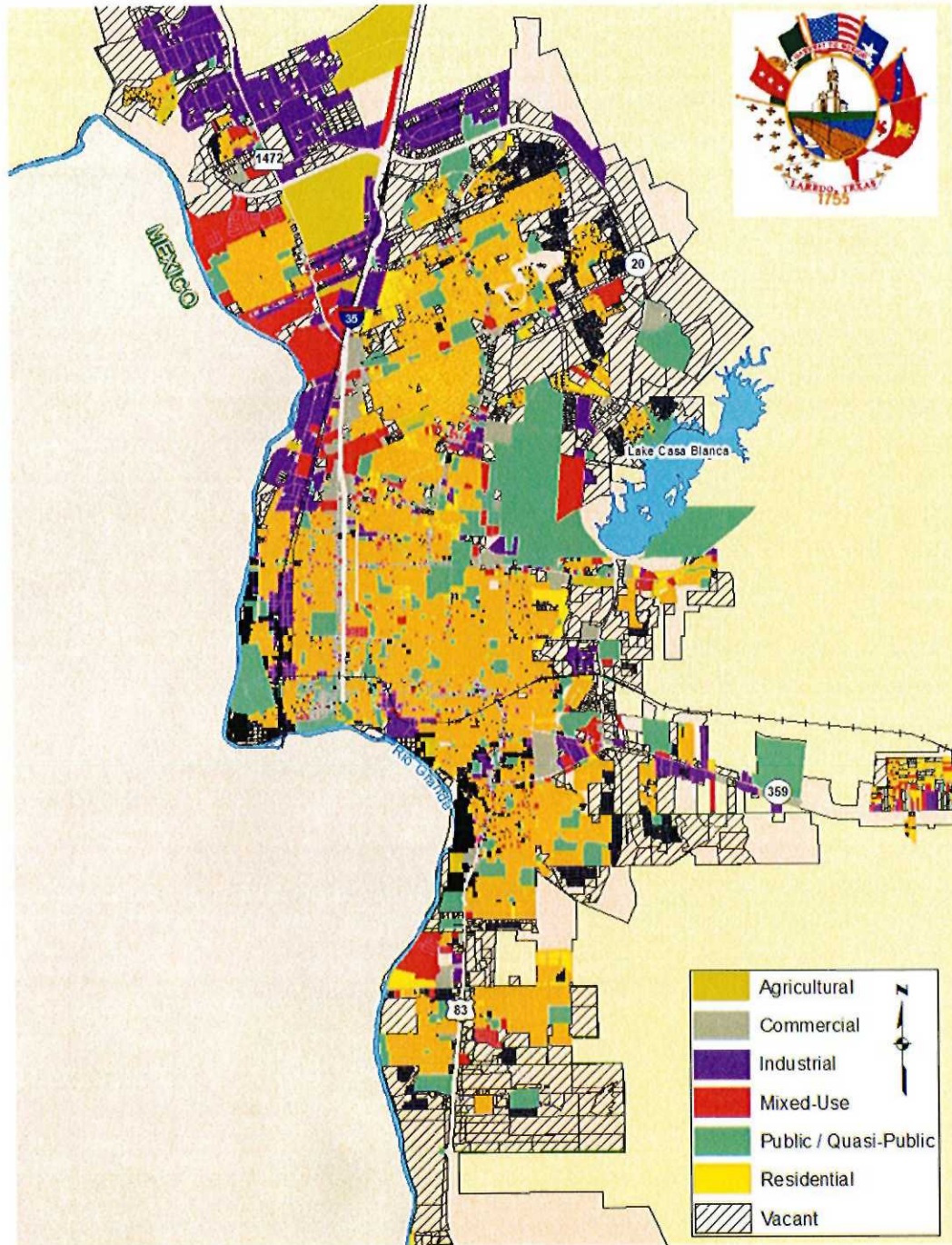
Other commercial corridors inside the study area can be found on Guadalupe Street, Saunders Street, Calton Road, and McPherson Road.

Industrial pockets exist just north of the Bob Bullock Loop, with one industrial area well north of the loop along I-35.

Multi-family residential use areas are far less in number than single-family areas, and are primarily situated inside the loop, east of I 35. Montgomery Street, Ponderosa Drive, Dogwood Avenue, and Monarch Drive all have multi-family use areas.

Figure 4: Laredo Existing Land Use (2010) graphically represents current Laredo land uses.

Figure 4: Laredo Existing Land Use (2010)



Future Land Use

Commercial uses cover areas southeast and east of the El Metro transit center. Land use to the north along San Bernardo and the I-35 frontage road to Mall del Norte remains commercial.

Along the east side of I-35, north of International Boulevard to the Bob Bullock Loop, the future land use is commercial, in comparison to existing which is industrial and vacant. West of Mall del Norte commercial node, Santa Maria Avenue divides industrial uses to the west from commercial uses surrounding Mall del Norte.

The public/institutional designation north of the El Metro transit center remains, as does low density residential to Mall del Norte. Commercial along Santa Maria Avenue from Sanchez Street to Chicago Street is a change from mostly single family. Generally west of Santa Rita Avenue is industrial to Madison Street, where it becomes single family until the end of Vidaurri Avenue. The Old Santa Maria Road industrial zone starts at Vidaurri and Marklel, while slightly further north the Mall del Norte a commercial node begins.

East of I-35 is primarily low density residential with the exception of Mall del Norte and the surrounding development. Significant areas of medium density residential use have been planned outside of the loop.

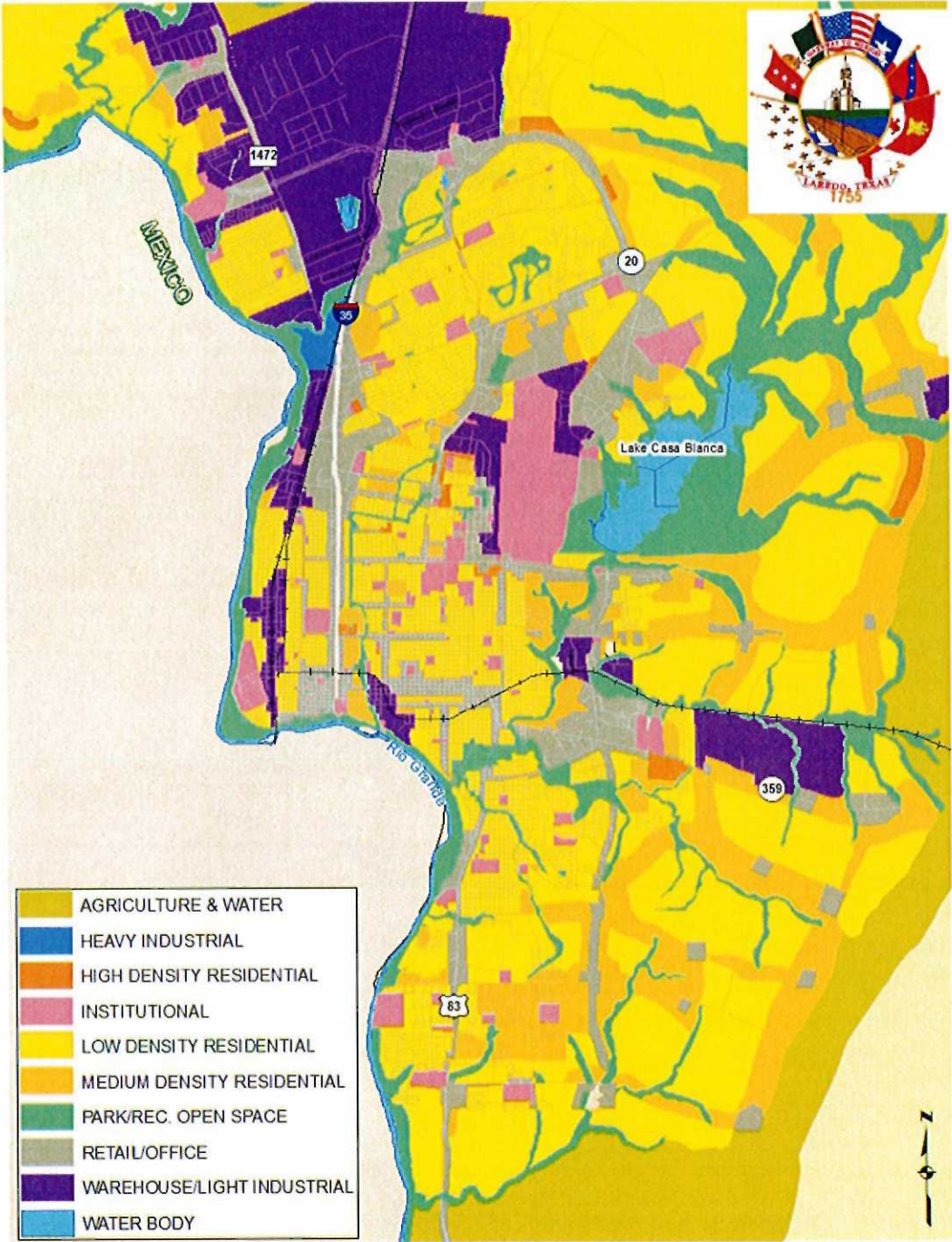
The commercial zone along Guadalupe Street sees major expansion, north all the way to Corpus Christi Street and from Maryland Avenue to Arkansas Avenue.

Other commercial corridors include: Clark Boulevard (new), Saunders Street, McPherson Road, Calton Road, Hillside Road, and Bob Bullock Loop.

The area north of the Bob Bullock Loop remains industrial.

Figure 5: Laredo Future Land Use graphically represents proposed Laredo future land uses.

Figure 5: Laredo Future Land Use



Population

Laredo's position along the I-35 corridor and adjacency to the Mexican border have been significant contributing factors to the region's population growth. 2008 population estimates for the Laredo MPO planning area place the number at 220,962 persons, up from 122,899 in 1990. Substantial growth is projected, pushing population estimates to 485,206 persons by 2035. The Laredo MPO arrived at this estimate using the 0.5 Migration Scenario, developed by the Texas state data center. This Scenario assumes rates of net migration one-half of those experienced in the 1990s.

Employment

Employment in Laredo, largely driven by the Trade, Transportation, and Utilities sector, as well as the Government and Education & Health Services sectors, is concentrated within the urban core and along major arterial facilities. High concentrations of employment can also be found in the area's industrial parks. As of 2008, the Laredo MPO put employment numbers at 95,961 jobs. However, future employment for the area is expected to more than double by 2035, with a projection of 202,100 jobs.

Future Travel and Transit Demand

An understanding of future travel and transit demand is important to determine the type of BRT facilities and level of investment in the BRT system needed to provide an acceptable level of service for transit riders. To determine future conditions, this study leverages the prior travel demand modeling work performed in the *2010 – 2035 Metropolitan Transportation Plan (MTP)*, dated December 2009, as well as data collected by the *Laredo Transit Development Plan (TDP)*, dated September 2009.

Travel Demand Model

When buses are in mixed flow, traffic congestion along potential BRT routes will negatively impact the system. As congestion increases in severity, the scale and cost of BRT improvements needed to avoid congestion in a corridor also increases. This section provides a brief overview of current and future traffic conditions along potential BRT routes, focusing on general conditions rather than specific links.

A level of service analysis for both existing conditions in 2008 and future conditions using the 2030 existing plus committed (E+C) network was performed as part of the 2009 MTP. Assigning letter grades is a common way of measuring the LOS being

provided by a roadway facility. While the letter grades are roughly equivalent to student report cards, with LOS F being failing and LOS A being the best, achieving a LOS above C is not cost-effective because transportation investments are expensive and the excess capacity associated with LOS A and B is unused. Finally, as a result of cost constraints, LOS D is often considered an acceptable LOS in urban areas.

Facilities operating at LOS E or F in 2008:

- I-35 from Clark Boulevard to just north of Del Mar Boulevard
- US 83 from I-35 to Sierra Vista Boulevard
- Meadow Avenue from US 83 (Guadalupe/Chihuahua Street) to US 83 (South Zapata Highway)
- Segments of US 59 (Saunders Street) from I-35 to North Arkansas Avenue

Facilities Operating at LOS C or D in 2008:

- I-35 from US 83 (Guadalupe/Chihuahua Street) to Clark Boulevard and from FM 1472 (Mines Road) to the north of Shiloh Road
- Loop 20 (Bob Bullock Loop) from Boomtown Street to Sinatra Parkway
- Segments of US 59 (Saunders Street) from I-35 to North Arkansas Avenue
- Clark Boulevard from I-35 to North Meadow Avenue

Facilities forecasted to operate at LOS E or F in 2035 (E+C):

- I-35 from Clark Boulevard to the northern city limit
- US 83 from I-35 to the southern city limit
- Meadow Avenue from US 83 (South Zapata Highway) to US 59 (East Saunders Street)
- SH 359 from US 83 (North Zapata Highway) to just west of the eastern city limit
- Segments of US 59 (Saunders Street) from I-35 to North Arkansas Avenue
- All of Loop 20 (Bob Bullock Loop)
- Cuatro Vientos
- FM 1472 (Mines Road) from I-35 to El Pico Road
- US 59 (Saunders Street) from I-35 to east of the city limit
- The entire length of Clark Boulevard
- McPherson from US 59 (East Saunders Street) to Shiloh Drive
- Del Mar Boulevard from I-35 to the eastern city limit
- Jacaman Road from McPherson to Loop 20 (Bob Bullock Loop)

Transit Demand

As part of the TDP effort in 2008, a ridership survey was conducted that obtained detailed passenger travel data by route. Results from this ridership survey are a critical piece of data that was used in the BRT scenario development process as well as potential route consolidation suggestions. The following ridership survey findings that are especially relevant to this BRT study include the following:

- Survey respondents indicated that improved bus stops, including a more sheltered environment is desirable.
- More frequent service was a common request of respondents.
- Improved schedule adherence.
- Reduction in route deviation.
- 45 percent of riders interviewed were making trips to or from Mexico.

Additional relevant findings and recommendations obtained from the TDP include:

- A linear hub transit structure along San Bernardo with a transit center at Mall del Norte is recommended.
- Consolidate the current routes along San Bernardo and I-35 to two, with the local route remaining on San Bernardo and an express route on the interstate.
- Examine service expansion opportunities to extend service to urban and suburban new development and implement where appropriate.
- Longer routes are generally not competitive, especially when they experience low ridership. Convert longer routes with low ridership to feeder routes linked to main routes at new transit centers.
- To grow transit market share, a move toward system designs that allow for new and different passenger movements without abandoning existing routes.

As part of the TDP, a desire line map was generated based on the passenger interviews conducted at the Laredo Transit Center. While most of the desire lines indicated are served by existing routes, there were a few north/south desire lines substantially east of downtown.

Bus Rapid Transit System Goals and Objectives

Goals are desired results that an entity envisions, plans and commits to achieve. Objectives are measurable milestones related to specific goals. Performance measures show progress towards meeting individual objectives.

Based on input from LUTS staff, stakeholders, and goals articulated in previous planning efforts, such as the MTP and TDP, the following goals and objectives were formulated:

- **GOAL:** Cost effectively improve the transit system
 - **Objective:** Improve service reliability
 - **Objective:** Provide more frequent service
 - **Objective:** Expand the service area
 - **Objective:** Increase viable affordable travel choices
- **GOAL:** Enhance safety and security
 - **Objective:** Provide a security presence at transit facilities
 - **Objective:** Enhance safety through enforcement, transit system employee training, and public education
- **GOAL:** Economic Vitality
 - **Objective:** Connect people to jobs
 - **Objective:** Connect retail and people
 - **Objective:** Connect people to services

Performance Measures

The following performance measures were identified based on the BRT goals and objectives:

1. Ridership (Boardings & Alightings) by Route
2. Headway (in Minutes)
3. Vehicle Revenue Hours (Annual)
4. Vehicle Revenue Miles (Annual)
5. Trip Times
6. BRT Characteristics
7. Existing Infrastructure
8. Change in Bus Routes
9. Reduction in Buses Through Downtown
10. Annual Passenger Miles
11. Annual Unlinked Trips

Identification of Transit Expansion Scenarios

Three transit scenarios were identified for testing based on the goals and objectives outlined above. For each scenario, a basic operations plan was developed that included modifying various existing local bus routes to interface with the proposed new BRT facilities. An operations model was developed for each scenario and performance measures were calculated. This section contains a description of each scenario and a discussion of the performance measure result.

Description of Scenarios

A description of each scenario is provided along with a list of bus routes with recommended consolidation or modifications as part of the scenarios. The intent of the scenario testing and bus route modifications is to assess the feasibility of each scenario and compare them against each other and the baseline conditions. The recommended changes are intended to test the feasibility of a BRT system and are not a detailed operating plan.

Transit Centers

Several of the scenarios share the same potential transit center locations. While the approximate location of these centers has been determined for the purposes of this BRT study, the actual location may vary within roughly ½ mile due to a number of factors in the land acquisition process that are unknown at this time.

The existing El Metro Downtown Transit Center is a key component of all the scenarios and will remain an important part of the transit system.

The potential North Transit Center is the same in all three scenarios, as well as the Preferred Transit Scenario. The TDP recommended a northern transit center at Mall del Norte. Operationally and as a destination this is an excellent recommendation. However, Mall del Norte is private property and the owners are not currently interested in having a transit center on their property. As such, an alternate location for the potential North Transit Center near the intersection of Del Mar Boulevard and Springfield Avenue is recommended.

A potential Southwest Transit Center is also the same in all three scenarios, but is located further south in the Preferred Transit Scenario. A location near of US 83 (South Zapata Highway) and Palo Blanco Street was tested in all three scenarios.

In Scenarios 2 and 3, a potential East West Transit Center near Loop 20 (Bob Bullock Loop) and US 59 (East Saunders Street) was tested.

Baseline Conditions

An operations model was built that included all existing transit routes that would be modified or eliminated as part of the three scenarios. The performance measures were then calculated for these routes to provide a basis for evaluating the scenarios against each other and existing conditions.

Scenario 1

Scenario 1 was designed to be a low cost alternative and relies on consolidation and reconfiguration of existing routes to increase service frequency without substantially increasing the need for vehicles or revenue hours. This scenario is aimed at enhancing the existing system. Scenario 1 is made up of the following components:

- **BRT on I-35:** from the existing Downtown Transit Center travel north to a potential North Transit Center located near Del Mar Boulevard and Springfield Avenue. In the short term, the proposed BRT would operate as express bus in mixed flow on I-35. Future traffic conditions will require either the BRT run in an HOV lane with carpool traffic or a dedicated lane of its own.
- **BRT South on US 83:** from the existing Downtown Transit Center travel east along US 83 (Chihuahua Street) and then continue south along US 83 (Zapata Highway) to a proposed Southwest Transit Center in the vicinity of US 83 (South Zapata Highway) and Palo Blanco Street. Current traffic conditions justify signal priority along US 83 (Guadalupe Street/Chihuahua Street and Zapata Highway) and queue jumper lanes at critical intersections. Congestion is predicted to be worse along this corridor in the future, extending to the southern city limit and a bus only lane may be required to achieve acceptable running times.
- **Super Local:** a two way looping route along FM 1472 (Mines Road), Loop 20 (Bob Bullock Loop), McPherson Avenue, and Shiloh Drive that returns to the proposed northern transfer center using the I-35 access road. This would operate as limited stop local service and distribute transfers from the proposed northern transfer center.
- **BRT Loop South (Future):** the proposed BRT would continue down US 83 (South Zapata Highway) from the proposed Southwest Transit Center to Cuatro Vientos and then follow Cuatro Vientos north to SH 359. At SH 359 and US 83 (North Zapata Highway) the following routing options exist:

- Continue following SH 359 to the existing Downtown Transit Center;
or
- Turn south on US 83 (South Zapata Highway) and return to the proposed Southwest Transit Center.

Because the BRT Loop South (Future) is long range enhancement, service on this route was not included as part of the operational modeling.

The following provides an overview of high level bus route modifications to determine the feasibility of this scenario. A detailed operations plan making use of strategies, such as interlining, will be needed to get the most efficiency possible out of the revised system.

As recommended in the TDP, the modified bus routes feature substantial consolidation. Route 2A was modified slightly, but continues to service San Bernardo Avenue. The common portion of routes 2A and 2B will be consolidated. Similarly the common segments of routes 12A, 12B, 16, and 17 will be consolidated as the I-35 BRT.

South of the downtown transit center, common portions of routes 9, 14, and 20 will be consolidated along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) as the south BRT. The proposed Southwest Transit Center will serve as a distribution point for the consolidated routes.

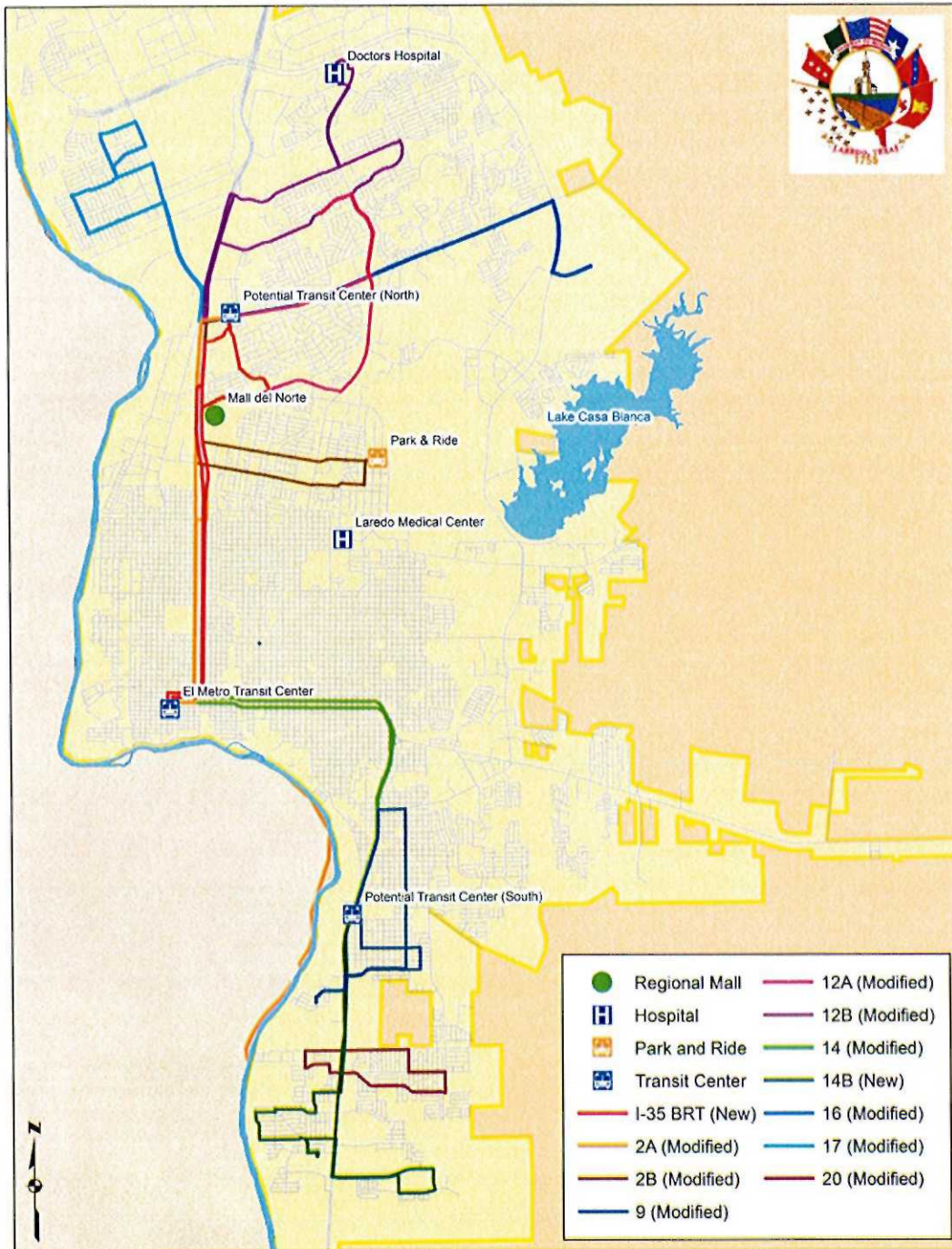
Existing bus routes that are recommended for consolidation and modification as part of Scenario 1 include the following:

- **I-35 BRT (New Route):** runs along I-35 from the Downtown Transit Center to Mall del Norte then takes Calle del Norte Road to Springfield Avenue where it turns north to Del Mar Boulevard. At Del Mar Boulevard, it loops through the potential North Transit Center and then continues on I-35 southbound and returns to the Downtown Transit Center.
- **2A:** Instead of running on Mann Road to return to I-35, route 2A would be modified to continue up Springfield Avenue to Del Mar Boulevard where it would access the proposed North Transit Center. Route 2A would exit the transit center and return to San Bernardo Avenue on Del Mar Boulevard. Route 2A would continue to serve Mall del Norte.
- **2B:** The existing segment of route 2B from the Downtown Transit Center to Calton Road would be eliminated. The modified route would be based out of the potential North Transit Center and would use the I-35 access roads to

travel south to its existing configuration along Hillside and Calton Roads.
Route 2B would continue to serve the mall.

- **9:** The existing route 9 segment from the Downtown Transit Center to Loop 20 (Bob Bullock Loop) would be truncated. The modified route 9 would be based out of the proposed Southwest Transit Center and follow the existing configuration.
- **12A:** Route 12A from the Downtown Transit Center to Mall del Norte would be eliminated. The existing segments along Calle Del Norte Road, McPherson Avenue, International Boulevard, Del Mar Boulevard, Village Boulevard, and the I-35 access road would remain. Route 12A would be based out of the proposed North Transit Center. Mall del Norte would continue to be served by route 12A.
- **12B:** The existing route 12B segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 12B would operate out of the potential North Transit Center. Route 12B would no longer serve the mall
- **14:** Route 14 would be split into two routes. The existing Route 14 would be truncated at the potential Southwest Transit Center and run along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) to the Downtown Transit Center.
- **14B (New Route):** Route 14B follows the existing Route 14, but starts from the proposed Southwest Transit Center instead of the Downtown Transit Center.
- **16:** The existing Route 16 segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 16 would run along Del Mar Boulevard and Loop 20 (Bob Bullock Loop) and continue to serve Texas A&M International University (TAMIU).
- **17:** Route 17 would terminate at the proposed North Transit Center and the segment between the Downtown Transit Center and along Old Santa Maria Road would be eliminated. Route 17 could be modified slightly to pick up the service on Old Santa Maria Road that route 17 would no longer provide.
- **20:** The existing route 20 segment from the Downtown Transit Center to Palo Blanco Street would be truncated. The modified route 20 would be based out of the proposed Southwest Transit Center and follow the existing configuration.

Figure 6: Scenario 1 Modified Bus Routes



Scenario 2

Scenario 2 was designed to be a medium cost alternative and includes substantial additional BRT service along Loop 20 (Bob Bullock Loop), which builds on the ideas for consolidation and reconfiguration of existing routes to increase service frequency expressed in Scenario 1. This scenario will enhance the existing system, improve service to Laredo Medical Center, and provide substantial new service to an area of the city that has seen recent growth and will continue to develop. Scenario 2 is made up of the following components:

- **BRT on I-35:** from the existing Downtown Transit Center north to a transit center located near Del Mar Boulevard and Springfield Avenue. In the short term, the proposed BRT would operate as express bus in mixed flow on I-35. Future traffic conditions will require either the BRT run in an HOV lane with carpool traffic or a dedicated lane of its own.
- **BRT along Loop 20 (Bob Bullock Loop):** runs from Doctors Hospital to the proposed Southwest Transit Center. The BRT would operate as express service in mixed flow in the near term as the corridor is currently relatively free flowing. By 2035, the entire corridor will be congested and signal priority and queue jumper lanes or a dedicated bus lane may be required.
- **BRT East:** runs west along US 59 (Saunders Street) from a potential East West Transit Center near Loop 20 (Bob Bullock Loop) and US 59 (East Saunders Street) to San Francisco Avenue where it turns south and continues to Park Street, where it turns east to Convent Avenue. At Convent Avenue, turns south again and terminates at the downtown transfer center. This route will require signal priority and possibly queue jumper lanes at critical intersections in the near term and likely a bus only lane in the long term, as segments are currently operating at a failing level of service and US 59 (Saunders Street) will be at LOS E or F in the future.
- **Super Local:** a two way looping route along FM 1472 (Mines Road), Loop 20 (Bob Bullock Loop), McPherson Avenue, and Shiloh Drive that returns to the proposed northern transfer center using the I-35 access road. This would operate as limited stop local service and distribute transfers from the proposed northern transfer center.
- **BRT Loop South (Future):** the proposed BRT would continue down US 83 (South Zapata Highway) from the proposed Southwest Transit Center to Cuatro Vientos and then follow Cuatro Vientos north to SH 359. At SH 359 and US 83 (North Zapata Highway) Turn south on US 83 (South Zapata Highway) and return to the proposed **Southwest Transit Center**.

As it will be a long range enhancement, service on the BRT Loop South (Future) route was not included as part of the operational modeling. Although not part of the initial scenario, when modifying the bus routes, a determination was made to include the following BRT route in Scenario 2 because routes 9, 14, and 20 are easily consolidated:

- **BRT South on US 83:** from the existing downtown El Metro Transit Center travel east along US 83 (Chihuahua Street) and then continue south along US 83 (Zapata Highway) to a proposed Southwest Transit Center in the vicinity of US 83 (South Zapata Highway) and Palo Blanco Street. Current traffic conditions justify signal priority along US 83 (Guadalupe Street/Chihuahua Street and Zapata Highway) and queue jumper lanes at critical intersections. Congestion is predicted to be worse along this corridor in the future, extending to the southern city limit and a bus only lane may be required to achieve acceptable running times.

The following provides an overview of high level bus route modifications to determine the feasibility of this scenario. A detailed operations plan will be needed to get the most efficiency possible out of the revised system.

As recommended in the TDP, the modified routes feature substantial consolidation. Route 2A was modified slightly, but continues to service San Bernardo Avenue. The common portion of routes 2A and 2B will be consolidated. Similarly the common segments of routes 12A, 12B, 16, and 17 will be consolidated as the I-35 BRT.

South of the downtown transit center, common portions of routes 9, 14, and 20 will be consolidated along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) as the south BRT. The proposed Southwest Transit Center will serve as a distribution point for the consolidated routes.

Existing bus routes that are proposed to be consolidated and modified as part of Scenario 2 include the following:

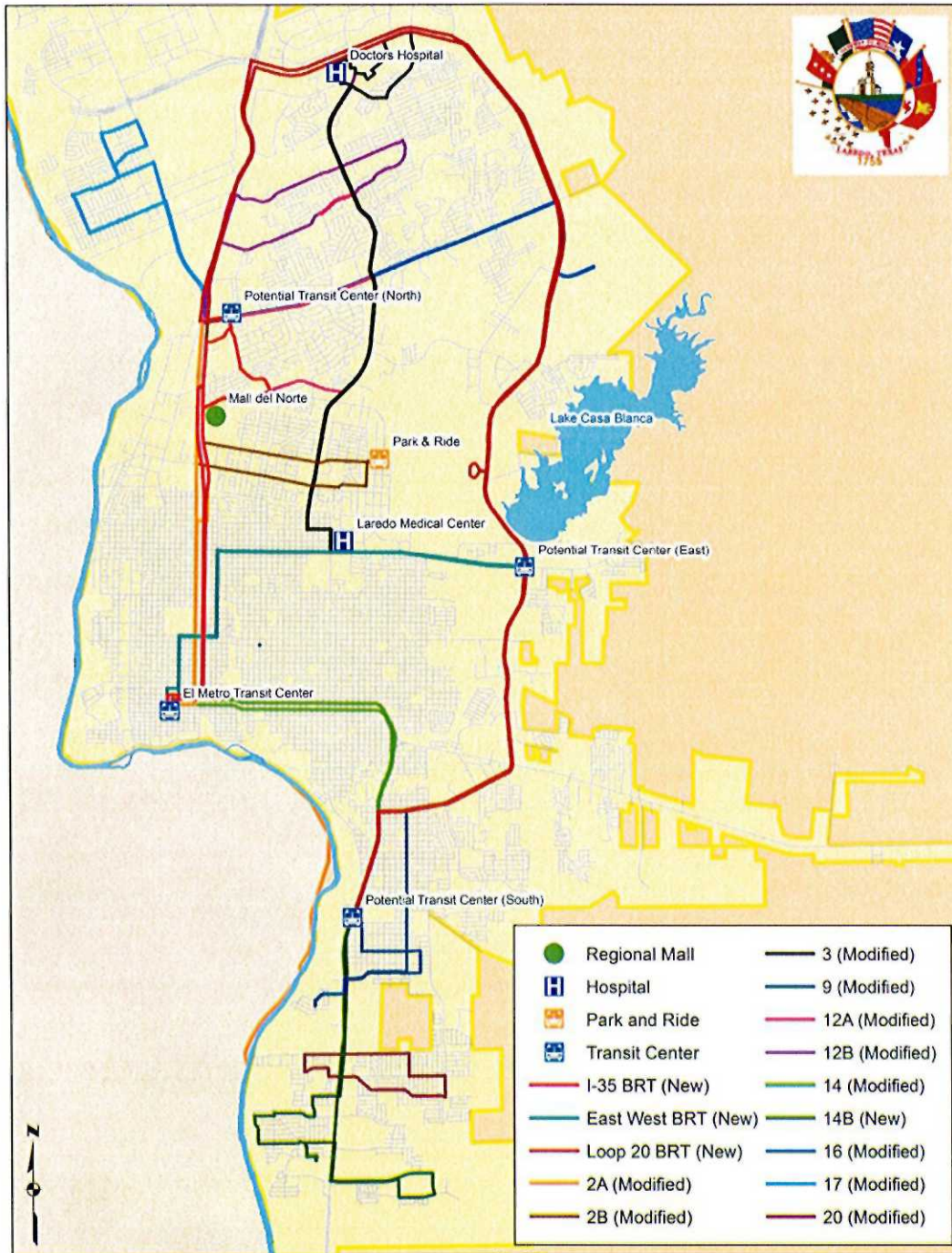
- **I-35 BRT (New Route):** runs along I-35 from the Downtown Transit Center to Mall del Norte then takes Calle del Norte Road to Springfield Avenue where it turns north to Del Mar Boulevard. At Del Mar Boulevard, it loops through the potential North Transit Center and then continues on I-35 southbound and returns to the Downtown Transit Center.

- **BRT along Loop 20 (Bob Bullock Loop):** runs from Doctors Hospital to the proposed Southwest Transit Center along Loop 20 (Bob Bullock Loop) and US 83 (Zapata Highway).
- **BRT East West (New Route):** runs west along US 59 (Saunders Street) from a potential East West Transit Center near Loop 20 (Bob Bullock Loop) and US 59 (East Saunders Street) to San Francisco Avenue where it turns south and continues to Park Street, where it turns east to Convent Avenue. At Convent Avenue, turns south again and terminates at the downtown transfer center. Serves Laredo Medical Center.
- **2A:** Instead of running on Mann Road to return to I-35, route 2A would be modified to continue up Springfield Avenue to Del Mar Boulevard where it would access the proposed North Transit Center. Route 2A would exit the transit center and return to San Bernardo Avenue on Del Mar Boulevard. Route 2A would continue to serve Mall del Norte.
- **2B:** The existing segment of route 2B from the Downtown Transfer Center to Calton Road would be eliminated. The modified route would be based out of the potential North Transit Center and would use the I-35 access roads to travel south to its existing configuration along Hillside and Calton Roads. Route 2B would continue to serve the mall.
- **3:** Laredo Medical Center will be the starting point for Route 3, which will then follow its existing routing up McPherson Road to Doctors Hospital. The segment between the Downtown Transit Center and Laredo Medical Center will be eliminated. Riders wishing to continue downtown will need to transfer to the BRT East West.
- **9:** The existing route 9 segment from the Downtown Transit Center to Loop 20 (Bob Bullock Loop) would be truncated. The modified route 9 would be based out of the proposed Southwest Transit Center and follow the existing configuration.
- **11:** Route 11 will be replaced by the BRT along Loop 20 (Bob Bullock Loop), described above.
- **12A:** Route 12A from the Downtown Transit Center to Mall del Norte would be eliminated. The existing segments along Calle Del Norte Road, McPherson Avenue, International Boulevard, Del Mar Boulevard, Village Boulevard, and the I-35 access road would remain. Route 12A would be based out of the proposed North Transit Center. Mall del Norte would continue to be served by route 12A.
- **12B:** The existing route 12B segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 12B would operate out of the potential North Transit Center. Route 12B would no longer serve the mall.
- **14:** Route 14 would be split into two routes. The existing Route 14 would be truncated at the potential Southwest Transit Center and run along US 83

(Guadalupe/Chihuahua Streets/Zapata Highway) to the Downtown Transit Center.

- **14B (New Route):** Route 14B follows the existing Route 14, but starts from the proposed Southwest Transit Center instead of the Downtown Transit Center.
- **16:** The existing Route 16 segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 16 would run along Del Mar Boulevard and Loop 20 (Bob Bullock Loop) and continue to serve TAMIU.
- **17:** Route 17 would terminate at the proposed North Transit Center and the segment between the Downtown Transit Center and along Old Santa Maria Road would be eliminated. Route 1 could be modified slightly to pick up the service on Old Santa Maria Road that route 17 would no longer provide.
- **20:** The existing route 20 segment from the Downtown Transit Center to Palo Blanco Street would be truncated. The modified route 20 would be based out of the proposed Southwest Transit Center and follow the existing configuration.

Figure 7: Scenario 2 Modified Bus Routes



Scenario 3

Scenario 3 was designed to provide substantial additional BRT service along Loop 20 (Bob Bullock Loop) and build on the ideas for consolidation and reconfiguration of existing routes to increase service frequency expressed in Scenario 1. This scenario will enhance the existing system and provide substantial new services to areas of the city that have seen recent growth and will continue developing. Scenario 3 is made up of the following components:

- **BRT on I-35:** from the existing Downtown Transit Center north to a proposed North Transit Center located near Del Mar Boulevard and Springfield Avenue. In the short term, the proposed BRT would operate as express bus in mixed flow on I-35. Future traffic conditions will require either the BRT run in an HOV lane with carpool traffic or a dedicated lane of its own.
- **BRT along Loop 20 (Bob Bullock Loop):** begins at the proposed North Transit Center and connects to the proposed Southwest Transit Center by running north on I-35 to Loop 20 (Bob Bullock Loop) where it turns east on Loop 20 (Bob Bullock Loop) and then turns south along US 83 (Zapata Highway) to the proposed Southwest Transit Center. The BRT would operate as express service in mixed flow in the near term as the corridor is currently relatively free flowing. By 2035, the entire corridor will be congested and signal priority and queue jumper lanes or a dedicated bus lane may be required.
- **BRT East West Park and Ride (New Route):** begins at the downtown transit center and takes I-35 north. The route departs I-35 at US 59 (West Saunders Street) and then runs along North Bartlett Avenue, Pappas Street, and Thomas Avenue to the existing park and ride lot at Thomas Avenue and Hillside Road. Based on forecasted levels of congestion, this route will likely require signal priority and potentially queue jumper lanes at critical intersections in the future.
- **BRT South on US 83:** from the existing Downtown El Metro Transit Center travel east along US 83 (Chihuahua Street) and then continue south along US 83 (Zapata Highway) to a proposed Southwest Transit Center in the vicinity of US 83 (South Zapata Highway) and Palo Blanco Street. Current traffic conditions justify signal priority along US 83 (Guadalupe Street/Chihuahua Street and Zapata Highway) and queue jumper lanes at critical intersections. Congestion is predicted to be worse along this corridor in the future, extending to the southern city limit and a bus only lane may be required to achieve acceptable running times.

- **Super Local:** a two way looping route along FM 1472 (Mines Road), Loop 20 (Bob Bullock Loop), McPherson Avenue, and Shiloh Drive that returns to the proposed northern transfer center using the I-35 access road. This would operate as limited stop local service and distribute transfers from the proposed northern transfer center.
- **BRT Loop South (Future):** the proposed BRT would continue down US 83 (South Zapata Highway) from the proposed Southwest Transit Center to Cuatro Vientos and then follow Cuatro Vientos north to SH 359. At SH 359 and US 83 (North Zapata Highway) the following routing options exist:
 - Continue following SH 359 to the existing Downtown Transit Center;
 - or
 - Turn south on US 83 (South Zapata Highway) and return to the proposed Southwest Transit Center.

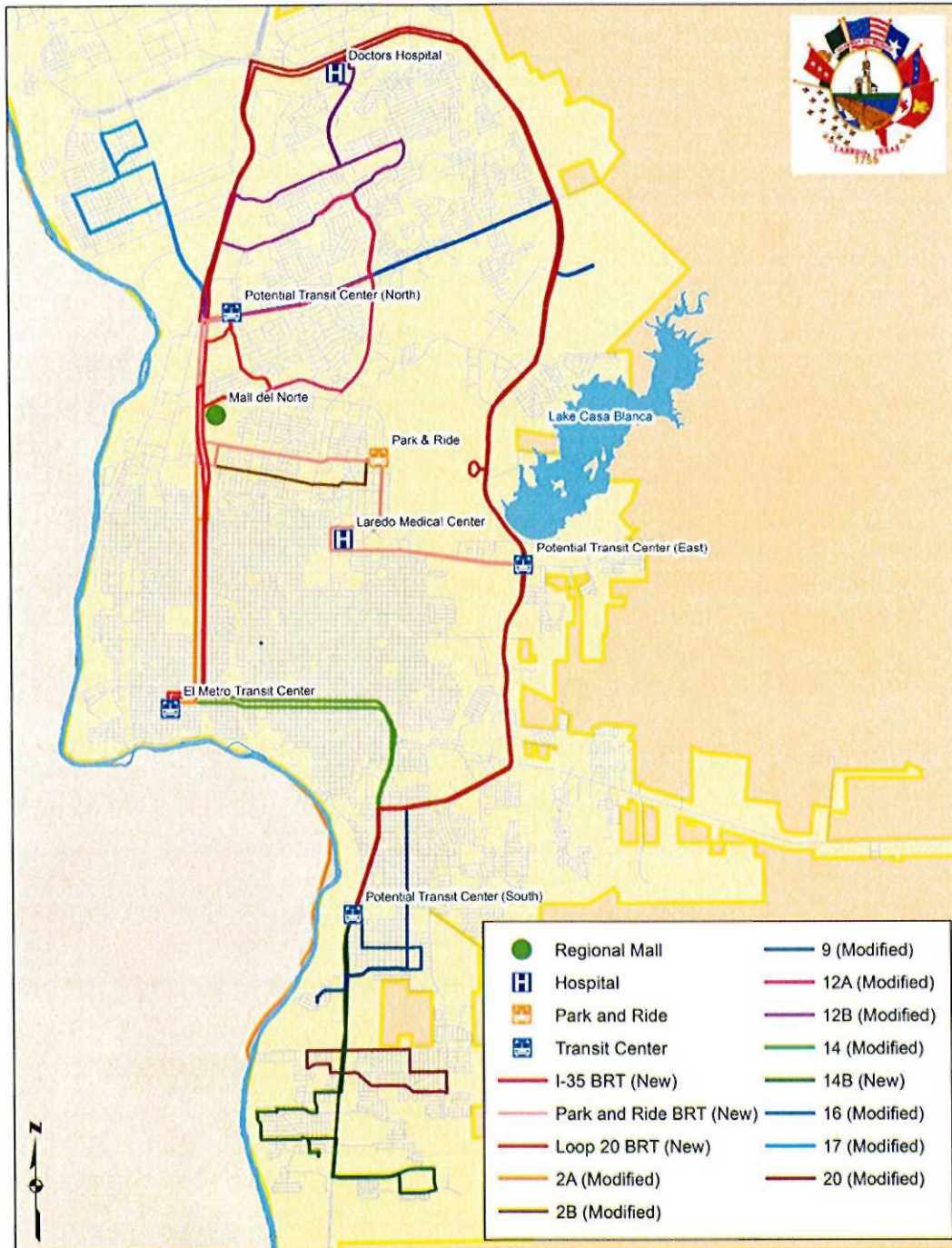
As it will be a long range enhancement, service on the BRT Loop South (Future) route was not included as part of the operational modeling.

Existing bus routes that are proposed to be consolidated and modified as part of Scenario 3 include the following:

- **I-35 BRT (New Route):** runs along I-35 from the Downtown Transit Center to Mall del Norte then takes Calle del Norte Road to Springfield Avenue where it turns north to Del Mar Boulevard. At Del Mar Boulevard, it loops through the potential North Transit Center and then continues on I-35 southbound and returns to the Downtown Transit Center.
- **BRT along Loop 20 (Bob Bullock Loop):** begins at the proposed North Transit Center and runs north on I-35 to Loop 20 (Bob Bullock Loop) where it turns east on Loop 20 (Bob Bullock Loop) and then turns south along US 83 (Zapata Highway) to the proposed Southwest Transit Center. Serves Doctors Hospital.
- **BRT East West Park and Ride (New Route):** begins at the Downtown Transit center and follows I-35 north. Departs I-35 at US 59 (West Saunders Street) and then runs along North Bartlett Avenue, Pappas Street, and Thomas Avenue to the existing park and ride lot at Thomas Avenue and Hillside Road.
- **2A:** Instead of running on Mann Road to return to I-35, route 2A would be modified to continue up Springfield Avenue to Del Mar Boulevard where it would access the proposed North Transit Center. Route 2A would exit the transit center and return to San Bernardo Avenue on Del Mar Boulevard. Route 2A would continue to serve Mall del Norte.

- **2B:** The existing segment of route 2B from the Downtown Transfer Center to Calton Road would be eliminated. The modified route would be based out of the potential North Transit Center and would use the I-35 access roads to travel south to its existing configuration along Hillside and Calton Roads. Route 2B would continue to serve the mall.
- **9:** The existing route 9 segment from the Downtown Transit Center to Loop 20 (Bob Bullock Loop) would be truncated. The modified route 9 would be based out of the proposed Southwest Transit Center and follow the existing configuration.
- **11:** Route 11 will be replaced by the BRT along Loop 20 (Bob Bullock Loop), described above.
- **12A:** Route 12A from the Downtown Transit Center to Mall del Norte would be eliminated. The existing segments along Calle Del Norte Road, McPherson Avenue, International Boulevard, Del Mar Boulevard, Village Boulevard, and the I-35 access road would remain. Route 12A would be based out of the proposed North Transit Center. Mall del Norte would continue to be served by route 12A.
- **12B:** The existing route 12B segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 12B would operate out of the potential North Transit Center. Route 12B would no longer serve the mall
- **14:** Route 14 would be split into two routes. The existing Route 14 would be truncated at the potential Southwest Transit Center and run along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) to the Downtown Transit Center.
- **14B (New Route):** Route 14B follows the existing Route 14, but starts from the proposed Southwest Transit Center instead of the Downtown Transit Center.
- **16:** The existing Route 16 segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 16 would run along Del Mar Boulevard and Loop 20 (Bob Bullock Loop) and continue to serve TAMIU.
- **17:** Route 17 would terminate at the proposed North Transit Center and the segment between the Downtown Transit Center and along Old Santa Maria Road would be eliminated. Route 17 could be modified slightly to pick up the service on Old Santa Maria Road that route 17 would no longer provide.
- **20:** The existing route 20 segment from the Downtown Transit Center to Palo Blanco Street would be truncated. The modified route 20 would be based out of the proposed Southwest Transit Center and follow the existing configuration.

Figure 8: Scenario 3 Modified Bus Routes



Scenario Performance

For each of the three scenarios described above, performance measures based on the study goals and objectives were calculated. Table 5: Scenario Performance summarizes the performance measure results by scenario.

Table 5: Scenario Performance

Performance Measure		Scenario			
Number	Name	Baseline	Scenario 1	Scenario 2	Scenario 3
1	Ridership (Boardings & Alightings) by Route	See Table 6: Ridership	See Table 6: Ridership	See Table 6: Ridership	See Table 6: Ridership
2	Headway (in Minutes)	0	-34.1	-29.7	-32.4
3	Vehicle Revenue Hours (Annual)	74,000	75,000	99,000	105,000
4	Vehicle Revenue Miles (Annual)	1,240,000	1,370,000	1,760,000	1,780,000
5	Trip Times	n/a	Varies	Varies	Varies
6	BRT Characteristics	n/a	100% Freeway, 0% Arterial	19% Freeway, 81% Arterial	18% Freeway, 82% Arterial
7	Existing Infrastructure	n/a	Excellent	Very Good	Very Good
8	Change in Bus Routes	n/a	+2	+4	+4
9	Reduction in Buses Through Downtown	n/a	6	6	6
10	Annual Passenger Miles	8,400,000	13,200,000	16,600,000	14,600,000
11	Annual Unlinked Trips	2,540,000	3,960,000	4,990,000	4,390,000

Performance Measure 2, Headway, calculates the average reduction in headway across all modified routes for each scenario. The average reduction in headway was fairly similar for all three scenarios, with Scenario 1 having the greatest average reduction in headway by a little over a minute compared to Scenario 3. However, all three scenarios substantially reduce average headway when compared to the baseline.

Performance Measures 3 and 4, Vehicle Revenue Hours and Vehicle Revenue Miles, are measures of the amount of service provided. They also give a rough indication of the cost, as more hours and more miles equate to higher costs. Scenario 1 is fairly close to the baseline on both measures, which is in keeping with its intent to enhance the existing system by increasing service frequency through route consolidation opportunities, while minimizing cost increases. Scenarios 2 and 3, which provide substantially more service than the baseline and Scenario 1, show significantly higher vehicle revenue hours and miles.

Performance Measure 5, Trip Times, is inconclusive, as the change in trip time varies by individual origin/destination pairs. Additionally, time savings from the BRT routes may be cancelled out by increased transfer times. However, the reduction in headways decreases average wait times.

Performance Measure 6, BRT Characteristics, measures how much of each scenario is on freeways or arterials. BRT service along freeways is grade separated and will provide faster running times, however, service along arterials is much cheaper to construct and also capable of providing enhanced running times.

Performance Measure 7, Existing Infrastructure, is a qualitative assessment of current conditions along the proposed BRT routes. Shoulder widths, pavement condition, and available right-of-way to implement BRT improvements were all assessed. All three scenarios scored essentially the same on this measure.

Performance Measure 8, Change in Bus Routes, shows the increase or decrease in the number of bus routes for each scenario. Scenario 1 only adds two routes, while Scenarios 2 and 3 both add four routes. In the case of Scenario 1, the new routes are the I-35 BRT and the splitting of existing route 14 into the South BRT and route 14B. Scenarios 2 and 3 both include the previously mentioned new routes as well as a new route along Loop 20 (Bob Bullock Loop) and a new east-west BRT route.

Performance Measure 9, Reduction in Buses Through Downtown, measures the effect of consolidation on the routes through downtown. All three scenarios scored the same, as they all include similar consolidation plans.

Performance Measures 10 and 11, Annual Passenger Miles and Annual Unlinked Trips, are related. Annual passenger miles are calculated using annual unlinked trips. Unlinked trips are a count of the number of passengers boarding transit vehicles and are not the same as a complete journey from an origin to a final destination. For example, using Scenario 1, if a passenger boards at the downtown center and then transfers to route 16 at the proposed North Transit Center and rides to TAMIU, that is counted as two unlinked trips. In contrast, on the existing system, route 16 runs from the downtown transit center to TAMIU, so the passenger would board once and be counted once. Because the scenarios all include proposed transfer centers and split existing bus routes, they automatically increase unlinked trips and passenger miles. Because of this, these measures should be compared between scenarios, but not to the baseline. Of the three scenarios, Scenario 2 has the highest number of annual passenger miles and annual unlinked trips, which means it will serve the most riders.

Table 6: Ridership shows the existing ridership by route for the baseline scenario and projected ridership by route for each of the three scenarios.

Table 6: Ridership

Route		Scenario			
Number	Name	Baseline	Scenario 1	Scenario 2	Scenario 3
2A	San Bernardo	1,517	2,463	2,463	2,463
2B	San Bernardo	1,099	834	834	834
3	Convent	1,096	1,096	356	604
9	Market	1,053	644	644	604
12A	Del Mar Express	767	560	560	560
12B	Express/ Shiloh	791	423	423	423

Laredo Urban Transportation Study
Bus Rapid Transit Feasibility Study

Route		Scenario			
Number	Name	Baseline	Scenario 1	Scenario 2	Scenario 3
14	Santa Rita/South BRT	251	542	542	542
14B	Santa Rita	n/a	646	646	646
16	TAMIU	311	445	445	445
17	Mines Road	513	420	420	420
20	Los Angeles	585	523	523	523
I-35ML	I-35 BRT	n/a	5,097	5,097	5,097
L-20	Loop 20 BRT	n/a	n/s	831	815
EW	East West BRT	n/a	n/a	3,564	n/a
EWPNR	Park and Ride BRT	n/a	n/a	n/a	1,269
	Total:	7,983	13,693	17,348	15,245

Preferred Transit Scenario

Based on the performance measure results of the three scenarios tested and input from the stakeholders, a Preferred Transit Scenario was developed. The preferred transit scenario is a hybrid of Scenarios 2 and 3, with some additional modifications as suggested by the stakeholders.

The TIP and MTP currently include a project for a combination North Transit Center and maintenance yard. The Preferred Transit Scenario recommends separating these two functions and placing the maintenance yard near compatible land uses, such as a light industrial area. A good example location would be the industrial area near the airport.

Description of the Preferred Transit Scenario

The Preferred Transit Scenario incorporates the consolidation and reconfiguration of existing routes to increase service frequency introduced in Scenario 1. Additionally, this scenario includes enhancements tested in Scenarios 2 and 3 that introduce new service to growing areas of Laredo.

Modifications introduced in the Preferred Transit Scenario from stakeholder input at the public meeting held Thursday, April 21, 2011, include the following:

- The proposed Southwest Transit Center would be located further south on US 83 (South Zapata Highway) instead of Palo Blanco Street and will include a park and ride lot. The park and ride lot will serve new and expected future residential developments south of Laredo along US 83 (Zapata Highway). Additionally, moving the park and ride lot south and extending the BRT is one strategy for mitigating current and forecasted congestion along US 83 (Zapata Highway).
- Intercept El Aguila vehicles at the proposed new transit centers instead of continuing to route them to the downtown transit center. While this will introduce a transfer for El Aguila riders, it will increase the overall efficiency of both transit systems.
- Extend transit along FM 1472 (Mines Road) to serve new developments to the north and accommodate future growth. In the short term, Extend Route 17 to Killam Industrial Boulevard, to serve the Killam and El Portal industrial parks. To go further north along FM 1472 (Mines Road) and maintain a 30 minute headway would require additional vehicles and is a long term recommendation.

A modification based on a windshield survey of the proposed routes is:

- The proposed Super Local route operating out of the proposed North Transit Center was dropped. The Super Local was envisioned as a way to further consolidate a portion of route 3 and routes 12A, 12B, and 17. However, after field review it was determined that the consolidation would result in unacceptable walking times to access the Super Local as compared to the existing route configurations. Route 17 was especially problematic, as implementing the Super Local would require dropping service along Bristol Road, Rancho Viejo Road, Atlanta Road, Big Bend Boulevard, and Fasken Boulevard, which would inconvenience a number of riders.

The Preferred Transit Scenario is made up of the following components:

- **BRT on I-35:** from the existing Downtown Transit Center north to a transit center located near Del Mar Boulevard and Springfield Avenue. In the short term, the proposed BRT would operate as express bus in mixed flow on I-35. Future traffic conditions will require either the BRT run in an HOV lane with carpool traffic or a dedicated lane of its own.
- **BRT along Loop 20 (Bob Bullock Loop):** begins at the proposed North Transit Center and connects to the proposed Southwest Transit Center by running north on I-35 to Loop 20 (Bob Bullock Loop) where it turns east on Loop 20 (Bob Bullock Loop) and then turns south along US 83 (Zapata Highway) to the proposed Southwest Transit Center. The BRT would operate as express service in mixed flow in the near term as the corridor is currently relatively free flowing. By 2035, the entire corridor will be congested and signal priority and queue jumper lanes or a dedicated bus lane may be required.
- **BRT East West:** runs west along US 59 (Saunders Street) from a potential East West Transit Center near Loop 20 (Bob Bullock Loop) and US 59 (East Saunders Street) to San Francisco Avenue where it turns south and continues to Park Street, where it turns east to Convent Avenue. At Convent Avenue, turns south again and terminates at the Downtown Transfer Center. This route will require signal priority and possibly queue jumper lanes at critical intersections in the near term and likely a bus only lane in the long term, as segments are currently operating at a failing level of service and US 59 (Saunders Street) will be at LOS E or F in the future.
- **BRT South on US 83:** from the existing Downtown Transfer Center travel east along US 83 (Chihuahua Street) and then continue south along US 83 (Zapata Highway) to a proposed Southwest Transit Center in the vicinity of US 83 (South Zapata Highway) and La Pita Mangana Road. Current traffic

conditions justify signal priority along US 83 (Guadalupe Street/Chihuahua Street and Zapata Highway) and queue jumper lanes at critical intersections. Congestion is predicted to be worse along this corridor in the future, extending to the southern city limit and a bus only lane may be required to achieve acceptable running times.

- **BRT Loop South (Future):** the proposed BRT would continue down US 83 (South Zapata Highway) from the proposed Southwest Transit Center to Cuatro Vientos and then follow Cuatro Vientos north to SH 359. At SH 359 and US 83 (North Zapata Highway) the following routing options exist:
 - Continue following SH 359 to the existing Downtown Transit Center; or
 - Turn south on US 83 (South Zapata Highway) and return to the proposed Southwest Transit Center.

As it will be a long range enhancement, service on the BRT Loop South (Future) route was not included as part of the operational modeling. This route is shown as dashed on Figure 9: Preferred Transit Scenario Modified Bus Routes and loops between the East West Transit Center and Southwest Transit Center.

The following provides an overview of high level bus route modifications to determine the feasibility of this scenario. A detailed operations plan making use of strategies, such as interlining, will be needed to get the most efficiency possible out of the revised system.

As recommended in the Laredo TDP, the modified routes feature substantial consolidation. Route 2A was modified slightly, but continues to service San Bernardo Avenue. The common portion of routes 2A and 2B will be consolidated. Similarly the common segments of routes 12A, 12B, 16, and 17 will be consolidated as the I-35 BRT.

The consolidation of routes 2A and 2B will complement the recommendations of the 2008 *San Bernardo Avenue Renovation and Restoration Project* report by providing enhanced transit service along the corridor. Additionally, the I-35 BRT will provide parallel high capacity transit service, relieving through travel demand on San Bernardo Avenue.

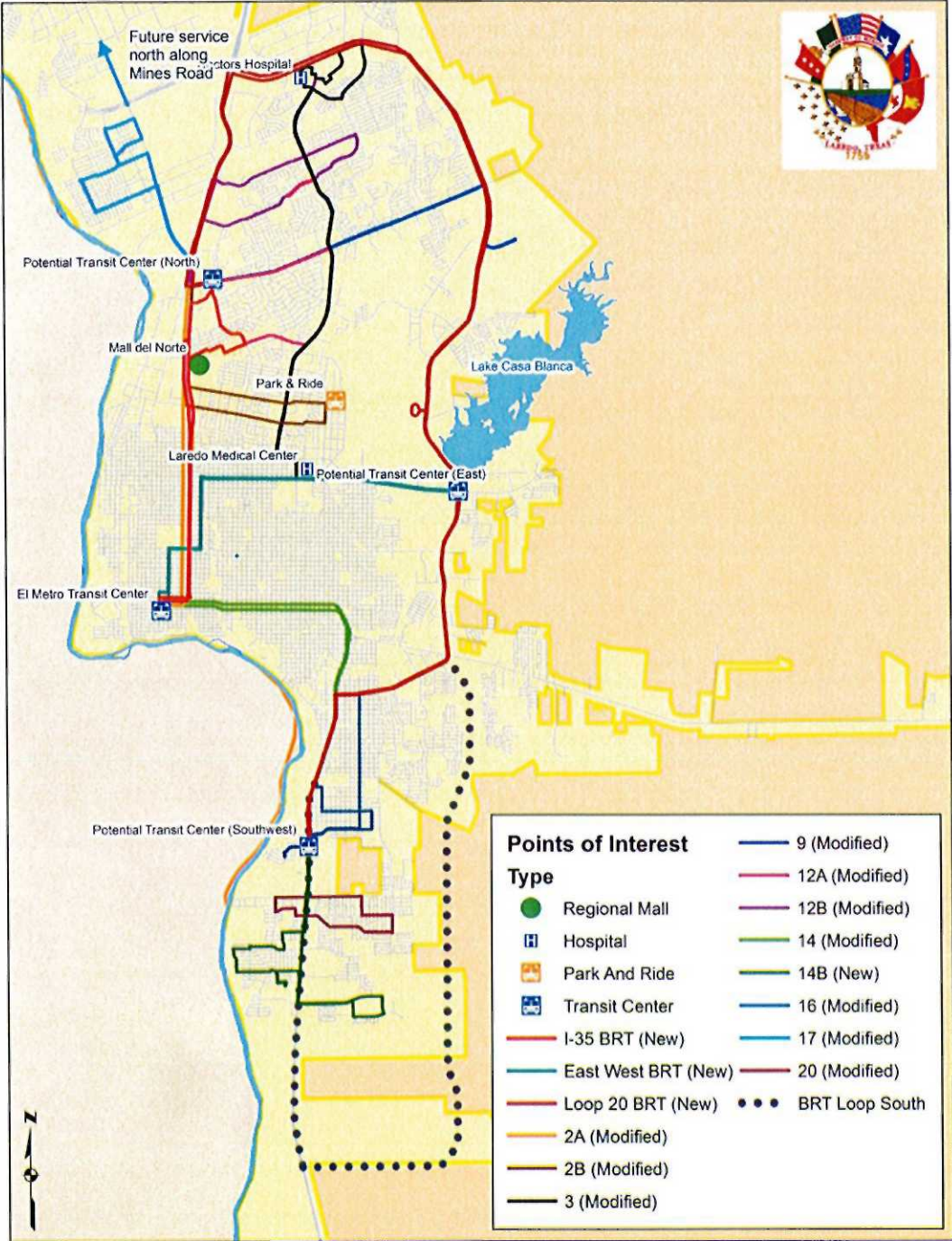
South of the Downtown Transit Center, common portions of routes 9, 14, and 20 will be consolidated along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) as the south BRT. The proposed Southwest Transit Center will serve as a distribution point for the consolidated routes.

Existing bus routes that are proposed to be consolidated and modified as part of the Preferred Transit Scenario include the following:

- **I-35 BRT (New Route):** runs along I-35 from the Downtown Transit Center to Mall del Norte then takes Calle del Norte Road to Springfield Avenue where it turns north to Del Mar Boulevard. At Del Mar Boulevard, it loops through the potential North Transit Center and then continues on I-35 southbound and returns to the Downtown Transit Center.
- **BRT along Loop 20 (Bob Bullock Loop):** begins at the proposed North Transit Center and runs north on I-35 to Loop 20 (Bob Bullock Loop) where it turns east on Loop 20 (Bob Bullock Loop) and then turns south along US 83 (Zapata Highway) to the proposed Southwest Transit Center. Serves Doctors Hospital.
- **BRT East West (New Route):** runs west along US 59 (Saunders Street) from a potential East West Transit Center near Loop 20 (Bob Bullock Loop) and US 59 (East Saunders Street) to San Francisco Avenue where it turns south and continues to Park Street, where it turns east to Convent Avenue. At Convent Avenue, turns south again and terminates at the Downtown Transit Center. Serves Laredo Medical Center.
- **2A:** Instead of running on Mann Road to return to I-35, route 2A would be modified to continue up Springfield Avenue to Del Mar Boulevard where it would access the proposed North Transit Center. Route 2A would exit the transit center and return to San Bernardo Avenue on Del Mar. Route 2A would continue to serve Mall del Norte.
- **2B:** The existing segment of route 2B from the Downtown Transit Center to Calton Road would be eliminated. The modified route would be based out of the potential North Transit Center and would use the I-35 access roads to travel south to its existing configuration along Hillside and Calton Roads. Route 2B would continue to serve the mall.
- **3:** Laredo Medical Center will be the starting point for Route 3, which will then follow its existing routing up McPherson Road to Doctors Hospital. The segment between the Downtown Transit Center and Laredo Medical Center will be eliminated. Riders wishing to continue downtown will need to transfer to the BRT East West.
- **9:** The existing route 9 segment from the Downtown Transit Center to Loop 20 (Bob Bullock Loop) would be truncated. The modified route 9 would be based out of the proposed Southwest Transit Center and follow the existing configuration.
- **11:** Route 11 will be replaced by the BRT along Loop 20 (Bob Bullock Loop), described above.

- **12A:** Route 12A from the Downtown Transit Center to Mall del Norte would be eliminated. The existing segments along Calle Del Norte Road, McPherson Avenue, International Boulevard, Del Mar Boulevard, Village Boulevard, and the I-35 access road would remain. Route 12A would be based out of the proposed North Transit Center. Mall del Norte would continue to be served by route 12A.
- **12B:** The existing route 12B segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 12B would operate out of the potential North Transit Center. Route 12B would no longer serve the mall
- **14:** Route 14 would be split into two routes. The existing Route 14 would be truncated at the potential Southwest Transit Center and run along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) to the Downtown Transit Center.
- **14B (New Route):** Route 14B follows the existing Route 14, but starts from the proposed Southwest Transit Center instead of the Downtown Transit Center.
- **16:** The existing Route 16 segment from the Downtown Transit Center to Del Mar Boulevard would be eliminated. Route 16 would run from the North Transit Center along Del Mar Boulevard and Loop 20 (Bob Bullock Loop) and continue to serve TAMIU.
- **17:** Route 17 would begin at the proposed North Transit Center and the segment between the Downtown Transit Center and along Old Santa Maria Road would be eliminated. In the short term, Route 17 would be extended to Killam Industrial Boulevard. Long term, Route 17 would be extended further north along FM 1472 (Mines Road) as demand warrants. Route 1 could be modified slightly to pick up the service on Old Santa Maria Road that route 17 would no longer provide.
- **20:** The existing route 20 segment from the Downtown Transit Center to Palo Blanco Street would be truncated. The modified route 20 would be based out of the proposed Southwest Transit Center and follow the existing configuration.

Figure 9: Preferred Transit Scenario Modified Bus Routes



Operating Costs

With implementation of just the I-35 BRT and South BRT, the system will cost approximately \$100,000 more per year to operate. At full build out, the Preferred Transit Scenario will cost an additional \$2.2 million per year to operate. It should be noted that the assumed service plan in the Preferred Transit Scenario significantly improves service frequency on many routes. Alternately, the operating plan could maintain existing service frequencies and lower the above operating costs. These figures are based on El Metro's current operating cost per revenue hour.

Capital Improvements and Costs

The following capital improvements are recommended as part of the Preferred Transit Scenario:

- I-35 BRT
 - North Transit Center and park and ride lot
 - Four additional vehicles (to address capacity on the I-35 mainline)
 - Total Cost: \$7.0 million
 - Cost with dedicated bus lanes: \$24.9 million
- Southwest BRT
 - Signal priority and queue jumper lanes along US 83
 - Southwest Transit Center and park and ride lot
 - Two additional vehicles
 - Total Cost: \$8.9 million
 - Cost with dedicated bus lanes: \$25.8 million
- East West BRT
 - Signal priority and queue jumper lanes along US 59
 - East West Transit Center
 - Total Cost: \$5.1 million
 - Cost with dedicated bus lanes on US 59: \$14.4 million
- Loop 20 (Bob Bullock Loop) BRT
 - Signal priority and queue jumper lanes along Loop 20
 - Two additional vehicles
 - Total Cost: \$6.9 million
 - Cost with dedicated bus lanes: \$41.3 million

For each BRT facility, the estimated cost of dedicated bus lanes is substantially higher than implementing signal priority and queue jumper lanes. Therefore, constructing dedicated bus lanes in the future is recommended only as a last resort.

Environmental Justice

The United States Department of Transportation defines three fundamental Environmental Justice (EJ) principles for the Federal Highway Administration and the Federal Transit Administration as follows:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Two public stakeholder meetings were held at the Laredo Public Library and a public information session was held at the El Metro Downtown Transit Center. Both locations are transit accessible and located near potentially affected communities. These are documented in separate meeting reports.

All three EJ principles are met by the Preferred Transit Scenario. The Preferred Transit Scenario will have minimal right of way and displacement impacts. All individual projects in the Preferred Transit Scenario will improve operations of the entire El Metro system so there will be no delay in benefits to any populations. By improving transit service in Laredo, it is likely the Preferred Transit Scenario will have a positive environmental impact on all populations.

Safety and Security

As the Preferred Transit Scenario is implemented, guidelines and best practices will need to be updated to the new facilities. Additional training for employees and supervisors will also be necessary.

Issues and Opportunities

The following issues and opportunities exist to enhance safety and security with the introduction of the Preferred Transit Scenario:

- The Preferred Transit Scenario will need to be integrated with existing safety program plans.

Laredo Urban Transportation Study
Bus Rapid Transit Feasibility Study

- The proposed new transit centers and combination transit centers and park and ride lots present a security issue in that additional officers will be needed to patrol them.
- An opportunity exists to include police substations at the transit centers to provide security and ease of access for the public.
- Updating the facilities department security plan to include the new transit centers and combination transit centers and park and ride lots is an opportunity

Implementation Plan

The first step in the implementation plan is to incorporate the Preferred Transit Scenario in the MTP, which is the long range plan for the region. After that is accomplished, the first phase needs to be included in the TIP, which is the short range plan for the region. The second phase should be included in the next TIP update. After completing phases 1 and 2, begin bringing Phase 3 projects from the MTP into the TIP as funding becomes available.

Phasing

The Preferred Transit Scenario has been broken into three phases for implementation purposes. Phase 1 is short term and covers the years 2011 to 2015. Phase 2 is medium term and covers 2016 to 2020. Phase 3 is long range and runs from 2021 to 2035. Implementation steps for each phase are shown as follows:

Phase 1 (2011 – 2015)

- Acquire land and build the proposed North Transit Center.
- Modify Route 2A and consolidate the common portions of routes 2A and 2B.
- Consolidate the common segments of routes 12A, 12B, 16, and 17 and implement express bus along I-35.
- Acquire a suitable site for the Southwest Transit Center.

Phase 2 (2016 – 2020)

- Build the proposed Southwest Transit Center.
- Consolidate common portions of routes 9, 14, and 20 along US 83 (Guadalupe/Chihuahua Streets/Zapata Highway) as the south BRT.
- Explore options for enhancing the I-35 BRT, such as running buses on the shoulders during peak hours or partnering with other agencies to build HOV/transit lanes on I-35 (none are currently in the MTP)
- Implement signal priority at critical intersections along the south BRT.
- Begin acquiring right of way and building queue jumper lanes at critical intersections along the south BRT.
- Explore making one lane of US 83 (Chihuahua/Guadalupe Streets) bus only during peak hours when MTP projects R05 (add one lane to Chihuahua Street) and R06 (add one lane to Guadalupe Street) are completed.
- Implement increased service further out FM 1472 (Mines Road) to serve growth areas in the northern areas of the City of Laredo.

- Acquire a suitable site for the East West Transit Center.

Phase 3 (2021 – 2035)

- Build the East West Transit Center
- Implement the Loop 20 (Bob Bullock Loop) BRT
- Build a dedicated BRT lane on I-35
- Explore adding dedicated BRT lanes on US-83
- Begin working on the BRT Loop South (Future) that continues south on US 83 (South Zapata Highway) from the proposed Southwest Transit Center and returns along Cuatro Vientos.

Funding

Some of the transit system modifications and improvements discussed in this report will require the expenditure of capital funds to implement. In addition, some of the changes recommended herein may change operating expenses. For example, the results of this analysis suggest that the addition of a second transfer center in the northern Laredo area will require capital expenditures to implement, but will then reduce the operating costs of some of the existing transit service. This section provides a brief discussion of existing and potential funding sources to implement the improvements recommended herein.

The *Laredo 2010-2035 Metropolitan Transportation Plan* and the *2009 Laredo Transit Development Plan* both discuss the existing and future costs and funding sources to operate El Metro. These plans identify the existing funding sources including fare revenues, advertising revenues, Texas Operating Assistance Funds, City of Laredo sales tax funds, and Federal Transit Administration (FTA) Section 5307 and Section 5309 funds. These plans also note that funding sources and limitations on use may change if Laredo exceeds a population of 200,000 resulting from the 2010 census.

The scenarios discussed in this report are designed to maintain or even reduce system operating costs. Therefore, the continuation of existing funding sources for operating assistance is assumed to be adequate to operate the system. However, implementation of new infrastructure will require capital funds. The Metropolitan Transportation Plan notes that while FTA Section 5309 funds are discretionary, it is anticipated that these funds will be sourced for funding the addition of a second transfer hub. In addition to pursuing Section 5309 funds, it is recommended that additional grant funds be pursued to fund BRT infrastructure elements.

The FTA's Small Starts and Very Small Starts initiatives provide two potential avenues for securing FTA grant funds for implementing BRT infrastructure and service. These programs are elements of FTA's Section 5309 program, and are intended to fund one-time capital expenses for fixed guideway and bus corridor improvements. Very Small Starts grants may be applicable for elements less than \$50 million, whereas the Small Starts grants may be applicable for up to \$75 million toward projects costing no more than \$250 million total.

In addition, it is very conceivable that one-time grant programs like the recent TIGER grants may provide additional funding opportunities. Recently, grant programs like TIGER and others have given priority funding to projects that return systems to a state of good repair, improve system efficiency, and enhance the livability and sustainability of our community. If future grant programs are designed to encourage similar objectives, then the BRT and enhanced bus strategies recommended herein may compete well within future competitive grant programs.

Detailed and specific programming and funding assumptions will necessarily be part of the next update to the Laredo Metropolitan Transportation Plan.