

TRAFFIC ENGINEERING STUDY

LEVEL OF SERVICE STUDY REPORT

Harry Wurzbach Rd

Limits: Lowes/HEB driveway to Garner Middle School

City of San Antonio, Texas

PREPARED FOR:



PREPARED BY:

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SECTION 1 EXECUTIVE SUMMARY

The City of San Antonio has requested a traffic analysis to evaluate and improve operations on Harry Wurzbach. Capacity analysis shall be performed to determine level-of-service for the intersections along the arterial.

Study will be based on the following conditions:

1. Existing Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours and includes the evaluation of existing ADT volume, signalized turning movement counts (TMC's), existing timing plans
2. Year 2025 Proposed Roadway Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours
3. Year 2035 Proposed Roadway Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours

Currently, the signalized intersections along Harry Wurzbach are coordinated and have different signal timing plans throughout the day and year. Based on the latest schematic of Harry Wurzbach roadway improvements, the following is proposed in the years 2025 and 2035:

- Two lanes, for each direction of travel, throughout the facility.
- Divided and undivided roadway segments.
- Proposed roadway on Harry Wurzbach will be below grade with Eisenhower Rd, similar to Austin Highway configuration. This will eliminate the excessive delays caused by the existing 5-leg signalized intersection. Eisenhower Rd will remain as an at-grade intersection. Through movements on Harry Wurzbach will not be affected by traffic signal at this intersection.
- There will be an additional access road southbound from Austin Highway connecting directly into the intersection of Harry Wurzbach and Lowes/HEB driveway.

Based on the above analysis of intersections and segments along Harry Wurzbach, recommendations are as follows:

- Include ADA compliant pedestrian facilities throughout Harry Wurzbach: connecting sidewalks, ramps, LED countdown pedestrian signal heads, accessible pedestrian push buttons.
- Incorporate traffic signal head arrangements (if traffic signal improvements are made with roadway improvements proposed by S&B) based on 2010 TMUTCD.
- Increase SB left turn lane storage at intersection of Garner Middle School and Oakwell Farms.
- Include a NB left turn lane at the intersection of Oakwell Oaks.
- Allow for the addition of left turn lanes or widen the minor street entrances at Oakwell Oak and Urban Crest. This will provide with flexibility with phasing when coordinating traffic signals.
- Removal of the signalized intersection of Harry Wurzbach and Eisenhower Rd will reduce through delays along the corridor.
- Modify coordination timing plans with the removal of the signalized intersection at Eisenhower Rd.
- Additional southbound access road, from Austin Highway, will increase delays and reduce capacity at Lowes/HEB signalized intersection.
- Allow for the addition/widen minor street entrances at Lowes and HEB driveways to allow for dedicated left turn lane.

SECTION 2 INTRODUCTION

The City of San Antonio has requested a traffic analysis to evaluate and improve operations on Harry Wurzbach. Capacity analysis shall be performed to determine level-of-service for the intersections along the arterial. Location of signalized intersections will be introduced later on this report. In this report, Wurzbach Road orientation will be in a north-to-south direction.

In 2011, an assessment program, performed by S&B Infrastructure, LTD. (S&B), was prepared for the City of San Antonio, *Final Report for Harry Wurzbach TAPS Memorial Blvd. Programming Assessment*. TEDSI Infrastructure Group will reference information and utilize existing data from the previously mentioned report.

Study will be based on the following conditions:

4. Existing Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours and includes the evaluation of existing ADT volume, signalized turning movement counts (TMC's), existing timing plans
5. Year 2025 Proposed Roadway Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours
6. Year 2035 Proposed Roadway Conditions – Analyze arterial and signalized intersection capacity and operations, for AM and PM Peak hours

This report is based on field data collected by TEDSI Infrastructure Group, 2010 *Highway Capacity Manual* (HCM), Transportation Research Board 2000, 2009 *Quality/Level of Service Handbook*, State of Florida Department of Transportation, City of San Antonio Unified Development Code and Synchro/SimTraffic software by Trafficware.

SECTION 3 STUDY AREA

3.1 SITE DESCRIPTION

Wurzbach Road is located in the city of San Antonio, and project location begins at the Fort Sam Houston Gate and extends to Interstate Highway 410. This part of the city consists of mostly residential and commercial developments. Existing developments of interest along the arterial include: Fort Sam Houston National Cemetery, Wal-Mart, Lowes, HEB, Sunset Memorial Park, and John Garner Middle School. An aerial map illustrating the project location, signalized intersections and arterial limits is presented in **Figure 1**.



Figure 1 Project Location-Existing Signalized Intersections

SECTION 4 TRANSPORTATION SYSTEM

4.1 EXISTING CONDITIONS

A site investigation was performed to gather all field information such as street geometrics, existing traffic control and the speed limits posted at the streets of interest for the study. TEDSI conducted site visits during the month of June 2012 to capture and compile all this information. Photographs were also taken at intersections along Wurzbach Road and are included in the **Appendix**.

4.1.1 EXISTING ROADWAYS AND SPEED LIMITS

General characteristics of the roadways in the study area consist of asphalt roadways with a mix of roadside ditches and curb sections. Speed limits in the surrounding area include: Wurzbach Road 45 MPH (IH 410 to Burr Road) and 40 MPH (Burr Road to Fort Sam Houston Gate), Garner Middle School has no

posted speed limit, Oakwell Farms Parkway 30 MPH, Urban Crest Drive/Oakwell Court 30 MPH, Eisenhower Road 35 MPH, Lowes/HEB driveway has no posted speed limit.

Wurzbach Road is a 50-ft four lane asphalt roadway with no shoulders that has a north to south direction. This existing roadway typical section changes from a divided facility into a four lane facility with a continuous two-way left turn lane. The divided facility begins at IH 410 and ends at the intersection of Eventide Drive, and does include left and right turn lanes at some intersections along Harry Wurzbach Road.

4.1.2 EXISTING CONTROL AT INTERSECTIONS

The signalized intersections of study for Wurzbach Road will be the following:

1. Harry Wurzbach at Lowes/HEB driveway
2. Harry Wurzbach at Eisenhower Road
3. Harry Wurzbach at Urban Crest Drive/Oakwell Court
4. Harry Wurzbach at Oakwell Farms Parkway
5. Harry Wurzbach at Garner Middle School

4.1.3 EXISTING CLASSIFICATION OF HARRY WURZBACH ROAD

The City of San Antonio has produced a Major Thoroughfare Plan 2012 for its coverage area and has classified existing Wurzbach Road as Secondary Arterial Type A. City of San Antonio Unified Development Code has provided roadway classification for the secondary arterial:

- Daily traffic volumes for this type of facility ranges from 14,000 to 16,000 vehicles per day for a two-lane road and 30,000 to 34,000 for a four-lane roadway.
- Street design standards for secondary arterials have minimum R.O.W. of 86 to 110 feet.
- Pavement width varies from 48 feet to 81 feet with a design speed of 45 MPH.
- Roadway should include a curb section with a median width of 16 feet minimum as well as sidewalk and bicycle facilities.

SECTION 5 DATA COLLECTION

5.1 TURNING MOVEMENT COUNTS (TMC's)

Existing TMC's were provided by S&B at each intersection in the study area. These were collected in around February 2012 along Wurzbach Road and were collected from 7-9 AM and also from 4-6 PM. See **Appendix** for traffic data collected for Wurzbach Road.

SECTION 6 EVALUATION OF TRAFFIC COUNTS/SIGNAL TIMING DATA

6.1 TRAFFIC COUNTS/SIGNAL TIMING DATA PROVIDED

TEDSI analyzed existing counts that were provided. TMC counts at the intersection of Harry Wurzbach and Eisenhower Rd did not account for the immediate intersection of Eisenhower Rd and Thrush View Ln. This intersection is included with the traffic signal operations of Harry Wurzbach and Eisenhower Rd. Based on scope, TEDSI was to evaluate ADT volumes and TMC counts for projected years 2025 and 2035. TEDSI has been directed to develop projections for the two scenario years.

TEDSI analyzed traffic signal data sheets, provided by City of San Antonio, for the analyzed intersections. NextEdit software is utilized in the existing signal controllers. Harry Wurzbach has a coordination plan for each day of the week and for multiple hours during each day. As TMC counts were performed for the hours of 7-9 AM and 4-6 PM, TEDSI evaluated timing plan 21 and 30. They are AM School and PM Peak, with cycle lengths of 130 seconds. These timing plans can be found in the **Appendix**. Signal timing parameters will be utilized in Synchro software to model existing traffic signals.

Field observations at project site dictated the following:

- No ADA compliant pedestrian detection at most of the signalized intersections
- No ADA compliant pedestrian push button locations for access
- No ADA compliant wheelchair ramps at the intersections
- No ADA compliant sidewalk facilities
- No ADA compliant cross slope across path of travel in roadway
- ADA compliant audible pedestrian push buttons on Harry Wurzbach and Eisenhower Rd, but pushbutton locations are not at recommended distances/locations.
- There are some left turn vehicles at intersection of Harry Wurzbach and Urban Crest/Oakwell Oak where there is no dedicated left turn lane. No dedicated left turn lane will produce rear-end collisions as well as increased delays for NB thru movement.
- Excessive delays could be seen at the intersection of Harry Wurzbach and Eisenhower Rd. This signalized intersection includes the nearby "T" intersection of Thrush View Lane, creating a 5-leg intersection. Signalized intersection includes split phasing for the eastbound, westbound and northbound Thrush View Lane directions, in which each split phase consumes green time and delays the progression Harry Wurzbach vehicle movements.
- The only flashing yellow arrow signal configuration of the signalized intersections on Harry Wurzbach project limits is located at Lowes/HEB driveway.
- Most NB left turn vehicles at the intersection with Lowes/HEB driveway are using this movement to access Austin Highway. The same can be said for the EB right turn movements at Lowes driveway. Motorists are using the parking lot of Lowes as a shortcut route into Austin Highway, as currently there is no direct access. TMC counts had a high number of directional movements that confirmed the above scenario.
- Striping configuration at Lowes/HEB driveway is as follows:
 - Shared WB thru and right turn movement on left lane, right turn movement for right turn lane
 - EB approach shows no striping, but motorists used center of driveway as shared thru and left, and right portion of driveway was used by right turn vehicles.

- There is a conflict on WB movement with overhead signs and pavement markings, as WB and EB movements share the same phase.
- Minor conflicts with motorists as there are multiple lanes with different movements at each approach. There are no protected movements in place, where will make it easier on motorists to maneuver through the intersection.

SECTION 7 ANALYSIS-METHODOLOGY

7.1 METHODOLOGIES UTILIZED ON HARRY WURZBACH

TEDSI will evaluate the arterial Level of Service (LOS) and intersection LOS and volume to capacity ratio using HCM/HCS and Synchro software.

7.1.1 METHODOLOGY FOR ANALYZING SIGNALIZED INTERSECTIONS

To determine the signalized intersections performance in the study area, LOS is used as a qualitative measure of traffic interruptions, volume of traffic, speed and travel time and is evaluated on the basis of control delay per vehicle. Six LOS range from “A” to “F”, where “A” experiences little delay to undesirable levels designated as “F”.

To determine the signalized intersections ability to handle vehicular traffic in the study area, the intersection can be evaluated using a volume to capacity (V/C) ratio for critical lane groups. In determining capacity for each lane group, a base saturation flow rate and effective green time over cycle length is used. Saturation flow rate is defined by the HCM as the flow rate per lane at which vehicles can pass through a signalized intersection. HCM and HCS will provide results for overall intersection V/C ratio at a signal. The overall V/C ratio for an intersection provides a good indication on how existing geometric conditions, number of approach vehicles and signal design is performing. Synchro software will not provide for an overall V/C ratio but a max V/C ratio for the worst lane group. Volume to capacity ratio indicates the amount of congestion a lane experiences, where a ratio greater than or equal to one is operating over capacity. For design purposes, each signalized intersection will be evaluated on its LOS and its max V/C ratio. **Table 2** presents its determination of the intersection status for design purposes based on its volume to capacity ratio..

Table 1 presents its determination of LOS for the entire intersection or an approach based only on control delay. To determine the LOS for a lane group, control delay and V/C ratio are utilized.

LEVEL OF SERVICE (LOS) CRITERIA FOR SIGNALIZED INTERSECTIONS		
CONTROL DELAY (S/VEH)	LOS BY VOLUME-TO-CAPACITY RATIO	
	<=1.0	>1.0
0-10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

Table 1 LOS measurements for signalized intersections

MAX V/C RATIO, X	CAPACITY CONDITION
≤ 1.00	Under Capacity
> 1.00	Over Capacity

Table 2 V/C measurements for signalized intersections

7.1.2 METHODOLOGY FOR ANALYZING ARTERIALS AND DETERMINING SEGMENT RUNNING TIME

To evaluate roadway conditions urban street facilities, HCM establishes Level of Service (LOS) to be used as a qualitative measure based on travel speed and volume to capacity ratio. Under current conditions for Wurzbach Road and criteria for roadway classification in HCM, this roadway has characteristics of urban street facilities. From IH 410 frontage road south to Eventide Road, roadway section consist of four travel lanes and left/right turn lanes with no shoulders and continuing south up to Eventide Road, it adds a continuous two-way left turn lane to replace depressed grassy median. Posted speed limit for Wurzbach Road is set at 45 MPH from IH 410 to Burr Road.

To determine the degree of mobility along Wurzbach Road, roadway will be analyzed under urban conditions. As urban streets are evaluated on Level of Service (LOS) that is used as a qualitative measure of traffic interruptions, volume of traffic, speed and travel time and is evaluated on the basis average through-vehicle travel speed for the segment. It is influenced by running speed between signals and the amount of control delay at each signalized intersection. The analysis of urban streets will be evaluated on both directions of travel to determine which segments might need improvements, if needed. Six LOS range from “A” to “F”, where “A” experiences primarily free-flow operations at average travel speeds to extremely slow speeds as “F”. HCM provides with methodology to analyze urban streets.

Below is the procedure that will be used to calculate arterial LOS:

- Measure segment length (ft)
- Compute running time for each segment (seconds)(2010 HCM Equation 17-6,17-7)
- Compute intersection approach delays (seconds)
- Compute average travel speed (MPH)
- Assess LOS based on criteria

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To assess LOS for urban facilities, **Table 3** includes criteria that are dependent on the base free flow speed. For this analysis, 45 MPH was chosen for base free-flow speed for Wurzbach Road. Free-flow speed was computed from 2010 HCM Equation 17-2. **Table 4** presents table with LOS for the urban street based on base free flow speed.

DETERMINATION OF FREE-FLOW SPEED				
Segment	SPEED CONSTANT (MPH)	ADJUSTMENT FOR CROSS SECTION (MI/H)	ADJUSTMENT FOR ACCESS POINTS (MI/H)	BASE FREE-FLOW SPEED (MPH)
Garner M.S.-Oakwell Farms	46.8	-1.5	-0	45.3
Oakwell Farms – Urban Crest	46.8	-1.5	-0	45.3
Urban Crest-Eisenhower	46.8	-1.5	-0	45.3
Eisenhower-Lowes/HEB	46.8	-1.5	-0	45.3

Table 3 Base free flow speed for Harry Wurzbach segments

LEVEL OF SERVICE (LOS) CRITERIA FOR URBAN STREET SEGMENTS			
TRAVEL SPEED AS PERCENTAGE OF BASE FREE-FLOW SPEED (%)	TRAVEL SPEED BASED ON BASE FREE-FLOW CALCULATED (45 MPH) FOR SEGMENTS (MPH)	LOS BY VOLUME-TO-CAPACITY RATIO	
		<=1.0	>1.0
>85	>38.3	A	F
>67-85	>30.2-38.3	B	F
>50-67	>22.5-30.5	C	F
>40-50	>18-22.5	D	F
>30-40	>13.5-18	E	F
<=30	≤13.5	F	F

Table 4 LOS analysis for urban streets

If an intersection experiences a volume to capacity ratio greater than 1 for a through movement, the segment will be categorized by a LOS “F”, regardless of segment speed.

In determining free-flow speeds along Wurzbach Road, traffic signals play a major role in the capacity and travel speed along an urban segment. Appropriate volumes will be inserted into each intersection and will then determine its free-flow speeds along this segment. Traffic signal parameters are utilized in the analysis to determine its final vehicular speeds along the arterial.

Urban street LOS criteria are based on average travel speed, volume to capacity ratio, signal density and its street classification. Generalized service volumes tables presented in the HCM are not to be used as capacity tables to determine number of lanes for a proposed roadway. Primary criterion for arterial LOS is based on average travel speed and according to FDOT's *Quality/Level of Service Handbook*, determination on the number of lanes on the arterial is determined at each signalized intersection and not between intersections.

Below is the segment lengths and running time along Harry Wurzbach corridor. Running time includes the calculations of free-flow speed, vehicle proximity adjustment factor and adjustment for a mid-segment delay source. Running time was calculated using 2010 HCM Equations 17-4, 17-5, 17-6, and 17-7. Running time took into consideration the highest directional volume during morning and afternoon peak hours and assumed that both directions of travel will have approximate running times, and are presented in **Table 5**.

HARRY WURZBACH LENGTHS AND RUNNING TIME		
Segment	LENGTH (FT) MI	2010 HCM RUNNING TIME (SEC)
Garner M.S.-Oakwell Farms	735 (.139)	15.6
Oakwell Farms –Urban Crest	1370 (.259)	24.0
Urban Crest-Eisenhower	3515 (.666)	55.7
Eisenhauer-Lowes/HEB	1378 (.261)	24.1

Table 5 Segment lengths and running time for Harry Wurzbach

Further along this report, traffic signal delays will be provided. Synchro reports performance values in its Arterial Level of Service report, which is based on the 2000 HCM criteria. Arterial Level of Service report provides with Arterial Class, Flow Speed, Running Time, Signal Delay, Travel Time, Distance of segment, Arterial Speed and Arterial LOS. Since we are using methodologies from 2010 HCM, TEDSI will only utilize appropriate results from Synchro.

Since the Running Time, provided by Synchro, is in close proximity to the running time values from 2010 HCM equation 17-2, we will keep values from **Table 5**. TEDSI will utilize Signal Delay values provided by Synchro Arterial Level of Service report. These values represent correct through movement delays at the signalized intersections, being either isolated or in coordination mode. TEDSI will calculate Arterial Speed using TEDSI's calculated Running Time and Synchro's Signal Delays, which will be provided in later in this report.

SECTION 8 ANALYSIS-EXISTING CONDITIONS

8.1 SCENARIOS

TEDSI will evaluate the arterial Level of Service (LOS) and intersection LOS and volume to capacity ratio using HCM/HCS and Synchro software for the following scenarios:

Existing AM and PM Peak Hour Traffic Volumes for year 2012.

8.1.1 INTERSECTION LEVEL OF SERVICE AND V/C RATIO -EXISTING CONDITIONS

Based on current conditions using Synchro, intersection LOS will be performed for year 2012. As this arterial has a coordination timing plan during various periods of the day, we will first analyze each signalized intersection as isolated. This will provide us with the true LOS and will indicate any deficiencies it may have.

SIGNALIZED INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2012 EXISTING INTERSECTION SUMMARY			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	95	B	17.4	.84	UNDER-CAPACITY
Oakwell Farms Parkway	80	B	13.1	.73	UNDER-CAPACITY
Urban Crest Drive/Oakwell Court	85	C	20.0	.74	UNDER-CAPACITY
Eisenhauer Road	155	F	83.3	1.22	OVER-CAPACITY
Lowes/HEB Driveway	85	B	13.8	.58	UNDER-CAPACITY

Table 6 LOS and Capacity measurements for existing traffic conditions, AM Peak Hour, for year 2012

SIGNALIZED INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2012 EXISTING INTERSECTION SUMMARY			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	90	A	9.8	.72	UNDER-CAPACITY
Oakwell Farms Parkway	90	B	13.9	.76	UNDER-CAPACITY
Urban Crest Drive/Oakwell Court	125	C	21.3	.81	UNDER-CAPACITY
Eisenhauer Road	155	F	146.4	2.47	OVER-CAPACITY
Lowes/HEB Driveway	75	B	16.2	.75	UNDER-CAPACITY

Table 7 LOS and Capacity measurements for existing traffic conditions, PM Peak Hour, for year 2012

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Intersection of Harry Wurzbach Rd and Eisenhower Rd is considered to be a 5-leg intersection. The signalized intersection also includes Thrush View Ln, as the separation between the two intersections is less than 100 feet. This configuration complicates the intersection as each of the minor street movements (westbound Eisenhower Rd, eastbound Eisenhower Rd, northbound Thrush View Ln) will require split phases. This will produce longer delays as the amount of green time allocated to the minor street movements produces longer waiting times for Harry Wurzbach motorists. This critical intersection, along the arterial, essentially becomes a “wall” along the segment as the traffic volumes exceed the capacity of the intersection during the peak hours. Recurring cycle failures cannot be eliminated through retiming.

The above isolated conditions do include pedestrian crossing times, which will increase the green times of the minor street movements in order to accommodate minimum pedestrian crossings. Under coordinated conditions, minimum pedestrian phases are not included. When a pedestrian call occurs, the controller phase will be extended beyond the phase force-off point, which will cause the controller to go out of coordination. Based on field observations, there were a few random pedestrian movements at the intersection of Harry Wurzbach and Eisenhower Rd.

To analyze the existing coordinated signal system, signalized intersections will match evaluated timing plans 21 and 30. Note that cycle lengths for AM and PM peak hours were for 130 second cycle. The coordinated plan does not provide for minimum pedestrian crossing times at the minor streets. Below are our findings:

INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2012 EXISTING INTERSECTION SUMMARY			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	130	B	13.7	.73	UNDER-CAPACITY
Oakwell Farms Parkway	130	B	11.6	.75	UNDER-CAPACITY
Urban Crest Drive/Oakwell Court	130	C	20.8	.75	UNDER-CAPACITY
Eisenhower Road	130	C	32.9	.95 WBTL	UNDER-CAPACITY
Lowes/HEB Driveway	130	B	12.7	.97 WBLTR	UNDER-CAPACITY

Table 8 LOS and Capacity measurements for existing traffic conditions, AM Peak Hour, for year 2012, coordinated

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INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2012 EXISTING INTERSECTION SUMMARY			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	130	A	7.1	.75	UNDER-CAPACITY
Oakwell Farms Parkway	130	B	11.3	.82	UNDER-CAPACITY
Urban Crest Drive/Oakwell Court	130	B	17.5	.77	UNDER-CAPACITY
Eisenhauer Road	130	D	39.2	1.09 WBTL	OVER-CAPACITY
Lowes/HEB Driveway	130	B	18.2	1.00 WBLTR	OVER-CAPACITY

Table 9 LOS and Capacity measurements for existing traffic conditions, PM Peak Hour, for year 2012, coordinated

The adjustments of minor street phase green times were reduced, as to not accommodate any pedestrian crossing times. This reduction of green time for the minor street phasings contributed to lower delays at the intersections as well as a lower V/C ratio.

The signalized intersections of Harry Wurzbach Rd at Eisenhauer Rd and HEB/Lowes Driveway have V/C ratios close to, equal to, or greater than 1.

Eisehauer Rd:

- AM PK HR
 - Westbound Shared Thru-Left turn movement 0.95 V/C ratio
- PM PK HR
 - Westbound Shared Thru-Left turn Movement 1.09 V/C ratio

HEB/Lowes Drwy:

- AM PK HR
 - Westbound Shared Right-Thru-Left turn movement 0.97 V/C ratio
- PM PK HR
 - Westbound Shared Right-Thru-Left turn movement 1.00 V/C ratio

8.1.2 ARTERIAL LOS ANALYSIS-EXISTING CONDITIONS

Based on current conditions and using HCM criteria Synchro output reports, arterial analysis will be analyzed for year 2012. As the analysis period for the AM and PM Peak Hours were performed using coordination plans 21 and 30, the results are as follows:

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

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HARRY WURZBACH ARTERIAL LOS-NB DIRECTION YEAR 2012- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Oakwell Farms-Garner M.S	45	15.6	6.8 (4.3)	22.4 (19.9)	.139	22.4 (25.1)	D (C)
Urban Crest-Oakwell Farms	45	24.0	5.3 (15.1)	29.3 (39.1)	.259	31.8 (23.8)	B (C)
Eisenhauer-Urban Crest	45	55.7	13.4 (33.3)	69.1 (89.0)	.666	34.6 (26.9)	B (C)
Lowes/HEB-Eisenhauer	45	24.1	19.2 (17.0)	43.3 (41.1)	.261	21.7 (22.9)	D (C)
Lowes/HEB	45	--	--	--	--	--	--

Table 10 Arterial LOS measurements for existing traffic conditions, AM and PM Peak Hour, for year 2012, NB direction

HARRY WURZBACH ARTERIAL LOS-SB DIRECTION YEAR 2012- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Garner M.S	45	--	--	--	--	--	--
Garner M.S.-Oakwell Farms	45	15.6	1.6 (1.9)	17.2 (17.5)	.139	29.1 (28.6)	C (C)
Oakwell Farms-Urban Crest	45	24.0	13.6 (10.7)	37.6 (34.7)	.259	24.8 (26.9)	C (C)
Urban Crest-Eisenhauer	45	55.7	31.3 (34.8)	87.0 (90.5)	.666	27.6 (26.5)	C (C)
Eisenhauer-Lowes/HEB	45	24.1	2.4 (3.8)	26.5 (27.9)	.261	35.4 (33.7)	B (B)

Table 11 Arterial LOS measurements for existing traffic conditions, AM and PM Peak Hour, for year 2012, SB direction

Observations of Harry Wurzbach with SimTraffic Software:

- AM PK-SB left turn lane with Garner Middle School does not provide with sufficient storage length
- AM PK-SB left turn lane with Oakwell Farms does not provide with sufficient storage length
- PM PK- SB left turn lane with Garner Middle School does not provide with sufficient storage length
- PM PK-SB left turn lane with Oakwell Farms does not provide with sufficient storage length
- PM PK-SB and NB left turn lane(s) with Eisenhauer Rd does not provide with sufficient storage length
- PM PK-SB and NB left turn lane(s) with Lowes/HEB driveway have 95% queues as long as the existing storage length

SECTION 9 PROPOSED ROADWAY IMPROVEMENTS

9.1 ANALYSIS

Based on the latest schematic of Harry Wurzbach roadway improvements, the following is proposed in the years 2025 and 2035:

- Two lanes, for each direction of travel, throughout the facility.
- Divided and undivided roadway segments.
- Proposed roadway on Harry Wurzbach will be below grade with Eisenhower Rd, similar to Austin Highway configuration. This will eliminate the excessive delays caused by the existing 5-leg intersection. Eisenhower Rd will remain as an at-grade intersection. It will be assumed to be an unsignalized intersection. Through movements on Harry Wurzbach will not be affected by traffic signal at this intersection.
- There will be an access road southbound from Austin Highway connecting directly into the intersection of Harry Wurzbach and Lowes/HEB driveway. There will be a total of 5 approaches to this signalized intersection.

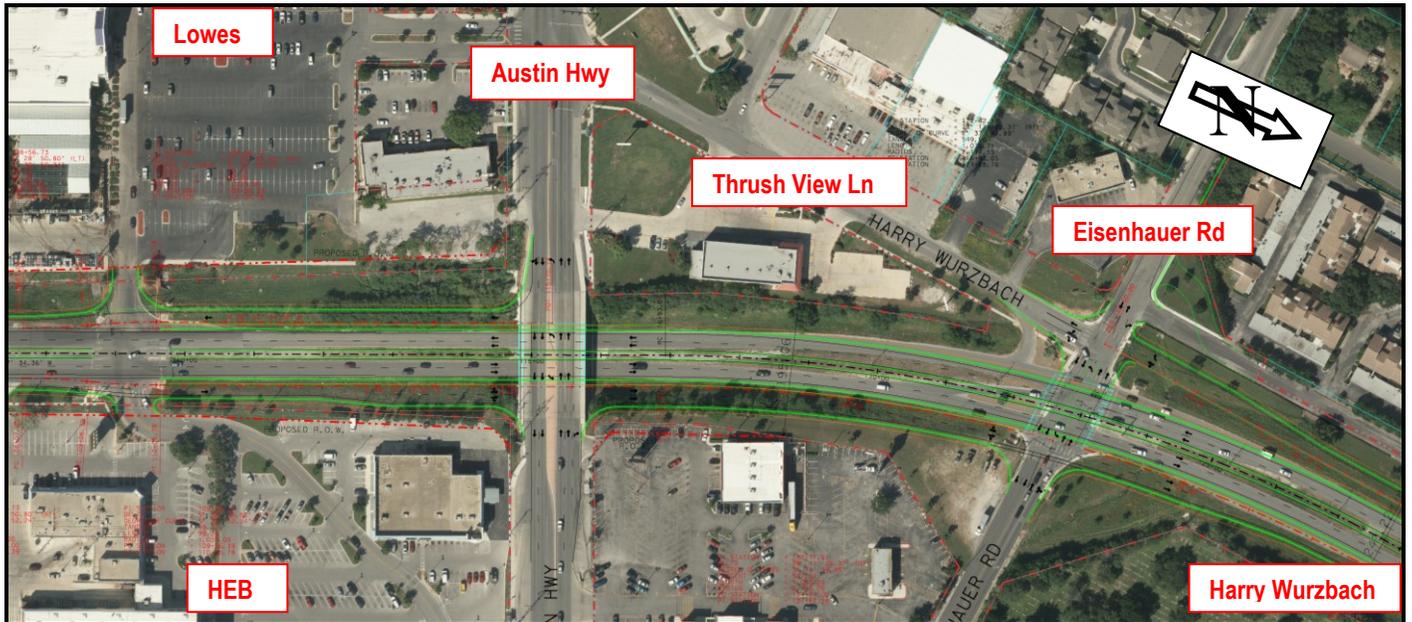


Figure 2 Proposed Roadway Improvements for Harry Wurzbach segment-Lowes/HEB driveway to Eisenhower Rd

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

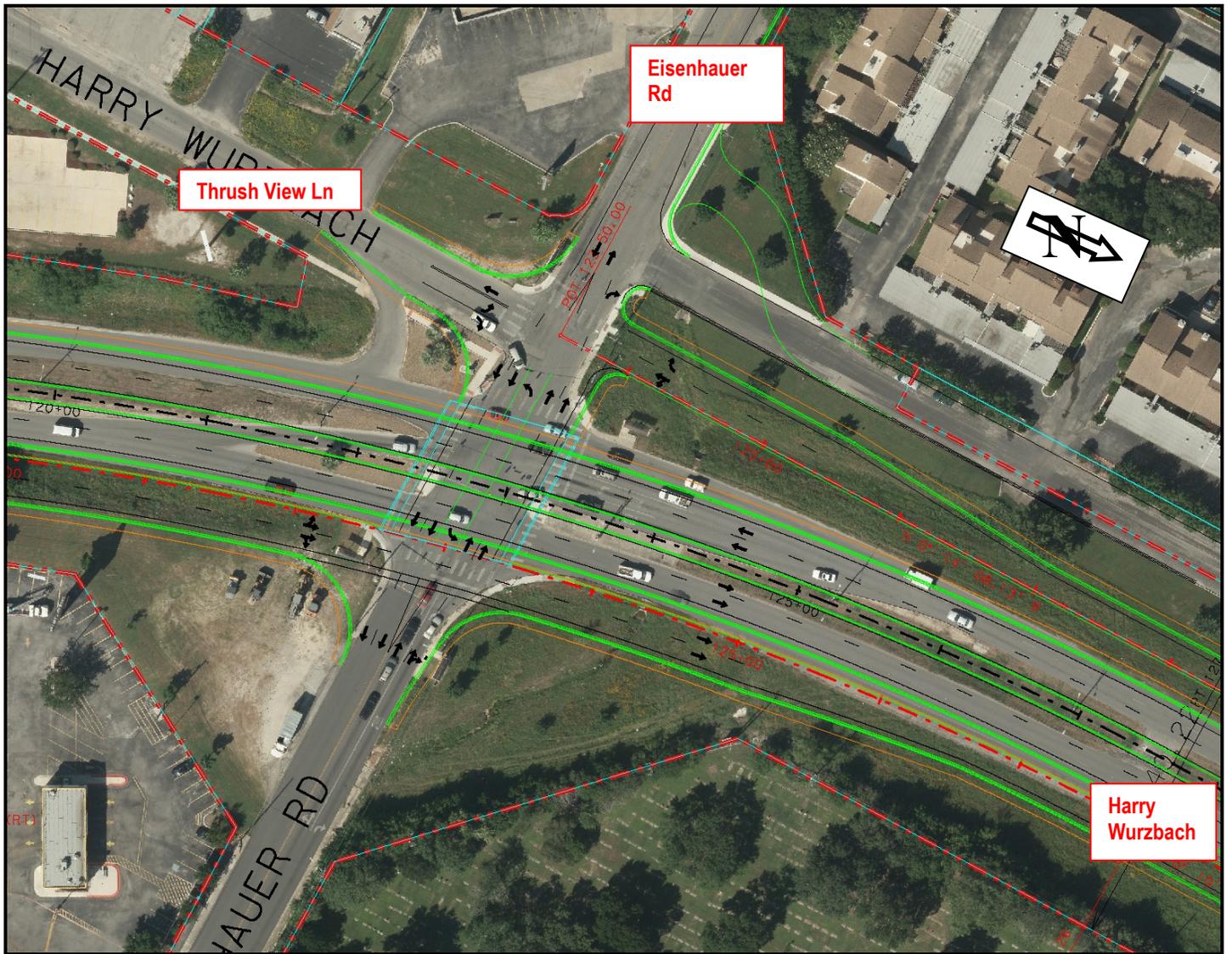


Figure 3 Proposed Improvements for Harry Wurzbach (below-grade) at Eisenhauer Rd (at-grade) intersection

SECTION 10 ANALYSIS OF INTERSECTIONS AND ARTERIAL

10.1 ANALYSIS

Using 2012 traffic volumes forecasted into year 2025 and 2035, the network will be evaluated.

TEDSI will evaluate the arterial Level of Service (LOS) using HCS and intersection LOS and volume to capacity ratios using Synchro software for the following scenarios:

2025 Forecasted Traffic Volumes (with proposed roadway improvements)

2035 Forecasted Traffic Volumes (with proposed roadway improvements)

Year 2025 and 2035 forecasted traffic volumes will be evaluated using existing roadway geometry as well as proposed roadway improvements. These scenarios will dictate if any improvements are needed to existing Harry Wurzbach Road with forecasted volumes.

For this analysis, there are no previous history on percent of truck traffic utilizing Harry Wurzbach Road and no information on truck traffic to be generated by proposed developments in the area. For this analysis, it will be assumed that 2 percent for base year 2012, 2025 and 2035 be utilized for traffic scenarios using Synchro software.

First step in analyzing Harry Wurzbach Road is to determine existing traffic control at the intersections. Once intersection performance is evaluated, arterial analysis for Harry Wurzbach Road will be analyzed and determine traffic progression through this arterial.

10.1.1 GROWTH RATES

TEDSI will assume an annual growth rate to be utilized in this report. Based on City of San Antonio Public Works Website, Average Daily Traffic (ADT) counts were conducted on Harry Wurzbach Road, locations north and south from the following minor streets: Rittiman Road, Austin Highway and Eisenhower Road. On TxDOT Urban Saturation Maps Traffic Maps show ADT counts for TxDOT-maintained roads, county roads and city streets for each district, and are performed every 5 years. For year 2010, in the San Antonio District, Harry Wurzbach was included in the traffic counts. Below are 2007-2011 ADT volumes and the percent increase in traffic: Text in black are City of San Antonio's data, text in red are from TxDOT, and text in green are from data collected recently in 2011-2012 by AC Group.

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

FORECASTED DAILY TRAFFIC VOLUMES FOR HARRY WURZBACH ROAD							
COUNTS ALONG HARRY WURZBACH		2007	2008	2010	2011	% INCREASE	% YEARLY INCREASE
Rittiman Road	CoSA		21,068		24,846	17.932	5.652
Austin Highway	CoSA						
Eisenhauer Road	CoSA	22,881			21,106	-7.758	-1.998
Austin Highway	TxDOT			7,180			
Urban Crest Drive/Oakwell Court	TxDOT			11,070	24,610	122.3	122.3
Rittiman Road	TxDOT			22300	24,846	11.417	11.417
Rittiman Road	AC Group				24,846		
Eisenhauer Road	AC Group				21,106		
Urban Crest Drive/Oakwell Court	AC Group				24,610		
					AVERAGE	35.97	34.34

Table 12 Calculations for percent growth in traffic, for CoSA, TxDOT and AC Group

Table 12 provides with uncertainty on obtaining a reasonable growth percentage rate from the above traffic counts. It will be mentioned that there are some referenced information from the MPO that is included in the Harry Wurzbach Program Assessment Study. MPO provided with GIS data with traffic counts throughout several segments within the project limits. Data is provided with year 2010, 2025 and 2035 ADT's. Below is a breakdown of forecasted daily traffic volumes:

FORECASTED DAILY TRAFFIC VOLUMES FOR HARRY WURZBACH ROAD						
COUNTS ALONG HARRY WURZBACH		2010	2025	2035	% INCREASE	% YEARLY INCREASE
Austin Highway to Northeast Parkway	MPO	22,001	27,798	30,075	2010-2025 = 26.349 2025-2035 = 8.191	2010-2025 = 1.571 2025-2035 = 0.79
Eisenhauer Road to Donovan Haven	MPO	26,501	31,974	35,445	2010-2025 = 20.652 2025-2035 = 10.856	2010-2025 = 1.259 2025-2035 = 1.036
				AVERAGE	2010-2025 = 23.5 2025-2035 = 9.52	2010-2025 = 1.415 2025-2035 = 0.913

Table 13 Calculations for percent growth of traffic volumes, from MPO data

After analyzing the above scenarios to determine a growth rate for existing traffic, reasonable growth rates are exhibited by MPO traffic count data and will be consistent with information presented in the Final Report for Harry Wurzbach TAPS Memorial Boulevard Programming Assessment. A 1.5% growth rate per year will be utilized from present year to 2025. Even though a 1% growth rate was observed for years 2025 through 2035, the 1.5% growth rate will be utilized as the worst case scenario for the arterial. Synchro outputs are located in the **Appendix** where the proposed 2025 and 2035 AM/PM peak hour Turning Movement Counts (TMC's) are illustrated.

10.1.2 INTERSECTION LEVEL OF SERVICE AND V/C RATIO-2025 AND 2035 FORECASTED CONDITIONS

Total traffic demands for year 2025 and 2035 will be based on proposed roadway improvements. LOS and V/C ratios are computed by Synchro software and presented in **Tables 14** and **15**.

To analyze the arterial with proposed improvements by S&B Infrastructure, signalized intersections will be evaluated on timing plans 21 and 30. Cycle lengths for AM and PM peak hours will be evaluated at 130 second cycle to compare with year 2012 Scenario.

Based on observations of existing conditions, the following modifications were implemented for years 2025 and 2035 scenarios:

- As Garner Middle School may exhibit pedestrian activity during morning and afternoon hours, it is recommended to provide minimum pedestrian crossing times at the signalized intersection. Any activation provided by pedestrians will ensure that they will receive adequate time in crossing and will keep coordination between signals for both AM and PM Peak hour analysis. The rest of the intersections will not include minimum pedestrian crossing times as pedestrians are less likely to be present and disrupt progression through the arterial. Also, SB Harry Wurzbach left turn lane was increased to 300 feet to decrease vehicles queues that may spill over into the through lanes.
- At the intersection with Oakwell Farms, SB left turn lane was increased to 300 feet to decrease vehicle queues that may spill over into the through lanes.
- At the intersection with Urban Crest/Oakwell Oak, a 200 feet NB left turn lane was included as part of roadway improvements for year 2025. This left turn lane will remove any left turning vehicles from the through lanes, reducing delay and rear end collisions.
- Existing Eisenhower Rd signalized intersection will not be included for year 2025 and 2035 as part of coordinated signals on Harry Wurzbach, based on S&B roadway improvements.
- At the signalized intersection of Harry Wurzbach and Lowes/HEB driveway, the existing permissive movement for the minor street was modified to simulate protected movements. This change was needed as the amount of movements combined with increased traffic will make difficult to maneuver through the intersection. Protected left turn movements will facilitate the motorists to have their own movement without additional conflicts.

Below are our findings using the above modifications:

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2025 INTERSECTION SUMMARY-AM AND (PM) PEAK HOURS			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	130	B (A)	16.5 (6.8)	.77 (.69)	UNDER-CAPACITY (UNDER-CAPACITY)
Oakwell Farms Parkway	130	B (B)	13.5 (12.5)	.78 (.79)	UNDER-CAPACITY (UNDER-CAPACITY)
Urban Crest Drive/Oakwell Court	130	B (B)	20.7 (20.7)	.65 (.78)	UNDER-CAPACITY (UNDER-CAPACITY)
Eisenhower Road	--	--	--	--	--
Lowe's/HEB Driveway (Uncoordinated)	110 (120)	D (D)	39.4 (49.9)	.90 (95)	UNDER-CAPACITY (UNDER-CAPACITY)

Table 14 Analysis for anticipated traffic conditions, AM and PM Peak Hour, for year 2025 scenario

Intersection LOS summary for Harry Wurzbach, year 2025:

- Signalized intersections at all analyzed intersections operate at acceptable LOS
- V/C ratio for signalized intersections demonstrates under-capacity conditions
- The addition of the proposed southbound access road, from Austin Highway to the intersection of Harry Wurzbach and Lowe's/HEB Driveway, is creating excessive delays. This southbound access road will need its own phase to allow for a safe and protected movement within the intersection. Capacity at this intersection is being reduced by the extra phase, reducing green time for all other approaches.

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	YEAR 2035 INTERSECTION SUMMARY-AM AND (PM) PEAK HOURS			
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION
Garner Middle School	130	C (A)	20.5 (9.4)	.92 (.93)	UNDER-CAPACITY (UNDER-CAPACITY)
Oakwell Farms Parkway	130	B (B)	13.8 (14.1)	.81 (.86)	UNDER-CAPACITY (UNDER-CAPACITY)
Urban Crest Drive/Oakwell Court	130	C (C)	23.5 (25.2)	.75 (.91)	UNDER-CAPACITY (UNDER-CAPACITY)
Eisenhower Road	--	--	--	--	--
Lowes/HEB Driveway (Uncoordinated)	130	E (E)	70.7 (64.5)	1.15 1.04 SBT (1.11)	OVER-CAPACITY (OVER-CAPACITY)

Table 15 Analysis for anticipated traffic conditions, AM and PM Peak Hour, for year 2035 scenario

Intersection LOS summary for Harry Wurzbach, year 2035:

- Signalized intersections at all analyzed intersections operate at acceptable LOS
- V/C ratio for signalized intersections demonstrates under-capacity conditions, except for Lowes/HEB Driveway.
- Synchro analysis dictated that the corridor’s best performance scenario is having the intersection of Lowes/HEB driveway as a actuated-uncoordinated signal.
- The addition of the proposed southbound access road, from Austin Highway to the intersection of Harry Wurzbach and Lowes/HEB Driveway, is creating excessive delays. This southbound access road will need its own phase to allow for a safe and protected movement within the intersection. Capacity at this intersection is being reduced by the extra phase, reducing green time for all other approaches.

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

10.1.3 ARTERIAL LOS ANALYSIS-2025 AND 2035 FORECASTED CONDITIONS

Below are results for Harry Wurzbach on Arterial LOS for year 2025 scenario:

HARRY WURZBACH ARTERIAL LOS-NB DIRECTION YEAR 2025- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Oakwell Farms-Garner M.S	45	15.6	11.0 (2.3)	26.6 (17.9)	.139	18.9 (27.9)	D (C)
Urban Crest-Oakwell Farms	45	24.0	10.7 (11.1)	34.7 (35.1)	.259	26.6 (26.6)	C (C)
Lowes/HEB-Urban Crest	45	76.8	6.7 (14.2)	83.5 (91.0)	.927	40.0 (36.7)	A (B)
Lowes/HEB	45	--	--	--	--	--	--

Table 16 Arterial LOS measurements for anticipated traffic conditions, AM and PM Peak Hour, for year 2025, NB direction

HARRY WURZBACH ARTERIAL LOS-SB DIRECTION YEAR 2025- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Garner M.S	45	--	--	--	--	--	--
Garner M.S.-Oakwell Farms	45	15.6	1.6 (2.7)	17.2 (18.3)	.139	29.1 (27.3)	C (C)
Oakwell Farms-Urban Crest	45	24.0	14.5 (16.5)	38.4 (40.6)	.259	24.2 (23.0)	C (C)
Urban Crest-Lowes/HEB	45	76.8	39.2 (34.3)	116 (111)	.927	28.8 (30.1)	C (C)

Table 17 Arterial LOS measurements for anticipated traffic conditions, AM and PM Peak Hour, for year 2025, SB direction

Arterial LOS summary for Harry Wurzbach, year 2025:

- Segment between Lowes/HEB and Urban Crest operates at a respectable free-flow operation. The removal of the 5-leg intersection at Eisenhower Rd improved travel speed through the arterial.
- NB direction on segment between Garner Middle School and Oakwell Farms, travel speed is reduced for morning activity at the middle school, inclusion of minimum pedestrian crossing times, as well as relative closeness between each signalized intersection that produced reduced travel speeds. This segment may not represent an accurate evaluation of urban street performance.
- The rest of the segments demonstrate stable conditions.

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

Below are results for Harry Wurzbach on Arterial LOS for year 2035 scenario:

HARRY WURZBACH ARTERIAL LOS-NB DIRECTION YEAR 2035- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Oakwell Farms-Garner M.S	45	15.6	15.5 (3.4)	31.1 (19.0)	.139	16.1 (27.2)	E (C)
Urban Crest-Oakwell Farms	45	24.0	11.2 (12.6)	35.2 (36.6)	.259	26.5 (29.4)	C (C)
Lowes/HEB-Urban Crest	45	76.8	15.0 (16.8)	91.8 (93.6)	.927	36.4 (39.8)	B (A)
Lowes/HEB	45	--	--	--	--	--	--

Table 18 Arterial LOS measurements for anticipated traffic conditions, AM and PM Peak Hour, for year 2035, NB direction

HARRY WURZBACH ARTERIAL LOS-SB DIRECTION YEAR 2035- AM AND (PM) PEAK HOUR							
SEGMENT	BASE FREE FLOW SPEED (MPH)	RUNNING TIME (SEC)	SIGNAL DELAY (SEC)	TRAVEL TIME (SEC)	DISTANCE (MILES)	ARTERIAL SEGMENT SPEED (MPH)	ARTERIAL LOS
Garner M.S	45	--	--	--	--	--	--
Garner M.S.-Oakwell Farms	45	15.6	1.4 (3.1)	17.0 (18.7)	.139	29.4 (26.8)	C (C)
Oakwell Farms-Urban Crest	45	24.0	17.8 (21.7)	41.8 (45.7)	.259	22.3 (20.4)	D (D)
Urban Crest-Lowes/HEB	45	76.8	70.6 (38.0)	147.4 (114.8)	.927	22.6 (29.1)	F (C)

Table 19 Arterial LOS measurements for anticipated traffic conditions, AM and PM Peak Hour, for year 2035, SB direction

Arterial LOS summary for Harry Wurzbach, year 2035:

- For southbound segment of Urban Crest-Lowes/HEB Driveway, a V/C ratio greater than 1 was observed for through movement, where the segment will be categorized by a LOS “F”. Improvements/modifications are necessary at this intersection to alleviate through movement delays.
- NB direction on segment between Garner Middle School and Oakwell Farms, travel speed is reduced for morning activity at the middle school, as well as including minimum pedestrian crossing times and relative closeness between each signalized intersection, which produced very low travel speeds. This segment may not represent an accurate evaluation of urban street performance. Travel speed is reduced from 18.9 MPH (Year 2025) to 16.1 MPH (Year 2035). This

segment, in year 2025, is in the lower portion of LOS “D”, year 2035 is at the upper portion of LOS “E”. LOS “E” is characterized by unstable operations and significant delay. The service level is increased in the afternoon hours as it is not in conflict with Garner Middle School dismissal of students, which occurs before the PM peak hour.

- SB direction on segment between Oakwell Farms and Urban Crest, travel speed is reduced and service level is decreased into LOS “D”. It indicates a less stable condition in which small increase in flow may cause substantial increase in delay and decrease travel speed. Both AM and PM peak hour travel speeds are relatively close to LOS “C” in which travel speed occurs, which demonstrate stable operations.
- The rest of the segments demonstrate stable conditions.

SECTION 11 ANALYSIS OF HARRY WURZBACH ROAD

11.1 OBSERVATIONS

Harry Wurzbach Road will experience potential growth of traffic volumes that will be generated along the arterial during the next 23 years. Below is a recap of Year 2012 Uncoordinated, 2012 Coordinated, 2025 Coordinated and 2035 coordinated scenarios:

INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	AM PK HR INTERSECTION SUMMARY			
		2012 Uncoordinated			
		2012 Coordinated			
		2025 Coordinated			
				2035 Coordinated	
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION: U=UNDER-CAPACITY O=OVER-CAPACITY
Garner Middle School	95	B	17.4	.84	U
	130	B	13.7	.73	U
	130	B	16.5	.77	U
	130	C	20.5	.92	U
Oakwell Farms Parkway	80	B	13.1	.73	U
	130	B	11.6	.75	U
	130	B	13.5	.78	U
	130	B	13.8	.81	U
Urban Crest Drive/Oakwell Court	85	C	20.0	.74	U
	130	C	20.8	.75	U
	130	B	20.7	.65	U
	130	C	23.5	.75	U
Eisenhauer Road	155	F	83.3	1.22	O
	130	D	32.9	.95	U
	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A
Lowe's/HEB Driveway	85	B	13.8	.58	U
	130	B	12.7	.97	U
	130	C	39.4	.90	U
	130	E	70.7	1.15 (1.04 SB)	O

Table 20 Analysis for Harry Wurzbach signalized intersections, AM Peak Hour, for years 2012, 2025 and 2035

Observations for AM PK Hour Highlights:

- Year 2012 Uncoordinated:
 - Eisenhauer Rd exhibits oversaturated conditions, due to the inclusion of minimum pedestrian crossing times
 - The rest of signalized intersections operate at acceptable levels
- Year 2012 Coordinated:
 - The signalized intersections operate at acceptable levels

- Year 2025 Coordinated:
 - Eisenhower Rd is not included with arterial analysis, as Eisenhower Rd will be at-grade intersection; Harry Wurzbach will become below-grade and will have no restrictions on free-flow speed.
 - Signalized intersection at Lowes/HEB included protected movements for EB and WB directions. Added an extra phase to accommodate proposed southbound access road, from Austin Highway into the intersection of Lowes/HEB Driveway.
 - Signalized intersections operate at acceptable levels
- Year 2035 Coordinated:
 - Eisenhower Rd is not included with arterial analysis, as Eisenhower Rd will be at-grade intersection; Harry Wurzbach will become below-grade and will have no restrictions on free-flow speed.
 - Signalized intersection at Lowes/HEB included protected movements for EB and WB directions. Added an extra phase to accommodate proposed southbound access road, from Austin Highway into the intersection of Lowes/HEB Driveway.
 - Signal LOS for intersection of Harris Wurzbach and Lowes/HEB Driveway demonstrates a LOS "E", with V/C ratio over 1 for the southbound through movement, southeast through movement (southbound access road) and westbound left turn movement. Due to the V/C ratio greater than 1 for a through movement, arterial LOS "F" will be designated regardless of travel speed.
 - The rest of the signalized intersections operate at acceptable levels

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

INTERSECTIONS ALONG HARRY WURZBACH RD	CYCLE LENGTH (SEC)	PM PK HOUR INTERSECTION SUMMARY			
				2012 Uncoordinated	2012 Coordinated
				2025 Coordinated	2035 Coordinated
		INTERSECTION DELAY		CAPACITY	
		LOS	DELAY (SEC)	MAX V/C RATIO	CONDITION: U=UNDER-CAPACITY O=OVER-CAPACITY
Garner Middle School	90	A	9.8	.72	U
	130	A	7.1	.75	U
	130	A	6.8	.69	U
	130	A	9.4	.93	U
Oakwell Farms Parkway	90	B	13.9	.76	U
	130	B	11.3	.82	U
	130	B	12.5	.79	U
	130	B	14.1	.86	U
Urban Crest Drive/Oakwell Court	125	C	21.3	.81	U
	130	B	17.5	.77	U
	130	B	20.7	.78	U
	130	C	25.2	.91	U
Eisenhower Road	155	F	146.4	2.47	O
	130	D	39.2	1.09 WBT	O
	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A
Lowe's/HEB Driveway	75	B	16.2	.75	U
	130	B	18.2	1.00 WBLTR	O
	130	C	49.9	.95	U
	130	E	64.5	1.11 EBT	O

Table 21 Analysis for Harry Wurzbach signalized intersections, PM Peak Hour, for years 2012, 2025 and 2035

Observations for PM PK Hour Highlights:

- Year 2012 Uncoordinated:
 - Eisenhower Rd exhibits oversaturated conditions, due to the inclusion of minimum pedestrian crossing times
 - The rest of signalized intersections operate at acceptable levels
- Year 2012 Coordinated:
 - Eisenhower Rd and Lowe's/HEB Driveway still experiences a high V/C ratio, despite the elimination of minimum pedestrian crossing times from signal timings
 - The rest of signalized intersections operate at acceptable levels
- Year 2025 Coordinated:
 - Eisenhower Rd is not included with arterial analysis, as Eisenhower Rd will be at-grade intersection; Harry Wurzbach will become below-grade and will have no restrictions on free-flow speed.
 - Signalized intersection at Lowe's/HEB included protected movements for EB and WB directions. Added an extra phase to accommodate proposed southbound access road, from Austin Highway into the intersection of Lowe's/HEB Driveway.
 - Signalized intersections operate at acceptable levels

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

- Year 2035 Coordinated:
 - Eisenhower Rd is not included with arterial analysis, as Eisenhower Rd will be at-grade intersection; Harry Wurzbach will become below-grade and will have no restrictions on free-flow speed.
 - Signal LOS for intersection of Harris Wurzbach and Lowes/HEB Driveway demonstrates a LOS “E”.
 - Signalized intersection at Lowes/HEB included protected movements for EB and WB directions. Added an extra phase to accommodate proposed southbound access road, from Austin Highway into the intersection of Lowes/HEB Driveway.
 - The rest of the signalized intersections operate at acceptable levels

Below is an arterial LOS recap of Year 2012 Uncoordinated, 2012 Coordinated, 2025 Coordinated and 2035 coordinated scenarios:

HARRY WURZBACH ARTERIAL LOS-NB AND SB DIRECTION-AM PEAK HOUR 2012 Uncoordinated 2012 Coordinated 2025 Coordinated 2035 Coordinated						
SEGMENT	BASE FREE FLOW SPEED (MPH)	SB ARTERIAL SEGMENT SPEED (MPH)	SB ARTERIAL LOS	NB ARTERIAL SEGMENT SPEED (MPH)	NB ARTERIAL LOS	SEGMENT
Garner M.S.-Oakwell Farms	45	N/A	N/A	N/A	N/A	Oakwell Farms-Garner M.S.
		29.1	C	22.4	D	
		29.1	C	18.9	D	
		29.4	C	16.1	E	
Oakwell Farms-Urban Crest	45	N/A	N/A	N/A	N/A	Urban Crest-Oakwell Farms
		24.8	C	31.8	B	
		24.2	C	26.6	C	
		22.3	D	26.5	C	
Urban Crest-Eisenhower (2012)	45	N/A	N/A	N/A	N/A	Eisenhower-Urban Crest (2012)
		27.6	C	34.6	B	
		N/A	N/A	N/A	N/A	
		N/A	N/A	N/A	N/A	
Eisenhower-Lowes/HEB (2012)	45	N/A	N/A	N/A	N/A	Lowes/HEB-Eisenhower (2012)
		35.4	B	21.7	D	
		N/A	N/A	N/A	N/A	
		N/A	N/A	N/A	N/A	
Urban Crest-Lowes/HEB (2025, 2035)	45	N/A	N/A	N/A	N/A	Lowes/HEB-Urban Crest (2025, 2035)
		N/A	N/A	N/A	N/A	
		28.8	C	40.0	A	
		22.6	F	36.4	B	

Table 22 Arterial LOS measurements for anticipated traffic conditions, AM Peak Hour, for year 2012, 2025 and 2035, NB and SB direction

Observations for AM PK Hour Highlights:

- Year 2012 Uncoordinated:
 - Year 2012 Uncoordinated conditions was not evaluated as per existing conditions
- Year 2012 Coordinated:
 - All of the segments demonstrate stable conditions.
- Year 2025 Coordinated:
 - Segment between Lowes/HEB and Urban Crest operates at a respectable free-flow operation. The removal of the 5-leg intersection at Eisenhower Rd improved travel speed.
 - The rest of the segments demonstrate stable conditions.
- Year 2035 Coordinated:
 - NB direction on segment between Garner Middle School and Oakwell Farms, travel speed is reduced for morning activity at the middle school, as well as including minimum pedestrian crossing times and relative closeness between each signalized intersection, which produced very low travel speeds. This segment may not represent an accurate indication of urban street performance. Travel speed is reduced from 18.9 MPH to 16.4 MPH. This segment, in year 2025, is in the lower portion of LOS "D", year 2035 is at the upper portion of LOS "E". LOS "E" is characterized by unstable operations and significant delay. The service level is increased in the afternoon hours as it is not in conflict with Garner Middle School dismissal of students, which occurs before the PM peak hour.
 - Segment between Urban Crest and Lowes/HEB Driveway categorized as LOS "F" as V/C ratio for the southbound through movement was greater than 1.

ARTERIAL AND INTERSECTION CAPACITY ANALYSIS

HARRY WURZBACH ROAD

HARRY WURZBACH ARTERIAL LOS-NB AND SB DIRECTION-PM PEAK HOUR 2012 Uncoordinated 2012 Coordinated 2025 Coordinated 2035 Coordinated						
SEGMENT	BASE FREE FLOW SPEED (MPH)	SB ARTERIAL SEGMENT SPEED (MPH)	SB ARTERIAL LOS	NB ARTERIAL SEGMENT SPEED (MPH)	NB ARTERIAL LOS	SEGMENT
Garner M.S.- Oakwell Farms	45	N/A	N/A	N/A	N/A	Oakwell Farms- Garner M.S.
		26.5	C	25.0	C	
		27.3	C	27.9	C	
		26.8	C	27.2	C	
Oakwell Farms- Urban Crest	45	N/A	N/A	N/A	N/A	Urban Crest- Oakwell Farms
		27.0	C	23.1	C	
		23.0	C	26.6	C	
		20.4	D	29.4	C	
Urban Crest- Eisenhauer (2012)	45	N/A	N/A	N/A	N/A	Eisenhauer- Urban Crest (2012)
		25.9	C	26.2	C	
		N/A	N/A	N/A	N/A	
		N/A	N/A	N/A	N/A	
Eisenhauer- Lowe/HEB (2012)	45	N/A	N/A	N/A	N/A	Lowe/HEB- Eisenhauer (2012)
		31.9	B	22.9	C	
		N/A	N/A	N/A	N/A	
		N/A	N/A	N/A	N/A	
Urban Crest- Lowe/HEB (2025, 2035)	45	N/A	N/A	N/A	N/A	Lowe/HEB- Urban Crest (2025, 2035)
		N/A	N/A	N/A	N/A	
		30.1	C	36.7	B	
		29.1	C	39.8	A	

Table 23 Arterial LOS measurements for anticipated traffic conditions, PM Peak Hour, for year 2012, 2025 and 2035, NB and SB direction

Observations for PM PK Hour Highlights:

- Year 2012 Uncoordinated:
 - Year 2012 Uncoordinated conditions were not evaluated as per existing conditions
- Year 2012 Coordinated:
 - All of the segments demonstrate stable conditions.
- Year 2025 Coordinated:
 - Segment between Lowe/HEB and Urban Crest operates at a respectable free-flow operation. The removal of the 5-leg intersection at Eisenhauer Rd improved travel speed.
 - The rest of the segments demonstrate stable conditions.
- Year 2035 Coordinated:
 - SB direction on segment between Oakwell Farms and Urban Crest, travel speed is reduced and service level is decreased into LOS “D”. It indicates a less stable condition in which small increase in flow may cause substantial increase in delay and decrease travel speed. PM peak hour travel speed is relatively close to LOS “C” travel speed (>22.5 MPH), which demonstrate stable operations.

SECTION 12 CONCLUSIONS AND RECOMMENDATIONS

12.1 INTERSECTION AND ARTERIAL RESULTS FOR HARRY WURZBACH ROAD AND RECOMMENDATIONS FOR STUDY AREA

Based on the above analysis of intersections and segments along Harry Wurzbach, recommendations are as follows:

- Include ADA compliant pedestrian facilities throughout Harry Wurzbach: connecting sidewalks, ramps, LED countdown pedestrian signal heads, accessible pedestrian push buttons and cross slope across path of travel in roadway.
- Incorporate traffic signal head arrangements (if traffic signal improvements are made with roadway improvements proposed by S&B) based on 2010 TMUTCD. 5-section signal heads will not be allowed unless signal head is shared with left turn lane/thru lane. 4-section flashing yellow arrow configuration provides with flexibility to allow for protected/permissive mode and protected only mode left turns.
- Increase SB left turn lane storage at intersection of Garner Middle School and Oakwell Farms to 300 feet.
- Include a 200 foot NB left turn lane at the intersection of Oakwell Oaks. There are existing left turn movements being performed on the inside northbound through lane, causing delays and may produce rear-end accidents.
- Allow for the addition/widen the minor street entrances at Oakwell Oak and Urban Crest to allow for a dedicated left turn lane. Adding left turn lanes will allow for flexibility in signal phasing and may reduce delays at the intersection by eliminating the existing split phase for WB and EB movements.
- Removal of the signalized intersection of Harry Wurzbach and Eisenhower Rd will reduce through delays and increase travel speeds along the corridor.
- Modify coordination plans with the removal of the signalized intersection at Eisenhower Rd. As the traffic signal at Eisenhower Rd was the critical intersection along the corridor, it became the anchor point along the corridor. Now that there is the opportunity to eliminate this critical intersection, there will be new possibilities to increase travel speed along Harry Wurzbach. Based on Synchro, the intersection of Lowes/HEB Driveway performs best as an actuated-uncoordinated signal.
- Due to a proposed southbound access road from Austin Highway into the intersection of Lowes/HEB driveway, an additional phase was added to allow protected movements. As this access road will require their own dedicated left turn and right turn movements as to no to conflict with southbound lane movements. This additional phase will reduce capacity at this intersection.
- Increase NB and SB left turn lane storage at the intersection of Lowes/HEB to 200 feet.
- Allow for the addition/widen minor street entrances at Lowes and HEB driveways to allow for dedicated left turn lanes. Adding left turn lanes will allow for flexibility in signal phasing and may reduce delays at the intersection.



APPENDIX F

Design Summary Report (DSR)

City of San Antonio Design Summary Report

The DSR is intended to be a tool that can be used by the Project Delivery team to anticipate and memorialize basic project information, with the objective being to minimize or eliminate rework, last minute surprises, and their associated costs and delays.

Although the DSR addresses a wide range of issues that can affect the design and delivery of a project, every project is unique and, as such, every project warrants thoughtful consideration about how its design and construction will be accomplished. Not all factors identified in the DSR will apply to each project and factors will arise on some projects that are not addressed in the standard DSR. Those individuals contributing the DSR are encouraged to think comprehensively and tailor their use of the DSR form to meet the unique needs of the project.

It is likely that the DSR will be partially completed prior to the Initial Scope Meeting (ISM) and updated from time to time as the project progresses. As information is added or revised, it is strongly recommended that they be associated with a date and the author of the change. Information that is outdated should not be deleted, but stricken, so as to preserve a more complete record of the progression of the project design. The ISM should be stored on the Web Portal and available for all parties to review. The City PM and the Consultant PM should be the only parties that can modify the ISM.

I. SCHEDULING, FUNDING, AND DELIVERY

Project: Harry Wurzbach Taps Memorial Blvd

Type of Project: Rehabilitation

Project Background, History, Goals and Objectives: Schematic and PER

City Council District: 10

Other Projects affected by this project: Other Projects

Preliminary Engineering Report Required (COSA PM Decision) yes

Project Schedule	Duration	Start	Completion
Design <u>days</u>		<u>M/D/YYYY</u>	<u>M/D/YYYY</u>
Environmental/Permitting <u>days</u>		<u>M/D/YYYY</u>	<u>M/D/YYYY</u>
ROW Acquisition <u>days</u>		<u>M/D/YYYY</u>	<u>M/D/YYYY</u>
Construction <u>days</u>		<u>M/D/YYYY</u>	<u>M/D/YYYY</u>

Programmed Funding and Date Available (Excluding Utility Costs):

Design	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
ROW	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Construction	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

Project Construction Cost Estimate History (Excluding Utility Relocation Costs):

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

Project Funding Partners and Description of Work, etc.

- SAWS - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

- CPS - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

- TxDOT - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

- ROW Costs - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

- Environmental Costs - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

- Capital Administration Costs - Description of Work, Etc.

Level 1 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
Level 2 Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
PER Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
40% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
70% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>
95% Design Project Estimate	<u>\$0.00</u>	Date	<u>M/D/YYYY</u>

Project Delivery

Anticipated method of project delivery

- Design-bid-build
 Competitive Sealed Proposals (list factors influencing awards)
 Cost (000%)
 Schedule (000%)
 Prior Experience (000%)
 Other (000%)
 Construction Manager at Risk
 Design-Build

II. EXISTING CONDITIONS

A1. Existing typical roadway conditions for Harry Wurzbach (From 900ft south of Rittman Rd to IH410)

1. Number of traffic lanes 4
2. Approximate lane width 12ft
3. Approximate shoulder/parkway width Varies
4. Sidewalks A small section of the project 2' wide
5. Median width 20'
6. Curbs Yes
7. Underground Storm Drainage System Yes

A2. Existing typical roadway conditions for Harry Wurzbach (From Fort Sam North Gate to about 900ft south of Rittman Rd)

1. Number of traffic lanes 4
2. Approximate lane width 12ft
3. Approximate shoulder/parkway width varies
4. Sidewalks None
5. Median width No
6. Curbs No
7. Underground Storm Drainage System No

B. Existing bridge and bridge class structure data

1. Name of stream, tributary, etc Ft. Sam Houston Tributary to Salado Creek
2. Structure type Bridge Class Structure
3. Structure length Approx. 27 LF
4. Date of construction ??????
5. Is structure adequate for:
 - a. Roadway ???
 - b. Sidewalk and pedestrian ???
 - c. Hydraulic capacity ???

C. Underground and cross drainage facilities:

- Location A Description: SBC 6' X 5' Meets 25Yr Event
Location B Description: SBC 5' x 5' Meets 25Yr Event
Location C Description: SBC 10' X 5.5' Meets 25Yr Event
Location D Description: MBC 4~6' X 5' Meets 25Yr Event
(Bridge Class Structure)
Location E Description: SBC 6' X 2' Does not meet 25Yr Event
Location F Description: SBC 6' X 6' Does not meet 25Yr Event
Location G Description: MBC 2~6' X 5' Does not meet 25Yr Event
Location H Description: SBC 7' X 6' Meets 25Yr Event

D. ROW

Existing ROW width	<u>Length</u>
Is ROW adequate?	<u>No</u>
Existing Sidewalks (Condition 0-3)	<u>0</u>
Existing Curb Ramps (Condition 0-3)	<u>0</u>
Estimated number of adjacent parcels	<u>##</u>
Estimated number of parcels required	<u>##</u>
Will "corner clips" be acquired?	<u>Yes</u>
Characterize adjacent land use: <u>Description</u>	

E. Environmental

Potential environmental concerns (i.e., gas stations, industrial sites, auto shops, landfills, etc.): Description: N/A
 Existing Creeks and/or Tributaries: Description: N/A
 Potential Historical Area (50 years or older) Description: N/A
 Potential Archeological Sites: Description: N/A
 Potential Endangered Species Habitat Area: Description: N/A
 Project over Edwards Aquifer Recharge or Transition Zone: Description: N/A

F. Constraints

Schools: Yes, John Garner Middle School
 Parks: Yes, Sunset Memorial Park
 Businesses: Yes, varies
 Cemeteries: Yes, Fort Sam Houston National Cemetery
 Trees: Yes, varies
 Other: Yes, Fort Sam Houston Golf Course

G. Railroads: crossing adjoining grade separation
 Railroad owner: Owner's Name
 Type of warning device:
 Passive
 Flashing lights only
 Lights and gates
 Other (pre-emption, crossing consolidation, etc.): Explain

H. Airport Clearance Zone issues: None

K. Are there any existing traffic signals, crosswalks, school zones, fire stations, emergency medical facilities, etc. that warrant special design consideration?
Yes, school crossing, emergency medical facilities.

L. Any other relevant information about the project that should be considered, such as existing historic structures or aesthetic design enhancement? Aesthetic design should be considered.

III. BASE MAPPING, GEOTECHNICAL & ENVIRONMENTAL, PERMITTING, & COMMUNITY RELATIONS ISSUES

Surveying and Mapping

Is aerial topo and mapping desired? Yes Scale: 1"=40'

- planimetric
- orthophoto
- contours

Coordinate system to be used: State Plain South Central Texas

Vertical control system to be used: NAD 83

ROW and/easements required? Yes Unknown No
Conceptual ROW Expansion approach (e.g., corner clips only, equal amounts both sides, all on one side, variable, etc.) Corner Clips, Roadway widening areas.

Locate apparent ROW only Locate and resolve ROW and side lot lines
Tree mitigation survey requirements (e.g., tie clusters, all trees over certain diameter, trunk size only, canopy) Yes

IV. DESIGN ISSUES

Governing Specifications: AASHTO 04

Roadways

Functional Classification for each roadway: Urban Principal Arterial

Design Speed: 45 mph

Preliminary Lane configuration

4 Number of lanes
1ft Offset from travel lane to face of curb
12ft Width of lanes
 Dual Left Turn Lane Width: 14
Type Curbed Median/surface treatment (concrete, grass, landscape, etc.)
Bike Facilities (check all that apply)
 Bike Lanes How many: 2
 Bike Accommodation Lanes
 Bike Paths

Sidewalk locations: Both Sides 5' wide

Bus stop pads: Yes No

Clear Zone width: 1.5ft from face of curb to top of ditch

Conceptual parkway restoration approach: Description

Controlling geometric design criteria

UDC
 AASHTO
 Other: Describe

Are any design waivers anticipated? Yes No
If so, what are they? Describe

Roadway Illumination

Intersections only
 Continuous lighting

Photometric Design by:

CPS
 Design Consultant

Vertical Clearance 16 FT

Ramps

Functional Classification for each roadway: Urban Principal Arterial

Design Speed: 45 mph

Preliminary Lane configuration

- Number of lanes
- 14ft Width of lanes
- Dual Left Turn Lane Width: ##
- Type Curbed Median/surface treatment (concrete, grass, landscape, etc.)
- Bike Facilities (check all that apply)
- Bike Lanes How many: 1
- Bike Accommodation Lanes
- Bike Paths

Sidewalk locations: Out Side 5' wide

Bus stop pads: Yes No

Clear Zone width: 1.5ft from face of curb to top of ditch

Conceptual parkway restoration approach: Description

Controlling geometric design criteria

- UDC
- AASHTO
- Other: Describe

Are any design waivers anticipated? Yes No
If so, what are they? Describe

Roadway Illumination

- Intersections only
- Continuous lighting

Photometric Design by:

- CPS
- Design Consultant

Vertical Clearance 16 FT

Traffic

Are additional traffic studies/counts required? Yes No
Describe if yes: Describe

Are there major generators in the project area? Yes No
Describe if yes: Fort Sam Houston Entrance Gate. Peek Hours.

Minimum Design Level of Service desired: C

Traffic signals

Signal head orientation Horizontal Vertical
 Mast arm Span wire/strain poles

Controller Type

Type 2070 (City maintained)

NEMA (TxDOT maintained)

Will controller maintenance be transferred to City? Yes

Are signal coordination communications facilities desired? Yes

School Zone Flashers

None (school zone signs only)

Roadside

Overhead

Intelligent traffic systems issues

Storm Drainage

Design/Analysis Frequency (in years):

25 -year rainfall event Streets (may depend on functional classification)

25 -year rainfall event Inlets

25 -year rainfall event Underground storm drains

25 -year rainfall event Open channels

25 -year rainfall event Cross drainage facilities

100 -year rainfall event Creeks, rivers, etc delineated as Zone A on FIRM

Hydrology analyzed for: (Choose one of the following)

existing conditions only

ultimate conditions

Runoff methodology: (Choose one of the following)

Rational method

TR55

a TxDOT

Other

Minimum number of un-flooded lanes to be provided for design storm: 1

On-grade inlet preferences: Description

Gate inlet preferences: Description

Open channel preferences

Earth lined (max side slope 3:1)

Geotextile armored (max side slope 2:1)

Concrete armored (max side slope 1:1)

Gabion armored

Full channel

Pilot channel only

Vertical wall concrete channel

Outfall preferences

Concrete chutes/scuppers

Pipe/box culvert to toe of slope

Preliminary Maintenance Access Ramp locations: Description

Construction Phasing

Preliminary construction phasing preferences:

- Half at a time
- Section by Section
- Other: Describe

Temporary illumination to be provided? Yes

Design Enhancements

Describe preliminary design enhancements desired (concept, location, budget, etc): Description

Overhead Utility Conversion? _____

V. PROJECT JOURNAL

Date Initially Created:	04/13/2012
Date Modified/Updated:	<u>MM/DD/YYYY</u>
Description:	<u>Describe</u>
Date Modified/Updated:	<u>MM/DD/YYYY</u>
Description:	<u>Describe</u>
Date Modified/Updated:	<u>MM/DD/YYYY</u>
Description:	<u>Describe</u>
Project Closed:	<u>MM/DD/YYYY</u>

PROJECT: Harry Warzbach
 CLIENT: City of San Antonio
 CSJ:
 COUNTY: Bexar
 S & B JOB NO.: U1810
 TASK: Roadway Design

Harry Warzbach
 Geometric Design Criteria

Description	Design Criteria					
	Mainlanes		American Association of State Highway and Transportation Officials (AASHTO)-04 and COSA Design Guidance Manual (DGM)-12, TxDOT Hydraulic Manual (TxDOT), San Antonio Unified Development Code (UDC)			
	Desirable	Minimum	Figure	Figure Page No.	Paragraph	Paragraph Pg. No.
Roadway Classification (TCM)	Collector Street, Residential					
Level of Service	C	D				
Design Speed	45 mph	45 mph	DGM	Table 1		
Horizontal Alignments (TCM)						
Control Location	RDWY Centerline					
Stopping Sight Distance	360'	360'	DGM	Exhibit 3-1		
Minimum Horizontal Radius	643'	643'	DGM	Exhibit 3-15		
Max. Superelevation Rate	6%	6%	DGM	Table 1		
Vertical Alignment (TCM)						
Control Location	RDWY Baseline					
Maximum Gradient (%)	8% MAX	0.4% MIN	DGM	Exhibit 6-8		
Maximum Algebraic Difference (%)	1%	1%	DGM	Table 1		
Crest Curve K Value		61	AASHTO(04')	3-71, 271	Ch 3	
Sag Curve K Value		79	AASHTO(04')	3-74, 275	Ch 3	
Vertical Clearance (TCM)						
Roadway	16.5'	14.5'	DGM	Table 1		
Cross Section Elements (TCM)						
Proposed Through Lane Width	12	10	DGM	Table 1		
Proposed Number of Through Lanes	2 LN		Existing			
Cross Slope - Lanes	2.0%	2.0%	AASHTO(04')		Ch 3	
Offset to Face of Curb	2	1	DGM	Table 1		
Median Width	18	4	DGM	Table 1		
Bicycle Lane Width	8	5	DGM	Table 1		
Border	11	8	DGM	Table 1		
Sidewalk Width	6	4	DGM	Table 1		
Sidewalk Cross Slope	2.00%		ADA			
Side Slopes	4 TO 1		AASHTO(04')		Ch 3	
Clear Zone Width Curb	3.0'	1.5'	DGM	Table 1		
Intersections	Yes		AASHTO(04')		Ch 3	
Turning Radius	20'		AASHTO(04')		Ch 3	
Driveway Grades	14%	14%	DGM		Sec 7	
Ramps						
Proposed Through Lane Width	14	14	DGM	Table 1		
Proposed Number of Through Lanes	2 LN		Existing			
Cross Slope - Lanes	2.0%	2.0%	AASHTO(04')		Ch 3	
Bridges						
Proposed Through Lane Width	12	12	AASHTO(04')	Exhibit 6-6	Ch 6	
Proposed Number of Through Lanes	2 LN		DGM		Sec 7	
Shoulders	3	3	AASHTO(04')	Exhibit 6-6	Ch 6	
Design Loading Structural Capacity	HS 20	HS 20	AASHTO(04')	Exhibit 6-6	Ch 6	
Drainage Design (DGM)						
Hydrology			DGM		Ch 4	
Method of computing runoff			UDC		(c)	Article V, Sec 35-504

PROJECT: Harry Warzbach
 CLIENT: City of San Antonio
 CSJ:
 COUNTY: Bexar
 S & B JOB NO.: U1810
 TASK: Roadway Design

Harry Warzbach
 Geometric Design Criteria

Description	Design Criteria				
	Mainlanes		American Association of State Highway and Transportation Officials (AASHTO)-04 and COSA Design Guidance Manual (DGM)-12, TxDOT Hydraulic Manual (TxDOT), San Antonio Unified Development Code (UDC)		
	Desirable	Minimum			
<640 acres	Rational Method		UDC		(c)(1)(A) Article V, Sec 35-504
>=640 acres	SCS Method		UDC		(c)(1)(B) Article V, Sec 35-504
Minimum Time of Concentration	5min	5min	UDC		(c)(2) Article V, Sec 35-504
Runoff Coefficient	Over 1% up to 3%	Over 3% up to 5%	UDC		(c)(3) Article V, Sec 35-504
Business or Commercial (90% or more impervious)	0.96	0.97	UDC		(c)(3) Article V, Sec 35-504
Densely developed (80% to 90% impervious)					
Closely Built Residential	0.88	0.91	UDC		(c)(3) Article V, Sec 35-504
Undeveloped	0.77	0.8	UDC		(c)(3) Article V, Sec 35-504
Large Lot Residential	0.7	0.72	UDC		(c)(3) Article V, Sec 35-504
Average residential	0.57	0.62	UDC		(c)(3) Article V, Sec 35-504
Average residential tail	0.67	0.69	UDC		(c)(3) Article V, Sec 35-504
Rainfall Intensity, 5 min (in/hr)	8.76 (25yr)	10.44 (100yr)	UDC	Table 504-2	(c)(4) Article V, Sec 35-504
SCS curve numbers			UDC	Table 504-3	(c)(4) Article V, Sec 35-504
A	25		UDC	Table 504-4	(c)(4) Article V, Sec 35-504
B	55		UDC	Table 504-4	(c)(4) Article V, Sec 35-504
C	70		UDC	Table 504-4	(c)(4) Article V, Sec 35-504
D	77		UDC	Table 504-4	(c)(4) Article V, Sec 35-504
Manning's n value			UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Concrete Lined Channel	0.015		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Grass Lined Channel with regular maintenance	0.035		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Grass Lined Channel without recent maintenance	0.05		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Vegetated Channel with trees	0.055		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Natural Channel with trees, moderate underbrush	0.075		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Natural Channel with trees, dense underbrush	0.09		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Natural Channel with dense trees, dense underbrush	0.1		UDC	Table 504-6	(c)(9) Article V, Sec 35-504
Hydraulics			DGM		Ch 4
Channels and Improved Watercourses					
Watercourse to remain unobstructed			UDC		(h)(1) Article V, Sec 35-504
Channel modifications			UDC		(h)(2) Article V, Sec 35-504
Maintenance			UDC		(h)(3) Article V, Sec 35-504
Multiple uses			UDC		(h)(4) Article V, Sec 35-504
Velocity Criteria			UDC	Table 504-8	(h)(5) Article V, Sec 35-504
Retard Spacing	Formula		UDC		(h)(6) Article V, Sec 35-504
Concrete Lined Channel			UDC		(h)(7) Article V, Sec 35-504
Vegetated earth channels			UDC		(h)(8) Article V, Sec 35-504
Culverts			DGM		Ch 4
Introduction			TxDOT		Ch 8
Design Considerations			TxDOT		Ch 8
Hydraulic operation of channels			TxDOT		Ch 8
Improved inlets			TxDOT		Ch 8

PROJECT: Harry Warzbach
CLIENT: City of San Antonio
CSJ:
COUNTY: Bexar
S & B JOB NO.: U1810
TASK: Roadway Design

Harry Warzbach
Geometric Design Criteria

Description	Design Criteria				
	Mainlanes		American Association of State Highway and Transportation Officials (AASHTO)-04 and COSA Design Guidance Manual (DGM)-12, TxDOT Hydraulic Manual (TxDOT), San Antonio Unified Development Code (UDC)		
	Desirable	Minimum			
Velocity protection and control devices			TxDOT		Ch 8
Storm Sewer			DGM		Ch 4
Storm Sewer Design	HGL below Gutter		UDC		(i)
Inlets and opening			UDC		(j)
Drop curb opening-side walk does not abut curb			UDC		(j)(1)
Curb or drop inlets			UDC		(j)(2)
Grate inlets			UDC		(j)(3)
Curb opening inlets			UDC		(j)(4)



APPENDIX G

Bicycle Route Location Map

SAN ANTONIO BIKE PLAN 2011 + IMPLEMENTATION STRATEGY

September 2011



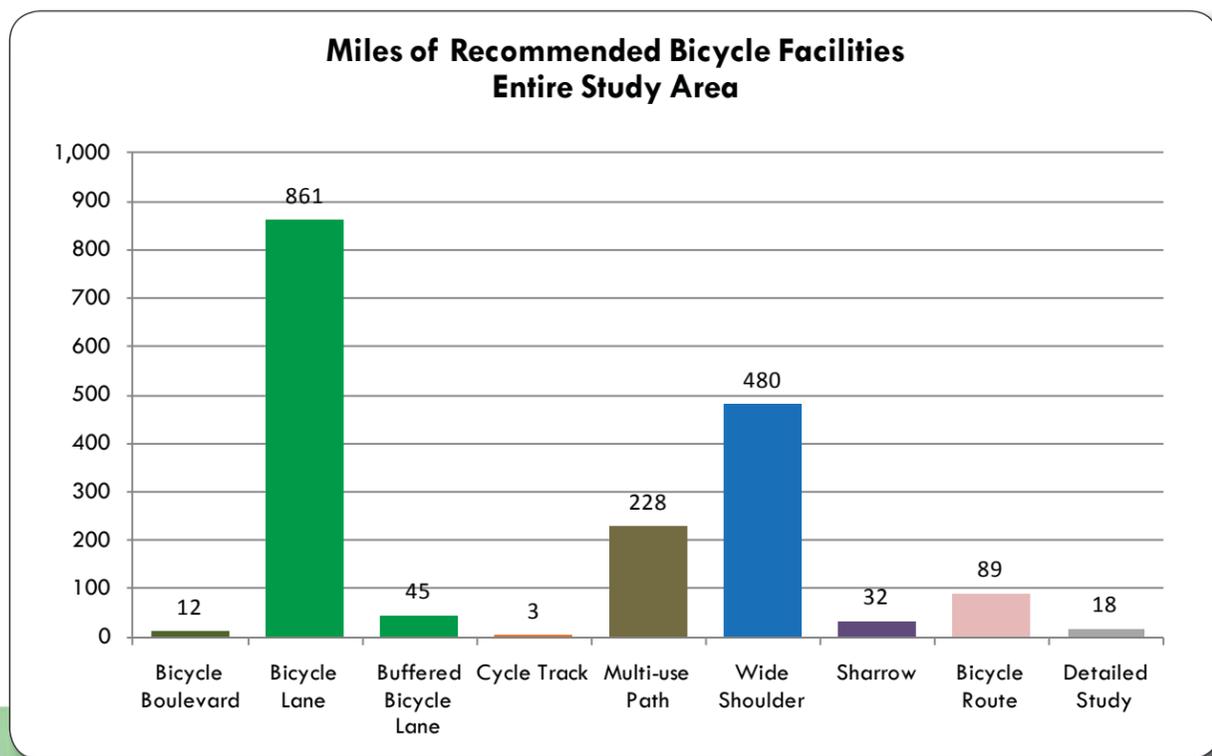
**SAN ANTONIO
BIKES**
Office of Environmental Policy



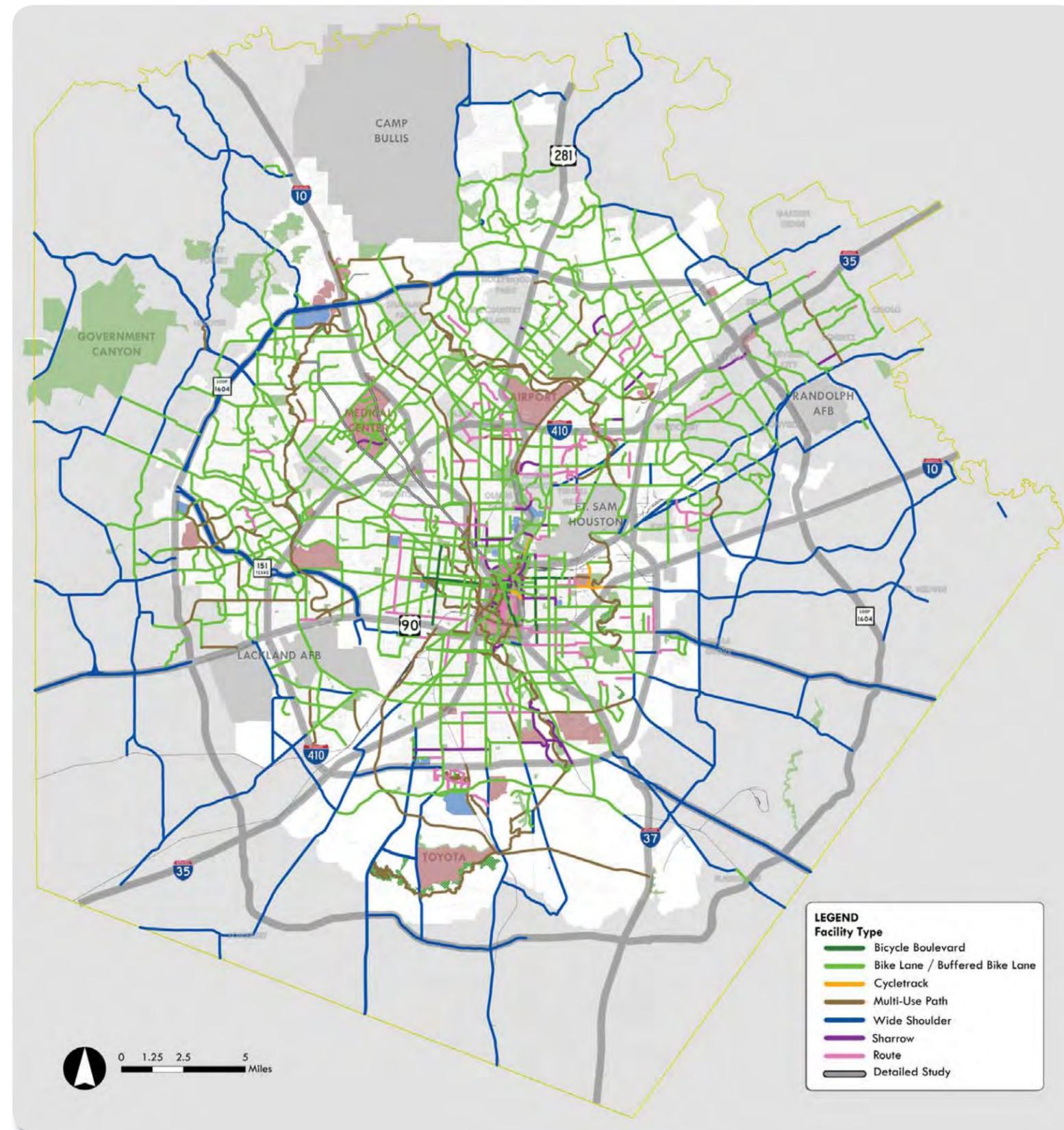


III. RECOMMENDED BICYCLE NETWORK FACILITY RECOMMENDATIONS

Bike Plan 2011 establishes a 1,768-mile interconnected bicycle network that provides access for residents and visitors of San Antonio to destinations throughout the City and surrounding region. The chart below illustrates the mileage of different facility types that make up the network.



RECOMMENDED BICYCLE NETWORK





appendix d:
recommended bicycle
network by street



SAN ANTONIO BIKE PLAN 2011 + IMPLEMENTATION STRATEGY :: APPENDIX

D • recommended network - by street

STREET NAME	SEGMENT START	SEGMENT END	JURISDICTION	OWNER (IF NOT SAN ANTONIO)	EXISTING FACILITY	RECOMMENDED FACILITY	ALTERNATIVE FACILITY	PROPOSED ACTION	LENGTH (MILES)	GREENWAY CONNECTION	ON-STREET PARKING?	COUNCIL DISTRICT	MAP AREA (CHAPTER 3)
GOLD CANYON RD	GOLD CANYON RD DEAD END	LOOP 1604	SAN ANTONIO	CoSA		BIKE LANE		CFD	0.31			9	Stone Oak Area
GOLD CANYON RD	START OF ROAD	END OF ROAD	SAN ANTONIO	CoSA		BIKE LANE			1.58			9, 10	Stone Oak Area
GOLD CANYON RD (FUTURE)	GOLD CANYON RD DEAD END	GOLD CANYON RD DEAD END	SAN ANTONIO	VARIES	NO ROAD	BIKE LANE		CFD	0.23			9	Stone Oak Area
GOLD CANYON RD (FUTURE)	DEAD END	EVANS RD	SAN ANTONIO	VARIES	NO ROAD	BIKE LANE		CFD	4.16			10	Stone Oak Area
GOLIAD RD	FAIR AVE	PECAN VALLEY CIR	SAN ANTONIO	CoSA		BIKE LANE			1.65	Y		3	Near East
GOLIAD RD	PECAN VALLEY	SE MILITARY DR	SAN ANTONIO	CoSA		BIKE LANE			1.05			3	South Central
GOLIAD RD	SE MILITARY DR	CITY-BASE LANDING	SAN ANTONIO	CoSA		BIKE LANE			0.45			3	South Central
GOLIAD RD	CITY-BASE LANDING	TEN BEARS	SAN ANTONIO	CoSA		BIKE LANE			0.34			3	South Central
GOLIAD RD	TEN BEARS	SE LOOP 410	SAN ANTONIO	CoSA		BIKE LANE			1.04			3	South Central
GOLIAD RD	SE LOOP 410	ROSILLO CREEK	SAN ANTONIO	TXDOT		SHOULDER			0.05			3	Far South
GRANT AVE	PASADENA	HILDEBRAND AVE	SAN ANTONIO	CoSA		ROUTE		NAC	0.22			1	North Central
GRANT AVE	W HILDEBRAND AVE	W ASHBY PLACE	SAN ANTONIO	CoSA		SHARROW		ADD MARKINGS	1.19			1	North Central
GRANT AVE	ASHBY PLACE	CINCINNATI AVE	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			0.07			1	North Central
GRAYSON ST	PINE ST	NEW BRAUNFELS AVE	SAN ANTONIO, FT SAM HOUSTON	CoSA	ROUTE	ROUTE			0.56		Y	2	North Central
GREELY ST	VIESCA AVE	CRESCENT ST	ALAMO HEIGHTS	INCORPORATED CITY		ROUTE			0.08				North Central
GREEN MOUNTAIN RD	E EVANS RD	N LOOP 1604 E	SAN ANTONIO	TXDOT	SHOULDER	SHOULDER		WIDEN PAVEMENT	1.25			10	Stone Oak Area
GREEN MOUNTAIN RD	N LOOP 1604 E	STAHL RD	SAN ANTONIO	CoSA		SHOULDER		WIDEN PAVEMENT	0.59			10	North 281 Corridor
GREEN SPRING DR	BULVERDE RD	ROWE DR	SAN ANTONIO	CoSA		SHARROW			0.84			10	North 281 Corridor
GREEN VALLEY RD	FM 3009	CITY LIMIT / GREEN VALLEY LOOP	SCHERTZ	INCORPORATED CITY		BIKE LANE		WIDEN PAVEMENT / RESTRIPE	0.71				Northeast / Randolph Area
GREEN VALLEY RD	GREEN VALLEY LP	GREEN VALLEY LP	BEXAR CO	INCORPORATED CITY		BIKE LANE		WIDEN PAVEMENT	0.27				Northeast / Randolph Area
GREEN VALLEY RD	GREEN VALLEY LP	CIBOLO VALLEY DR	CIBOLO	INCORPORATED CITY		BIKE LANE		WIDEN PAVEMENT	0.14				Northeast / Randolph Area
GRISSOM RD	TEZEL RD	TIMBER PATH	SAN ANTONIO	TXDOT		BIKE LANE			0.60	Y		6	North Leon Creek Area
GRISSOM RD	TIMBER PATH	OAKFIELD WAY	SAN ANTONIO	TXDOT		BIKE LANE			0.93	Y		6	North Leon Creek Area
GRISSOM RD	OAKFIELD WAY	TIMBERHILL DR	SAN ANTONIO	TXDOT		BIKE LANE			0.90	Y		6, 7	North Leon Creek Area
GRISSOM RD	TIMBERHILL DR	SHADOW MIST	SAN ANTONIO, LEON VALLEY	TXDOT		BIKE LANE			0.35	Y		7	North Leon Creek Area
GRISSOM RD	SHADOW MIST	BANDERA RD	LEON VALLEY	TXDOT		BIKE LANE			0.73	Y			North Leon Creek Area
GROSENBACHER RD	W MILITARY DR	POTRANCO RD	BEXAR CO	BEXAR CO		BUFFERED BL		RD4>2; RESTRIPE	1.36				Far West / Westover Hills Area
GROSENBACHER RD	POTRANCO RD	GROSENBACH RD / CANTHREE	BEXAR CO	BEXAR CO		SHOULDER	BIKE LANE	WIDEN PAVEMENT	1.30				Far West / Westover Hills Area
GROSENBACHER RD	CANTHREE DR	MARBACH RD (FUTURE)	BEXAR CO	BEXAR CO		SHOULDER		WIDEN PAVEMENT	0.93				Far West / Westover Hills Area
GROSENBACHER RD / WT MONTGOMERY (FUTURE)	CANTHREE DR	WT MONTGOMERY	BEXAR CO	VARIES	NO ROAD	SHOULDER	BIKE LANE	CFD	1.79				Far West / Westover Hills Area
GROWDON RD	MOREY RD	ACME RD	SAN ANTONIO	US	SHOULDER	SHOULDER		NAC	1.14	Y		4	Lackland Area
GROWDON RD	ACME RD	N FRANK LUKE DR / SW 36TH ST	PORT SAN ANTONIO	CoSA	SHOULDER	SHOULDER		NAC	1.06	Y			Lackland Area
GROWDON RD	N FRANK LUKE DR / SW 36TH ST	THOMPSON PLACE	PORT SAN ANTONIO	CoSA	SHOULDER	SHOULDER		NAC	0.85				Lackland Area
GUADALUPE ST	CASTROVILLE RD / SW 19TH ST	ZARZAMORA	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RD4>3	0.55			5	Near West
GUADALUPE ST	ZARZAMORA	SAN JACINTO	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE	SHARROW	RD4>3	0.69			5	Near West
GUADALUPE ST	SAN JACINTO	BRAZOS	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RD4>2-FTP2	0.14		Y	5	Near West
GUADALUPE ST	BRAZOS	RICHTER ST	SAN ANTONIO	CoSA		BIKE LANE	SHARROW	RD4>3	0.21			5	Near West
GUADALUPE ST	RICHTER ST	FRIO ST	SAN ANTONIO	CoSA		SHARROW		RD4>2	0.36			5	Near West
GUADALUPE ST	FRIO ST	IH 10 ACCESS RD	SAN ANTONIO	CoSA		BIKE LANE		RD4>3	0.16			1, 5	Near West
GUADALUPE ST	IH 10 ACCESS RD	SANTA ROSA	SAN ANTONIO	TXDOT		BIKE LANE		RD4>3	0.06			1	Downtown
GUADALUPE ST	SANTA ROSA	FLORES ST	SAN ANTONIO	TXDOT		SHARROW		RD-FTP2-SHARROW	0.17			1	Downtown
GUENTHER ST	FLORES ST	MAIN AVE	SAN ANTONIO	CoSA		SHARROW		ADD MARKINGS	0.14			1	Downtown
GUENTHER ST	MAIN AVE	PEREIDA ST	SAN ANTONIO	CoSA		SHARROW		ADD MARKINGS	0.24			1, 5	Downtown
GUENTHER ST	PEREIDA ST	CROFTON	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.11			1	Downtown
GUENTHER ST	CROFTON	CONSTANCE	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.16			1	Downtown
GUENTHER ST	CONSTANCE	EAGLELAND DR	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.21			1, 5	Downtown
GULF ST	GEVERS ST	ONSLow	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.81			2	Near East
GULF DALE	ISOM	GULF DALE	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.59		Y	9	North 281 Corridor
GUS ECKERT RD	CINNAMON HILL	FREDERICKSBURG RD	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	0.38			8	North Leon Creek Area
HACIENDA DR	EL CHARRO	DEAD END	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.30		Y	10	North 281 Corridor
HACKBERRY ST	W DREXEL AVE	RIGSBY AVE	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.16			2, 3	Near East
HALTOWN	CAROLWOOD DR	BLANCO RD	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.29		Y	9	North 281 Corridor
HAMILTON AVE	LOMBRANO	MARTIN ST	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RS-FTP2wBL	0.75		Y	1, 5	Near West
HAMILTON AVE	BUENA VISTA	GUADALUPE ST	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RS-FTP2wBL	0.52		Y	5	Near West
HAMILTON WOLFE	OAKDELL WAY	BABCOCK RD	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	0.22			8	North Leon Creek Area
HAMILTON WOLFE	BABCOCK RD	FLOYD CURL	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE; CFD	0.42			8	North Leon Creek Area
HAMILTON WOLFE	FLOYD CURL	FREDERICKSBURG	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE; CFD	0.91			8	North Leon Creek Area

SAN ANTONIO BIKE PLAN 2011 + IMPLEMENTATION STRATEGY :: APPENDIX

D • recommended network - by street

STREET NAME	SEGMENT START	SEGMENT END	JURISDICTION	OWNER (IF NOT SAN ANTONIO)	EXISTING FACILITY	RECOMMENDED FACILITY	ALTERNATIVE FACILITY	PROPOSED ACTION	LENGTH (MILES)	GREENWAY CONNECTION	ON-STREET PARKING?	COUNCIL DISTRICT	MAP AREA (CHAPTER 3)
HARDING BLVD	ESCALON AVE	COMMERCIAL AVE	SAN ANTONIO	CoSA		ROUTE	SHARROW	SIGNS; RS-FTP2	0.21		Y	3, 4	South Central
HARDING BLVD	COMMERCIAL AVE	PLEASANTON RD	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RS-FTP2wBL; FUNDED	0.75		Y	3	South Central
HARDING BLVD	PLEASANTON RD	FLORES ST	SAN ANTONIO	CoSA		ROUTE	BIKE LANE	SIGNS; RS-FTP2wBL	0.91		Y	3	South Central
HARDING BLVD	FLORES ST	MISSION RD	SAN ANTONIO	CoSA		ROUTE	SHARROW	SIGNS; RS-FTP2	0.98			3	South Central
HARDY OAK BLVD	DEAD END	WILDERNESS OAK	SAN ANTONIO	CoSA		BIKE LANE		CFD	0.83			9	Stone Oak Area
HARDY OAK BLVD	WILDERNESS OAK	STONE OAK PKWY	SAN ANTONIO	CoSA		BUFFERED BL		RD4>2	3.13			9	Stone Oak Area
HARDY OAK BLVD	HUEBNER RD / REDLAND RD (FUTURE)	LOOP 1604	SAN ANTONIO	CoSA		BIKE LANE		CFD	1.98			9	Stone Oak Area
HARDY OAK BLVD (FUTURE)	BLANCO RD	DEAD END	BEXAR CO	VARIES	NO ROAD	BIKE LANE		CFD	0.58				Stone Oak Area
HARDY OAK BLVD (FUTURE)	STONE OAK PKWY	HUEBNER RD / REDLAND RD (FUTURE)	SAN ANTONIO	VARIES	NO ROAD	BIKE LANE		CFD	1.48			9	Stone Oak Area
HARRIMAN PLACE	FRIO CITY RD	CHARLOTTE ST	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.08			5	South Central
HARRIMAN PLACE	US HWY 90	BRAZOS ST	SAN ANTONIO	CoSA		BIKE LANE	ROUTE		0.69			5	Near West
HARRY WURZBACH	CORINNE	RITTIMAN RD	SAN ANTONIO	CoSA		SHOULDER			0.07			2	North Central
HARRY WURZBACH	LOOP 410	EISENHAEUER RD	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	0.10			10	North Central
HARRY WURZBACH	RITTIMAN RD	BURR	TERRELL HILLS, FT SAM HOUSTON	CoSA		BIKE LANE		WIDEN PAVEMENT	1.21	Y		2,	North Central
HARRY WURZBACH	EISENHAEUER RD	SUMNER DR	SAN ANTONIO	CoSA		BIKE LANE	PATH	WIDEN PAVEMENT; DETAILED STUDY	0.22			2, 10	North Central
HARRY WURZBACH	BURR	FT SAM ENTRANCE	SAN ANTONIO, FT SAM HOUSTON	CoSA		BIKE LANE		WIDEN PAVEMENT	0.88	Y		9	North Central
HARRY WURZBACH	SUMNER DR	RITTIMAN RD	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	0.02			2	North Central
HASKIN RD	WYNDALE	BURNSIDE DR	SAN ANTONIO	CoSA		ROUTE			0.25			10	North Central
HAUSMAN RD	FM 1604	BABCOCK RD	SAN ANTONIO	CoSA		BIKE LANE		CFD	1.21	Y		8	North Leon Creek Area
HAUSMAN RD	BABCOCK RD	RIDGE OAK PKWY	SAN ANTONIO	CoSA		BIKE LANE			0.42	Y		8	North Leon Creek Area
HAUSMAN RD	RIDGE OAK PKWY	LANGSTON WELL	SAN ANTONIO	CoSA		BIKE LANE			1.13	Y		8	North Leon Creek Area
HAUSMAN RD	LANGSTON WELL	IH 10	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	0.68	Y		8	North Leon Creek Area
HAYS ST	HAYS STREET BRIDGE	OLIVE ST	SAN ANTONIO	CoSA	ROUTE	BIKE LANE		RESTRIPE	0.23		Y	2	Near East
HAYS ST	OLIVE ST	PINE ST	SAN ANTONIO	CoSA	ROUTE	BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.09		Y	2	Near East
HAYS ST	PINE ST	PALMETTO ST	SAN ANTONIO	CoSA	ROUTE	BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.28		Y	2	Near East
HAYS ST	PALMETTO ST	NEW BRAUNFELS AVE	SAN ANTONIO	CoSA		BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.28		Y	2	Near East
HAYS ST	NEW BRAUNFELS AVE	MITTMAN ST	SAN ANTONIO	CoSA		BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.37		Y	2	Near East
HAYS ST	MITTMAN ST	WALTERS ST	SAN ANTONIO	CoSA		BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.16		Y	2	Near East
HAYS ST	WALTERS ST	ONSLow	SAN ANTONIO	CoSA		BICYCLE BOULEVARD		TRAFFIC CALMING; ADD MARKINGS AND SIGNS	0.50	Y	Y	2	Near East
HAYS STREET BRIDGE	AUSTIN ST	HAYS ST	SAN ANTONIO	CoSA	PATH	PATH			0.27			2	Near East
HEATH CIRCLE DR	CORAL SPRINGS	SILENT SUNRISE	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	0.21			7	North Leon Creek Area
HEATH CIRCLE DR	SILENT SUNRISE	HEATH RD	SAN ANTONIO	CoSA		BIKE LANE			0.53			7	North Leon Creek Area
HEATH RD	HEATH CIRCLE	GRISSOM	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	0.97			7	North Leon Creek Area
HEDGES ST	RIO GRANDE	RIO GRANDE	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		NAC	0.03	Y		2	Near East
HEIMER RD	BROKEN OAK DR	ARCHWAY DR	SAN ANTONIO	CoSA	SHOULDER	BIKE LANE		ADD STRIPING & MARKINGS	0.40		Y	9	North 281 Corridor
HEIMER RD	ARCHWAY DR	BROOK HOLLOW	SAN ANTONIO	CoSA	SHOULDER	BIKE LANE			0.60		Y	9	North 281 Corridor
HEIMER RD	BROOK HOLLOW	CROSS CANYON	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	0.50			9	North 281 Corridor
HEIMER RD	CROSS CANYON	BITTERS RD	SAN ANTONIO	CoSA		BIKE LANE			0.64			9	North 281 Corridor
HELOTES CREEK PATH	FM 1560	Old Town Helotes	HELOTES	VARIES		PATH			1.03				Northwest Bexar County
HEMISFAIR PLAZA WAY	S ALAMO ST	TOWER OF THE AMERICAS	SAN ANTONIO	CoSA		ROUTE			0.28			1	Downtown
HENDERSON PASS	US HWY 281 N	GOLD CANYON RD	SAN ANTONIO	CoSA		PATH			1.34			9, 10	North 281 Corridor
HENDERSON PASS	GOLD CANYON	POINT OAK / CEDAR RIDGE	SAN ANTONIO	CoSA	BUFFERED BL	BUFFERED BL			1.22			10	North 281 Corridor
HENDERSON PASS	POINT OAK / CEDAR RIDGE	TURKEY POINT	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			0.40			10	North 281 Corridor
HENDERSON PASS	TURKEY POINT	THOUSAND OAKS	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			0.69			10	North 281 Corridor
HENDERSON PASS	THOUSAND OAKS	BROOK HOLLOW	SAN ANTONIO	CoSA		BIKE LANE		RD4>3	1.24	Y		9, 10	North 281 Corridor
HIAWATHA	S GEVERS ST	CLARK AVE	SAN ANTONIO	CoSA		ROUTE			0.51	Y		3	Near East
HIAWATHA	CLARK AVE	MEADOWLAKE AVE	SAN ANTONIO	CoSA		ROUTE			0.41	Y		3	Near East
HIAWATHA	MEADOWLAKE AVE	KASHMUIR PL	SAN ANTONIO	CoSA		ROUTE			0.48	Y		3	Near East
HICKS AVE	ELGIN AVE	PECAN VALLEY DR	SAN ANTONIO	CoSA		ROUTE			0.62			3	Near East
HIDDEN DR	VILLAGE DR	STARCREST DR	SAN ANTONIO	CoSA		BIKE LANE		RS-FTP2wBL	0.28		Y	10	North 281 Corridor
HIGGINS RD	STAHL RD	BROMLEY PLACE	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	0.36			10	North 281 Corridor
HIGGINS RD	BROMLEY PLACE	NACOGDOCHES RD	SAN ANTONIO	CoSA		BIKE LANE		RD4>3	0.83			10	North 281 Corridor
HIGHCLIFF DR	STARCREST DR	CREEK	SAN ANTONIO	CoSA		ROUTE		SIGNS	0.47	Y	Y	10	North Central
HIGHCLIFF TO BRIARGLEN BRIDGE	HIGHCLIFF DR	BRIARGLEN	SAN ANTONIO	VARIES		BRIDGE			0.03	Y		2, 10	North Central
HILDEBRAND AVE	GRANT AVE	GRANT AVE	SAN ANTONIO	CoSA		ROUTE		NAC	0.02			1	North Central
HILDEBRANDT	CACIAS RD	FOSTER RD	BEXAR CO	BEXAR CO		SHOULDER	BIKE LANE	WIDEN PAVEMENT; CFD	2.74				Far East
HILLCREST DR	FREDERICKSBURG RD	BABCOCK RD	BALCONES HEIGHTS	INCORPORATED CITY		BIKE LANE		RESTRIPE	0.63				Near West



appendix e:
**recommended bicycle
network by council
district & jurisdiction**



SAN ANTONIO BIKE PLAN 2011 + IMPLEMENTATION STRATEGY :: APPENDIX

E • recommended network - by council district & jurisdiction

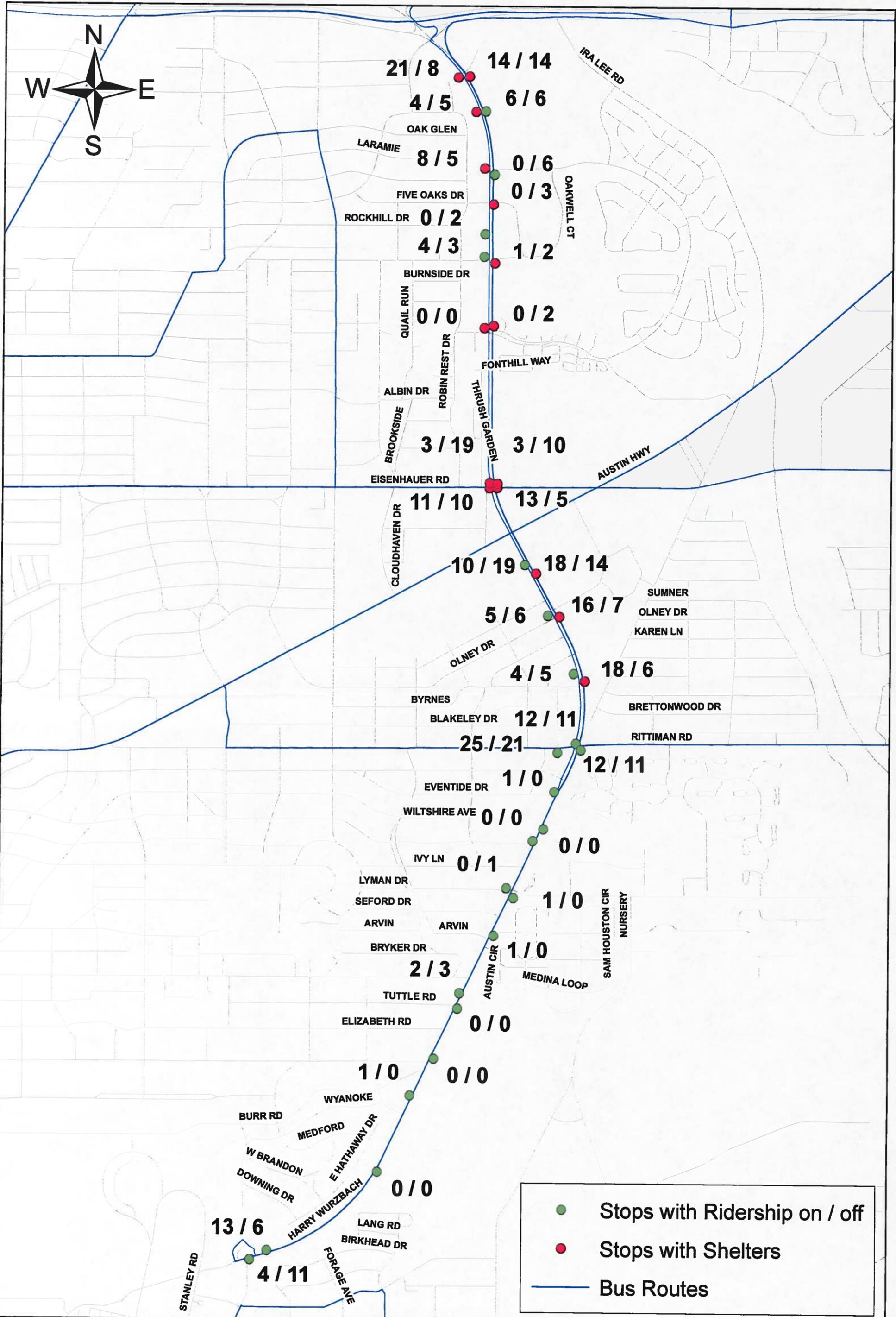
Council District 10

STREET NAME	SEGMENT START	SEGMENT END	JURISDICTION	OWNER (IF NOT SAN ANTONIO)	EXISTING FACILITY	RECOMMENDED FACILITY	ALTERNATIVE FACILITY	PROPOSED ACTION	LENGTH (FEET)	LENGTH (MILES)	GREENWAY CONNECTION	ON-STREET PARKING?	COUNCIL DISTRICT	MAP AREA (CHAPTER 3)
AT&T CENTER PATH	ONSLow	AT&T CENTER PKWY	SAN ANTONIO	PRIVATE		PATH			3,243	0.61			10	Near East
AUSTIN HWY	MEADOWLANE DR	EISENHauer RD	SAN ANTONIO	TXDOT	SHOULDER	SHOULDER		REPAVE SHOULDER	8,772	1.66	Y		2, 10	North Central
AUSTIN HWY	EISENHauer RD	SALADO CREEK GREENWAY NORTH	SAN ANTONIO	TXDOT	SHOULDER	SHOULDER		REPAVE SHOULDER	3,218	0.61	Y		2, 10	North Central
AUSTIN HWY ALTERNATIVE PATH	S VANDIVER RD	SALADO CREEK GREENWAY NORTH	SAN ANTONIO	VARIES		PATH			7,422	1.41	Y		2, 10	North Central
BARRINGTON	STARCREST DR	oVERTON	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	1,823	0.35		Y	10	North 281 Corridor
BARRINGTON	oVERTON	KINGS PT	SAN ANTONIO	CoSA		SHARROW		ADD MARKINGS	1,744	0.33		Y	10	North 281 Corridor
BELL DR	STAHl RD	UHR LN	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			4,901	0.93		Y	10	North 281 Corridor
BELLCREST	BELL DR	HIGGINS RD	SAN ANTONIO	CoSA	ROUTE	ROUTE	BIKE LANE		3,798	0.72		Y	10	North 281 Corridor
BITTERS RD	WETMORE RD	BROADWAY	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	1,539	0.29			10	North 281 Corridor
BITTERS RD	BROADWAY	NACOGDOCHES RD	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			3,756	0.71	Y		10	North 281 Corridor
BREES BLVD	NEW BRAUNFELS AVE	CHEVY CHASE DR	SAN ANTONIO	CoSA		ROUTE		SIGNS	3,782	0.72		Y	10	North Central
BREES BLVD	CHEVY CHASE DR	VANDIVER RD	SAN ANTONIO	CoSA		ROUTE		SIGNS	1,824	0.35		Y	10	North Central
BRIARCREST DR	BULVERDE RD	CLASSEN RD	SAN ANTONIO	CoSA		ROUTE		SIGNS	6,136	1.16		Y	10	North 281 Corridor
BROADWAY	BITTERS RD	LOOP 410	SAN ANTONIO	CoSA		BIKE LANE	SHARROW	DETAILED STUDY	7,555	1.43	Y		10	North 281 Corridor
BROADWAY	LOOP 410	SUNSET RD	SAN ANTONIO	CoSA		BIKE LANE	SHARROW		3,775	0.71			9, 10	North Central
BRYN MAWR DR	CHEVY PARK	SEIDEL	SAN ANTONIO	CoSA		ROUTE		ADD MARKINGS	663	0.13		Y	10	North Central
BULVERDE PKWY	BULVERDE RD	LIATRIS LN	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE		RESTRIPE	2,375	0.45			10	Stone Oak Area
BULVERDE RD	EVANS RD	LOOP 1604	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	17,179	3.25			9, 10	Stone Oak Area
BULVERDE RD	N LOOP 1604	BULVERDE RD	SAN ANTONIO	CoSA		BIKE LANE			667	0.13			10	North 281 Corridor
BULVERDE RD	BULVERDE RD (S OF REDLAND)	JONES MALTSBERGER RD	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	817	0.15	Y		10	North 281 Corridor
BULVERDE RD	JONES MALTSBERGER RD	BULVERDE RD (NEAR 1604)	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	3,884	0.74	Y		10	North 281 Corridor
BULVERDE RD	BULVERDE RD	BRIARCREST DR	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	6,538	1.24			10	North 281 Corridor
BULVERDE RD	BRIARCREST DR	STAHl RD	SAN ANTONIO	CoSA		BIKE LANE		RESTRIPE	2,878	0.55	Y		10	North 281 Corridor
BURNSIDE DR	KENILWORTH BLVD	HASKIN RD	SAN ANTONIO	CoSA		ROUTE		ADD MARKINGS	674	0.13		Y	10	North Central
BUTTERLEIGH DR	BULVERDE DR	ROWE DR	SAN ANTONIO	CoSA		ROUTE		ADD MARKINGS	2,637	0.50		Y	10	North 281 Corridor
CHEVY CHASE DR	EISENHauer RD	CHEVY CHASE DR	SAN ANTONIO	CoSA		ROUTE		SIGNS	1,972	0.37		Y	10	North Central
CHEVY PARK	CHEVY CHASE DR	BRYN MAWR DR	SAN ANTONIO	CoSA		ROUTE		SIGNS	395	0.07		Y	10	North Central
CLASSEN RD	BULVERDE RD	KNOLLCREEK	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	6,447	1.22			10	North 281 Corridor
CLASSEN RD	KNOLLCREEK	CREEK/STREAM	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	2,820	0.53			10	North 281 Corridor
CLASSEN RD	CREEK/STREAM	STAHl RD	SAN ANTONIO	CoSA		BIKE LANE	SHOULDER	WIDEN PAVEMENT	872	0.17			10	North 281 Corridor
COMSTOCK	KINGS PT	PERRIN BEITEL	SAN ANTONIO	CoSA		ROUTE		SIGNS	231	0.04			10	North 281 Corridor
CORINNE	AUSTIN HWY	HARRY WURZBACH	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	5,628	1.07	Y		2, 10	North Central
CORPORATE WOODS	GOLD CANYON RD	LOOP 1604	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			4,128	0.78			9, 10	Stone Oak Area
CROSSWINDS WAY	WURZBACH PKWY	IH 35 N ACCESS RD	SAN ANTONIO	CoSA		BIKE LANE		DETAILED STUDY	3,829	0.73			10	North 281 Corridor
CROSSWINDS WAY	IH 35 N ACCESS RD	IH 35 N ACCESS RD	SAN ANTONIO	TXDOT		BIKE LANE		DETAILED STUDY	178	0.03			10	North 281 Corridor
DALEWOOD PLACE	HARRY WURZBACH	WYNDALE	SAN ANTONIO	CoSA		ROUTE		SIGNS	1,243	0.24			10	North Central
EARLYWAY	STARLIGHT TERRACE	SHERRI ANN RD	SAN ANTONIO	CoSA		BIKE LANE	ROUTE		769	0.15		Y	10	Northeast / Randolph Area
EISENHauer RD	NEW BRAUNFELS BLVD	AUSTIN HWY	SAN ANTONIO	CoSA		BIKE LANE			9,529	1.80	Y		10	North Central
EISENHauer RD	AUSTIN HWY	KINGSTON	SAN ANTONIO	CoSA	SHOULDER	BIKE LANE			5,441	1.03	Y	Y	2, 10	North Central
EL CHARRO	LA POSITA	HACIENDA DR	SAN ANTONIO	CoSA		ROUTE			460	0.09		Y	10	North 281 Corridor
EL SENDERO	LEONHARDT RD	THOUSAND OAKS	SAN ANTONIO	CoSA		SHARROW	ROUTE		2,404	0.46		Y	10	North 281 Corridor
EL SENDERO	THOUSAND OAKS	PERRIN BEITEL	SAN ANTONIO	CoSA		SHARROW	ROUTE		3,680	0.70		Y	10	North 281 Corridor
EVANS RD	BULVERDE RD	CIBOLO CANYON	SAN ANTONIO	BEXAR CO		SHOULDER	BIKE LANE	WIDEN PAVEMENT	7,634	1.45			9, 10	Stone Oak Area
EVANS RD	CIBOLO CANYON	GREEN MOUNTAIN RD	SAN ANTONIO	CoSA		SHOULDER	BIKE LANE	WIDEN PAVEMENT	18,875	3.57			10	Stone Oak Area
EVANS RD	GREEN MOUNTAIN	CITY LIMIT	SAN ANTONIO	BEXAR CO		SHOULDER		WIDEN PAVEMENT	16,397	3.11			10	Stone Oak Area
FIVE OAKS DR	WYNDALE	PIKE PLACE	SAN ANTONIO	CoSA		ROUTE			727	0.14			10	North Central
FM 2252	LOOP 1604 ACCESS RD	CITY LIMITS	SAN ANTONIO	TXDOT		BIKE LANE			7,565	1.43			10	Stone Oak Area
FOUNTAINWOOD DR	O'CONNOR RD	JUDSON RD	SAN ANTONIO	CoSA	BIKE LANE	BIKE LANE			6,432	1.22			10	North 281 Corridor
GOLD CANYON RD	N LOOP 1604 E ACCESS RD	HENDERSON PASS	SAN ANTONIO	CoSA		BIKE LANE		CFD	2,653	0.50			10	North 281 Corridor
GOLD CANYON RD	N LOOP 1604 E ACCESS RD	N LOOP 1604 E ACCESS RD	SAN ANTONIO	CoSA		BIKE LANE		CFD	567	0.11			9, 10	Stone Oak Area
GOLD CANYON RD	START OF ROAD	END OF ROAD	SAN ANTONIO	CoSA		BIKE LANE			8,339	1.58			9, 10	Stone Oak Area
GOLD CANYON RD (FUTURE)	DEAD END	EVANS RD	SAN ANTONIO	VARIES	NO ROAD	BIKE LANE		CFD	21,951	4.16			10	Stone Oak Area
GREEN MOUNTAIN RD	E EVANS RD	N LOOP 1604 E	SAN ANTONIO	TXDOT	SHOULDER	SHOULDER		WIDEN PAVEMENT	6,605	1.25			10	Stone Oak Area
GREEN MOUNTAIN RD	N LOOP 1604 E	STAHl RD	SAN ANTONIO	CoSA		SHOULDER		WIDEN PAVEMENT	3,120	0.59			10	North 281 Corridor
GREEN SPRING DR	BULVERDE RD	ROWE DR	SAN ANTONIO	CoSA		SHARROW			4,420	0.84			10	North 281 Corridor
HACIENDA DR	EL CHARRO	DEAD END	SAN ANTONIO	CoSA		ROUTE		SIGNS	1,606	0.30		Y	10	North 281 Corridor
HARRY WURZBACH	LOOP 410	EISENHauer RD	SAN ANTONIO	CoSA		BIKE LANE		WIDEN PAVEMENT	507	0.10			10	North Central
HARRY WURZBACH	EISENHauer RD	SUMNER DR	SAN ANTONIO	CoSA		BIKE LANE	PATH	WIDEN PAVEMENT; DETAILED STUDY	1,173	0.22			2, 10	North Central
HASKIN RD	WYNDALE	BURNSIDE DR	SAN ANTONIO	CoSA		ROUTE			1,338	0.25			10	North Central
HENDERSON PASS	US HWY 281 N	GOLD CANYON RD	SAN ANTONIO	CoSA		PATH			7,067	1.34			9, 10	North 281 Corridor



APPENDIX H

Bus Route Location Map



- Stops with Ridership on / off
- Stops with Shelters
- Bus Routes



Harry Wurzbach

- LIST OF MEDICAL FACILITIES**
- 1 American Heart Association Heart Center
 - 2 UTMSI Children's Cancer Research Institute
 - 3 Cancer Therapy & Research Center
 - 4 Methodist Cancer Center
 - 5 Texas Transplant Institute
 - 6 Methodist Specialty & Transplant Hospital
 - 7 St. Luke's Hospital
 - 8 Christus Santa Rosa Medical Center
 - 9 Diabetes & Endocrine Disease Clinic
 - 10 University Hospital
 - 11 Methodist Plaza
 - 12 The Methodist Center
 - 13 VA Hospital
 - 14 Methodist Children's Hospital of South Texas
 - 15 Methodist Heart Hospital
 - 16 University of Texas Health Science
 - 17 Sabal Medical Building
 - 18 Bob Ross Senior Service Center

Key

- FREQUENTSERVICE
- SKIPSERVICE
- METROSERVICE
- EXPRESSSERVICE
- primoSERVICE
- primo Station
- Limited hours only - see schedule
- Direction of service
- Park & Ride
- Transit facilities
- Major Transfer points
- Point of interest
- Trailhead - Linear Creekway or Hike & Bike Trail
- Hospital
- Library
- Railway
- County Boundary
- Interstate Highways
- U.S. Highways
- State Highways
- Suburban municipalities that receive services
- Suburban municipalities that do not receive services
- Military Area
- Airport
- University / Research Institute / Business Park
- Parks

This system map contains routes, fares and service information that may change between printings. Please refer to individual bus pocket schedules for the most current information or call 210.353.2000. ©2012 CTR America, www.napsos.com

MEDICAL CENTER

MEDICAL CENTER TRANSIT CENTER

CROSSROADS PARK & RIDE

INGRAM TRANSIT CENTER

NORTH STAR TRANSIT CENTER

KEL-LAC TRANSIT CENTER

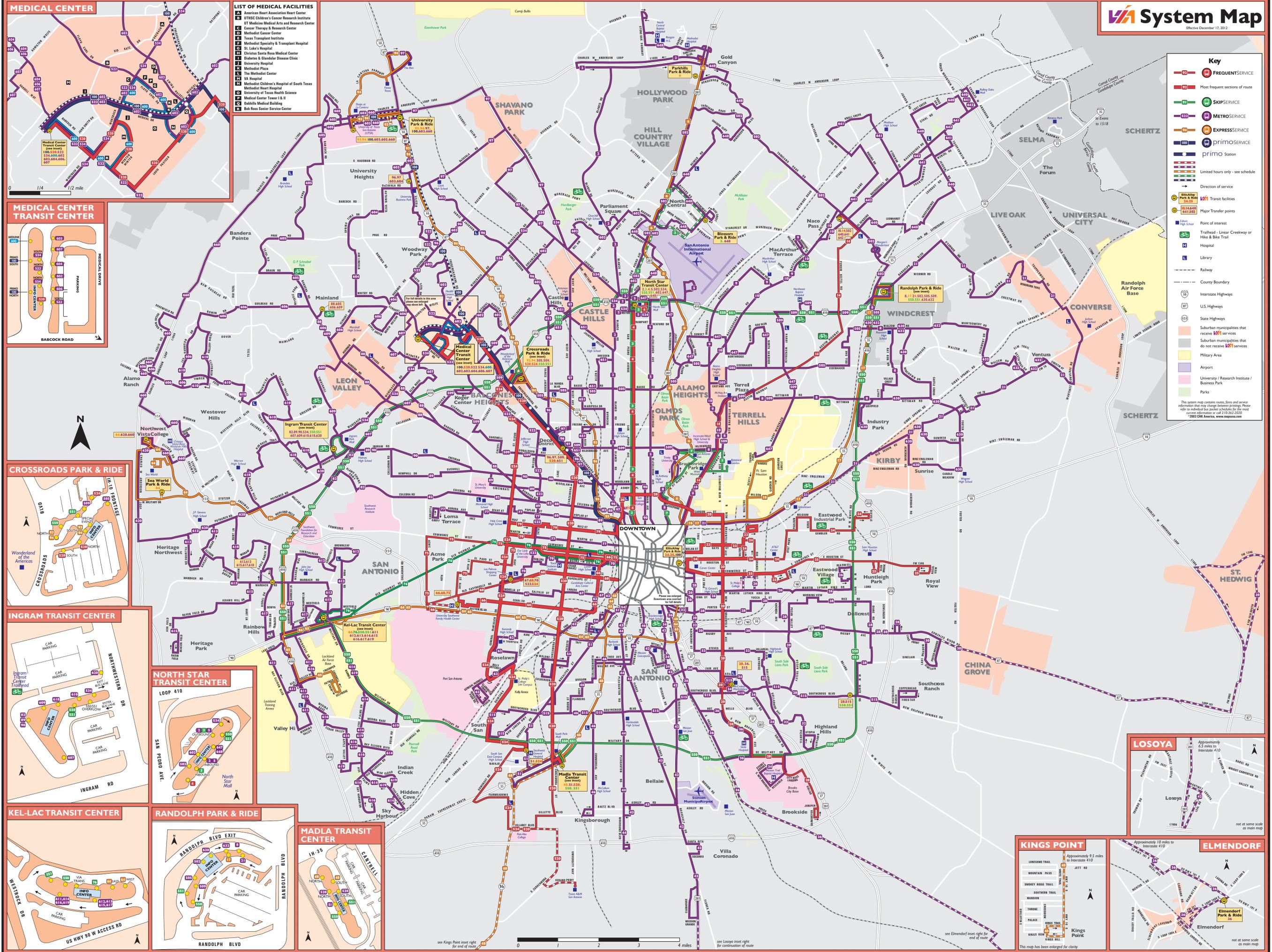
RANDOLPH PARK & RIDE

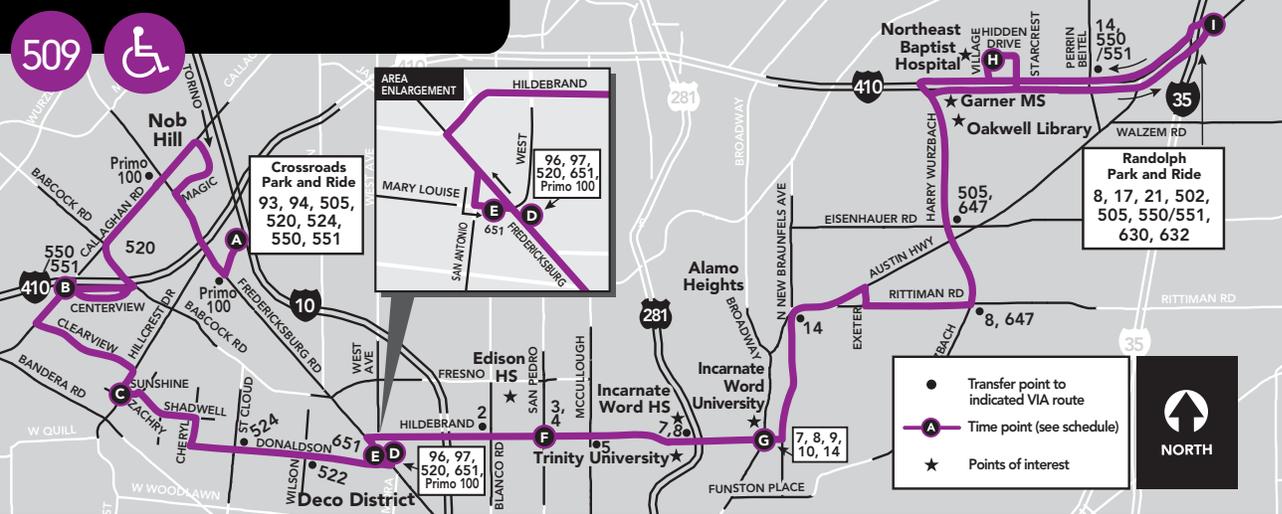
MADLA TRANSIT CENTER

LOSoya

KINGS POINT

ELMENDORF





MONDAY - FRIDAY

EASTBOUND: TRAVELS FROM A → I

	A	B	C	D	F	G	H	I
AM								
FG 5:30 (2)	5:46	5:53	6:05	6:12	6:19	6:40	6:50	6:58
6:30 (2)	6:50	6:59	7:13	7:21	7:30	7:55	8:05	
7:30 (2)	7:50	7:59	8:13	8:21	8:30	8:54	9:04	
8:30 (2)	8:50	8:57	9:10	9:18	9:27	9:51	10:01	
9:30 (2)	9:50	9:57	10:10	10:18	10:27	10:51	11:01	
10:30 (2)	10:50	10:57	11:10	11:18	11:27	11:51	12:01	
11:30 (2)	11:50	11:57	12:10	12:18	12:27	12:51	1:01	
PM								
12:30 (2)	12:50	12:57	1:10	1:18	1:27	1:51	2:01	
1:30 (2)	1:50	1:57	2:10	2:18	2:27	2:51	3:01	
2:30 (2)	2:50	2:57	3:10	3:18	3:27	3:52	4:02	
3:35 (2)	3:56	4:03	4:16	4:25	4:34	4:59	5:09	
4:35 (2)	4:56	5:03	5:16	5:25	5:34	5:59	6:09	
5:40 (1)	6:01	6:08	6:21	6:29	6:37	6:59	7:07	
6:45 (1)	7:01	7:08	7:20	7:28	7:36	7:58	8:06	
7:50	8:06	8:13	8:25	8:33	8:41	9:03	9:11	
8:50	9:06	9:13	9:25	9:33	9:41	10:02	10:10	
9:50	10:05	TG 10:12						

WESTBOUND: TRAVELS FROM I → A

	I	H	G	F	E	C	B	A
AM								
FG 5:25 (1)	5:32	5:53	6:00	6:08	6:20	6:27	6:47	
6:25 (1)	6:34	6:59	7:09	7:18	7:31	7:40	8:00	
7:25 (1)	7:34	7:59	8:09	8:18	8:30	8:38	8:58	
8:25 (1)	8:33	8:56	9:05	9:14	9:26	9:34	9:54	
9:25 (1)	9:33	9:56	10:05	10:14	10:26	10:34	10:54	
10:25 (1)	10:33	10:56	11:05	11:14	11:26	11:34	11:54	
11:25 (1)	11:33	11:56	12:05	12:14	12:26	12:34	12:54	
PM								
12:25 (1)	12:33	12:56	1:05	1:14	1:26	1:34	1:54	
1:25 (1)	1:33	1:56	2:05	2:14	2:26	2:34	2:54	
2:25 (1)	2:33	2:56	3:05	3:14	3:26	3:35	3:56	
3:25 (1)	3:34	3:58	4:08	4:18	4:31	4:40	5:01	
4:25 (1)	4:34	4:58	5:08	5:18	5:31	5:40	6:01	
5:25 (1)	5:34	5:58	6:08	6:16	6:28	6:35	6:51	
6:25 (1)	6:33	6:53	7:01	7:09	7:21	7:28	7:44	
7:25	7:33	7:53	8:01	8:09	8:21	8:28	TG 8:44	
8:25	8:33	8:53	9:01	9:08	9:20	9:26	9:41	
9:25	9:32	9:51	9:58	TG 10:05				
10:25	10:32	10:51	TG 10:58					

1 - Continues as route 505
2 - Continues as route 630

FG & TG - From or to VIA garage at 1021 San Pedro

HOLIDAY SCHEDULES
Bus service on VIA observed holidays will be provided as follows:

Saturday Schedule - Martin Luther King Day, Memorial Day & Friday after Thanksgiving

Sunday Schedule - New Year's Day, Labor Day, Thanksgiving and Christmas

Please look for notices on the bus, at www.viainfo.net or call Customer Service at 362-2020 (select option 5) for holiday service for Independence Day, Veteran's Day, Christmas Eve, and New Year's Eve.

FOR YOUR SAFETY: If you're late, just wait. Chasing a moving bus can be dangerous and deadly.



SERVICES FOR RIDERS WITH DISABILITIES: All VIA buses and many stops are now accessible to riders with disabilities. You can get bus schedule and other information in accessible formats. Please call 362-2020 or TTY 362-2019.

BIKE & RIDE: You and your bike can go anywhere VIA goes. On Primo there are bike racks inside the vehicle and on all other buses the bike rack is outside the bus in the front. It takes only seconds to load your bike and be on your way. Call Customer Service at 210-362-2020 for more information.

PERSONAL TRIP PLANNER: Plan your own trip online 24 hours a day at www.viainfo.net. You can also get directions by transit at maps.google.com. These online tools are easy to use and will provide step-by-step instructions and a map of your trip.

EASTBOUND: TRAVELS FROM A → I

A	B	C	D	F	G	H	I
Crossroads Park & Ride	Callaghan & Centerview	Hillcrest & Sunshine	Fred. Rd & Mary Louise	San Pedro & Hildebrand	Broadway & Hildebrand	N.E. Baptist Hospital	Randolph Park & Ride

AM							
FG 5:30			5:30	5:38	5:45	6:06	6:14
6:57	6:12	6:18	6:30	6:38	6:45	7:06	7:14
7:12	7:12	7:18	7:30	7:38	7:45	8:06	8:14
7:57	8:12	8:18	8:30	8:38	8:45	9:06	9:14
8:53	9:10	9:17	9:30	9:38	9:45	10:07	10:15
9:53	10:11	10:18	10:31	10:39	10:46	11:08	11:17
10:52	11:10	11:17	11:29	11:37	11:45	12:08	12:17
11:52	12:11	12:18	12:30	12:38	12:46	1:09	1:18
PM							
12:52	1:11	1:18	1:30	1:38	1:46	2:09	2:18
1:52	2:11	2:18	2:30	2:38	2:46	3:09	3:18
2:52	3:11	3:18	3:30	3:38	3:46	4:09	4:18
3:52	4:11	4:18	4:30	4:38	4:46	5:09	5:18
4:52	5:11	5:18	5:30	5:38	5:46	6:09	6:17
5:53	6:11	6:18	6:30	6:38	6:46	7:08	7:16
6:53	7:10	7:17	7:29	7:37	7:45	8:07	8:15
7:54	8:11	8:18	8:30	8:38	8:46	9:07	9:15
8:54	9:10	9:17	9:29	9:37	9:45	10:06	10:14
9:42	9:58	TG 10:05					

WESTBOUND: TRAVELS FROM I → A

I	H	G	F	E	C	B	A
Randolph Park & Ride	N.E. Baptist Hospital	Broadway & Hildebrand	San Pedro & Hildebrand	Mary Louise & Fred. Rd	Hillcrest & Sunshine	Callaghan & Centerview	Crossroads Park & Ride

AM							
FG 5:30	5:36	5:56	6:02	6:10	6:21	6:27	6:42
6:30	6:36	6:56	7:02	7:10	7:21	7:27	7:42
7:30	7:36	7:56	8:02	8:10	8:21	8:27	8:42
8:30	8:36	8:56	9:02	9:10	9:21	9:27	9:43
9:25	9:31	9:52	9:59	10:07	10:18	10:24	10:40
10:25	10:31	10:52	10:59	11:07	11:18	11:25	11:42
11:25	11:32	11:55	12:02	12:11	12:22	12:29	12:46
PM							
12:25	12:32	12:55	1:02	1:11	1:22	1:29	1:46
1:25	1:32	1:55	2:02	2:11	2:22	2:29	2:46
2:25	2:32	2:55	3:02	3:11	3:22	3:29	3:46
3:25	3:32	3:55	4:02	4:11	4:22	4:29	4:46
4:25	4:32	4:55	5:02	5:11	5:22	5:29	5:46
5:25	5:32	5:55	6:02	6:10	6:21	6:28	6:44
6:25	6:32	6:53	7:00	7:08	7:19	7:26	7:42
7:25	7:32	7:53	8:00	8:08	8:19	8:26	8:42
8:25	8:32	8:53	9:00	9:07	9:18	9:25	9:40
9:25	9:31	9:52	TG 10:59				
10:25	10:31	10:52					

FG & TG - From or to VIA garage at 1021 San Pedro

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PERSONAL TRIP PLANNER: Plan your own trip online 24 hours a day at www.viainfo.net. You can also get directions by transit at maps.google.com. These online tools are easy to use and will provide step-by-step instructions and a map of your trip.

LOOKING 4 ME?

Text your Bus Stop N° to: **52020** GET REAL-TIME BUS ARRIVAL ESTIMATES ON YOUR MOBILE DEVICE

Customer Service/Information:
362-2020 (1-866-362-2020)
 TTY 362-2019
www.viainfo.net



- Metro, Frequent, or Skip Service \$ 1.10
- Express Service \$ 2.50
- Transfer Slip \$.15
- Monthly Big Pass \$ 30.00
- Veterans Patrons: FREE
- OFF PEAK SPECIAL for seniors and persons with limited mobility with VIA ID: .25¢ weekdays 9 a.m. to 3 p.m., Saturdays and Sundays.
- DISCOUNTS: Discounted fares and passes are available to the following: seniors (62 and older), students, persons with certain disabilities, Medicare recipients and children 5-11 (no ID required for children, 4 and under ride free).
- REDUCED FARE ID: A VIA Reduced Fare ID is required and must be presented when boarding in order to pay reduced fares or use discounted passes.
- TRANSFERS: Transfer slips, which allow you to connect from one bus to another, must be purchased when boarding and are valid on date issued within 2 hours from time indicated. If transferring from a regular service to Express Service, additional fare is required.
- PASSES: Passes and tickets are available online at www.viainfo.net, at all VIA Information Centers or by mail. In addition, there are convenient retail pass outlets throughout the city.
- TIPS TO RIDE BY:
 - No smoking, eating or drinking on bus.
 - Be at your stop five minutes early.
 - Have correct change ready (operators do not carry change).
 - Keep belongings out of the aisle.
 - Please offer front seats to seniors and riders with disabilities.
 - Exit through the rear door.
 - Stand behind yellow line on board.

METROSERVICE

509

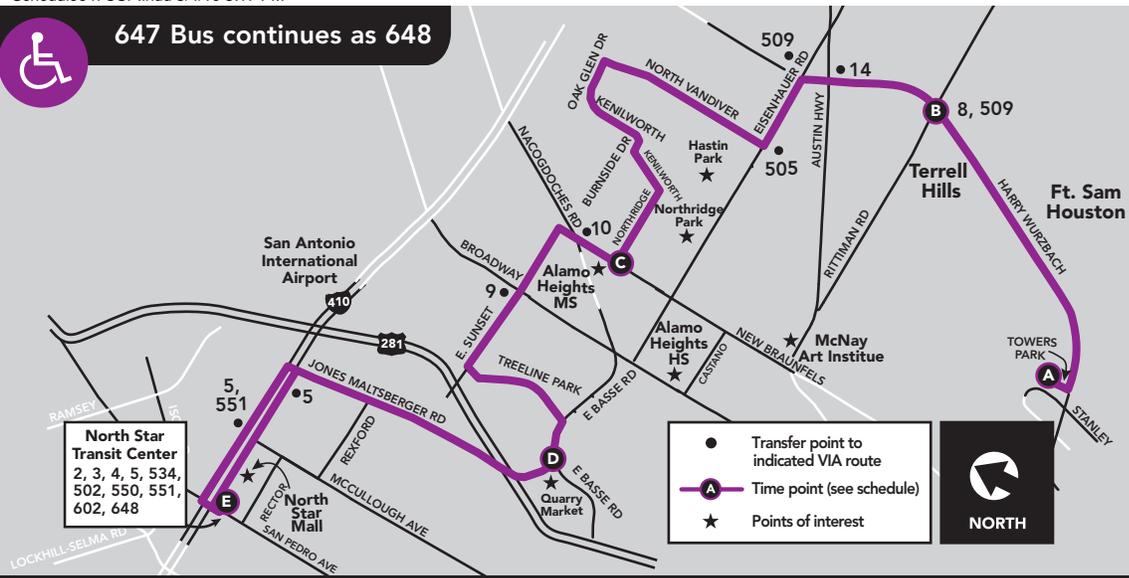
HILDEBRAND
 Randolph Park & Ride,
 Alamo Heights,
 Deco District, Crossroads Park & Ride

EFFECTIVE: 12-17-2012

647



647 Bus continues as 648



MONDAY - FRIDAY

NORTHBOUND: TRAVELS FROM A → E

	A	B	C	D	E
	Harry Wurzbach & Towers Park	Harry Wurzbach & Rittiman	New Braunfels & Northridge	Jones Maltzberger & Quarry Market	North Star Transit Center
AM					
	6:18	6:23	6:36	6:48	7:03
	7:19	7:24	7:37	7:49	8:04
	8:20	8:25	8:38	8:50	9:04
	9:22	9:27	9:40	9:51	10:05
	10:22	10:27	10:40	10:51	11:05
	11:22	11:27	11:40	11:51	12:05
PM					
	12:22	12:27	12:40	12:51	1:05
	1:22	1:27	1:40	1:51	2:05
	2:22	2:27	2:40	2:51	3:07
	3:23	3:28	3:41	3:51	4:07
	4:25	4:30	4:43	4:53	5:09
	5:25	5:30	5:43	5:52	6:07
	6:25	6:30	6:43	6:52	7:05
	7:23	7:28	7:40	7:49	8:02
	8:21	8:26	8:38	8:47	9:00

SOUTHBOUND: TRAVELS FROM E → A

	E	D	C	B	A
	North Star Transit Center	Jones Maltzberger & Quarry Market	New Braunfels & Northridge	Harry Wurzbach & Rittiman	Harry Wurzbach & Towers Park
AM					
	5:41	5:51	5:59	6:11	6:16
	6:40	6:50	6:59	7:12	7:17
	7:40	7:51	8:00	8:13	8:18
	8:42	8:53	9:02	9:15	9:20
	9:41	9:53	10:02	10:15	10:20
	10:41	10:53	11:02	11:15	11:20
	11:41	11:53	12:02	12:15	12:20
PM					
	12:41	12:53	1:02	1:15	1:20
	1:41	1:53	2:02	2:15	2:20
	2:42	2:54	3:03	3:16	3:21
	3:43	3:56	4:05	4:18	4:23
	4:43	4:56	5:05	5:18	5:23
	5:44	5:57	6:05	6:18	6:23
	6:44	6:56	7:04	7:16	7:21
	7:43	7:54	8:02	8:14	8:19
	8:43 (1)	8:54	TG 9:02		

1 - To New Braunfels and Northridge Only.
 FG & TG - From or to VIA garage at 1021 San Pedro.

HOLIDAY SCHEDULES
 Bus service on VIA observed holidays will be provided as follows:

Saturday Schedule - Martin Luther King Day, Memorial Day & Friday after Thanksgiving

Sunday Schedule - New Year's Day, Labor Day, Thanksgiving and Christmas

Please look for notices on the bus, at www.viainfo.net or call Customer Service at 362-2020 (select option 5) for holiday service for Independence Day, Veteran's Day, Christmas Eve, and New Year's Eve.

Christmas Eve, and New Year's Eve.



SERVICES FOR RIDERS WITH DISABILITIES: All VIA buses and many stops are now accessible to riders with disabilities. You can get bus schedule and other information in accessible formats. Please call 362-2020 or TTY 362-2019.



BIKE & RIDE: Take your bike on the bus! Every VIA bus has a bike rack, and it takes only seconds to mount your bike and be on your way. Call VIA Customer Service at 362-2020 for more information.



PERSONAL TRIP PLANNER: Plan your own bus trip online 24 hours a day. Log on to www.viainfo.net, and select Personal Trip Planner. Just enter where and when you want to go on the bus and the Trip Planner does the rest—providing you with step-by-step instructions and a map of your trip.

▶ SATURDAY

NORTHBOUND: TRAVELS FROM A → E

	A Harry Wurzbach & Towers Park	B Harry Wurzbach & Rittiman	C New Braunfels & Northridge	D Jones Maltberger & Quarry Market	E North Star Transit Center
AM					
	6:15	6:20	6:32	6:41	6:54
	7:15	7:20	7:32	7:41	7:54
	8:15	8:20	8:32	8:42	8:56
	9:18	9:23	9:35	9:45	9:59
	10:18	10:23	10:36	10:47	11:02
	11:19	11:24	11:37	11:48	12:04
PM					
	12:19	12:24	12:37	12:48	1:04
	1:22	1:27	1:40	1:51	2:07
	2:22	2:27	2:40	2:51	3:07
	3:22	3:27	3:40	3:51	4:07
	4:22	4:27	4:40	4:51	5:07
	5:22	5:27	5:40	5:51	6:07
	6:22	6:27	6:40	6:50	7:05

SOUTHBOUND: TRAVELS FROM E → A

	E North Star Transit Center	D Jones Maltberger & Quarry Market	C New Braunfels & Northridge	B Harry Wurzbach & Rittiman	A Harry Wurzbach & Towers Park
AM					
	5:40	5:50	5:57	6:08	6:13
	6:40	6:50	6:57	7:08	7:13
	7:40	7:50	7:57	8:08	8:13
	8:40	8:51	8:59	9:11	9:16
	9:40	9:51	9:59	10:11	10:16
	10:39	10:51	11:00	11:12	11:17
	11:39	11:51	12:00	12:12	12:17
PM					
	12:41	12:54	1:03	1:15	1:20
	1:41	1:54	2:03	2:15	2:20
	2:41	2:54	3:03	3:15	3:20
	3:41	3:54	4:03	4:15	4:20
	4:41	4:54	5:03	5:15	5:20
	5:41	5:54	6:03	6:15	6:20
	6:40	6:52	7:00	7:12	TG 7:17

▶ SUNDAY

NORTHBOUND: TRAVELS FROM A → E

	A Harry Wurzbach & Towers Park	B Harry Wurzbach & Rittiman	C New Braunfels & Northridge	D Jones Maltberger & Quarry Market	E North Star Transit Center
AM					
	6:15	6:20	6:32	6:41	6:54
	7:15	7:20	7:32	7:41	7:54
	8:15	8:20	8:32	8:42	8:56
	9:18	9:23	9:35	9:45	9:59
	10:18	10:23	10:36	10:47	11:02
	11:19	11:24	11:37	11:48	12:04
PM					
	12:19	12:24	12:37	12:48	1:04
	1:22	1:27	1:40	1:51	2:07
	2:22	2:27	2:40	2:51	3:07
	3:22	3:27	3:40	3:51	4:07
	4:22	4:27	4:40	4:51	5:07
	5:22	5:27	5:40	5:51	6:07

SOUTHBOUND: TRAVELS FROM E → A

	E North Star Transit Center	D Jones Maltberger & Quarry Market	C New Braunfels & Northridge	B Harry Wurzbach & Rittiman	A Harry Wurzbach & Towers Park
AM					
FG 5:40	5:40	5:50	5:57	6:08	6:13
	6:40	6:50	6:57	7:08	7:13
	7:40	7:50	7:57	8:08	8:13
	8:40	8:51	8:59	9:11	9:16
	9:40	9:51	9:59	10:11	10:16
	10:39	10:51	11:00	11:12	11:17
	11:39	11:51	12:00	12:12	12:17
PM					
	12:41	12:54	1:03	1:15	1:20
	1:41	1:54	2:03	2:15	2:20
	2:41	2:54	3:03	3:15	3:20
	3:41	3:54	4:03	4:15	4:20
	4:41	4:54	5:03	5:15	5:20
	5:41	5:54	6:03	6:15	TG 6:20

FG & TG - From or to VIA garage at 1021 San Pedro

SERVICES FOR RIDERS WITH DISABILITIES: All VIA buses and many stops are now accessible to riders with disabilities. You can get bus schedule and other information in accessible formats. Please call 362-2020 or TTY 362-2019.

HOLIDAY SCHEDULES

Bus service on VIA observed holidays will be provided as follows:

Saturday Schedule - Martin Luther King Day, Memorial Day & Friday after Thanksgiving

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PERSONAL TRIP PLANNER: Plan your own bus trip online 24 hours a day. Log on to www.viainfo.net, and select Personal Trip Planner. Just enter where and when you want to go on the bus and the Trip Planner does the rest—providing you with step-by-step instructions and a map of your trip.

Sunday Schedule - New Year's Day, Labor Day, Thanksgiving and Christmas

Please look for notices on the bus, at www.viainfo.net or call Customer Service at 362-2020 (select option 5) for holiday service for Independence Day, Veteran's Day, Christmas Eve, and New Year's Eve.

 METROSERVICE



647

NORTH STAR / HARRY WURZBACH

The Towers, Alamo Heights, Terrell Hills, North Star Transit Center

EFFECTIVE: 03-01-2010

BUS FARES:

• Metro, Frequent, or Skip Service	ADULT	DISCOUNT*
• Express Service	\$ 1.10	\$.55
• Transfer Slip	2.50	1.25
• Monthly Big Pass	.15	.07
	30.00	15.00

VIAtrans PATRONS:

Includes their personal care attendant and a companion with VIA ID.

OFF PEAK SPECIAL for seniors and persons with limited mobility with VIA ID:

weddays 9 a.m. to 3 p.m.	25c
Saturdays and Sundays	FREE

*** DISCOUNTS:** Discounted fares and passes are available to the following:

seniors (62 and older), students, persons with certain disabilities, Medicare recipients and children 3-11 (no ID required for children, 4 and under ride free).

*** REDUCED FARE ID:** A VIA Reduced Fare ID is required and must be presented when boarding in order to pay reduced fares or use discounted passes. Call Customer Service for information on obtaining a VIA ID.

TRANSFERS: Transfer slips, which allow you to connect from one bus to another, must be purchased when boarding and are valid on date issued within 2 hours from time indicated. If transferring from a regular service to Express Service, additional fare is required.

PASSES: Passes and tickets are available online at www.viainfo.net, at all VIA Information Centers or by mail. In addition, there are convenient retail pass outlets throughout the city.

TIPS TO RIDE BY:

- Be at your stop five minutes early.
- Have correct change ready (operators do not carry change).
- Keep belongings out of the aisle.
- No smoking, eating or drinking on bus.
- Please offer front seats to seniors and riders with disabilities.
- Exit through the rear door.
- Stand behind yellow line on board.

Customer Service/Information:

362-2020 (1-866-362-2020)

TTY 362-2019

www.viainfo.net





APPENDIX I

Preliminary Cost Estimate

S&B INFRASTRUCTURE PRELIMINARY ESTIMATE HARRY WURZBACH SECTION 1

COUNTY: Bexar
 HIGHWAY: **Harry Wurzbach**
 CSJ: 0
 LENGTH: 1.345 MI
 TRAFFIC: 0 ADT
 TIP Categor: 0
 Roadway Classification:

LOCATION (SEE ATTACHED MAP)

FROM: **Fort Sam Houston Scott Gate**
 TO: **South of Lyman Drive**

R1	BEG STA:	16+00.00	BEG MP.:	0
R1	END STA:	50+25.55	END MP.:	0
R2	BEG STA:	16+00.00	BEG MP.:	0
R2	END STA:	52+75.00	END MP.:	0
	LENGTH:	7,100.55 FT		1.345 MI

RECONSTRUCT EXISTING (X) NEW LOCATION () EXIST ROW WIDTH:

LAYMAN'S DESCRIPTION OF PROPOSED WORK:

EXISTING IMPROVEMENTS:

PROJECT COST

GRADING	\$	5,592,390.00
SMALL DRAINAGE STRUCT (CULV)	\$	1,007,200.00
LARGE STRUCT	\$	-
SUBGRADE/ EXIST BASE TREATMENT	\$	565,171.32
HOT MIX	\$	3,765,500.00
CONCRETE PAVING	\$	265,932.00
SURFACE	\$	1,130,360.00
TRAFFIC SIGNALS (5@\$180,000EA)	\$	180,000.00
MOBILIZATION (11%)	\$	1,375,700.00
LANDSCAPING & AESTHETICS	\$	2,082,000.00
IRRIGATION	\$	278,000.00
ILLUMINATION	\$	1,388,000.00
SUB-TOTAL (Construction Bid Items)	\$	17,630,253.32
E&C Costs	\$	3,525,746.68
CONSTRUCTION TOTAL	\$	21,156,000.00
ROW COST	\$	54,000.00
Utility - Underground Conversion - Median	\$	-
Utility - Underground Conversion - ROW	\$	3,692,000.00
Project Subtotal	\$	24,902,000.00

TOTAL PROJECT **\$ 24,902,000.00**

PREPARED BY: _____

S&B INFRASTRUCTURE PRELIMINARY ESTIMATE HARRY WURZBACH SECTION 3

COUNTY: Bexar
 HIGHWAY: **Harry Wurzbach**
 CSJ: 0
 LENGTH: 0.89 MI
 TRAFFIC: 0 ADT
 TIP Categor: 0
 Roadway Classification:

LOCATION (SEE ATTACHED MAP)

FROM: **South of Brynes**
 TO: **North of Eisenhower Rd**
 BEG STA: 88+00.00 BEG MP.: 0
 END STA: 135+00.00 END MP.: 0
 LENGTH: 4,700.00 FT 0.89 MI

RECONSTRUCT EXISTING (X) NEW LOCATION () EXIST ROW WIDTH:

LAYMAN'S DESCRIPTION OF PROPOSED WORK:

EXISTING IMPROVEMENTS:

PROJECT COST

GRADING	\$	5,633,010.00
SMALL DRAINAGE STRUCT (CULV)	\$	766,900.00
LARGE STRUCT	\$	1,606,600.00
SUBGRADE/ EXIST BASE TREATMENT	\$	264,609.30
HOT MIX	\$	1,762,900.00
CONCRETE PAVING	\$	88,644.00
SURFACE	\$	773,270.00
TRAFFIC SIGNALS (5@\$180,000EA)	\$	900,000.00
MOBILIZATION (11%)	\$	1,297,600.00
LANDSCAPING & AESTHETICS	\$	1,964,000.00
IRRIGATION	\$	262,000.00
ILLUMINATION	\$	1,310,000.00
SUB-TOTAL (Construction Bid Items)	\$	16,629,533.30
E&C Costs	\$	3,325,466.70
<hr/>		
CONSTRUCTION TOTAL	\$	19,955,000.00
ROW COST	\$	462,000.00
	\$	-
Utility - Underground Conversion - Median	\$	-
Utility - Underground Conversion - ROW	\$	2,444,000.00
<hr/>		
Project Subtotal	\$	22,861,000.00

TOTAL PROJECT \$ 22,861,000.00

PREPARED BY: _____

S&B INFRASTRUCTURE PRELIMINARY ESTIMATE HARRY WURZBACH SECTION 4

COUNTY: Bexar
 HIGHWAY: **Harry Wurzbach**
 CSJ: 0
 LENGTH: 1.07 MI
 TRAFFIC: 0 ADT
 TIP Categor: 0
 Roadway Classification:

LOCATION (SEE ATTACHED MAP)

FROM: **North of Eisenhower Rd**
 TO: **South of 410**
 BEG STA: 135+00.00 BEG MP.: 0
 END STA: 191+50.00 END MP.: 0
 LENGTH: 5,650.00 FT 1.07 MI

RECONSTRUCT EXISTING (X) NEW LOCATION () EXIST ROW WIDTH:

LAYMAN'S DESCRIPTION OF PROPOSED WORK:

EXISTING IMPROVEMENTS:

PROJECT COST

GRADING	\$	3,870,290.00
SMALL DRAINAGE STRUCT (CULV)	\$	1,588,900.00
LARGE STRUCT	\$	-
SUBGRADE/ EXIST BASE TREATMENT	\$	303,777.75
HOT MIX	\$	2,023,900.00
CONCRETE PAVING	\$	221,610.00
SURFACE	\$	782,210.00
TRAFFIC SIGNALS (5@\$180,000EA)	\$	540,000.00
MOBILIZATION (11%)	\$	1,026,400.00
LANDSCAPING & AESTHETICS	\$	1,554,000.00
IRRIGATION	\$	207,000.00
ILLUMINATION	\$	1,036,000.00
SUB-TOTAL (Construction Bid Items)	\$	13,154,087.75
E&C Costs	\$	2,630,912.25
<hr/>		
CONSTRUCTION TOTAL	\$	15,785,000.00
ROW COST	\$	-
Utility - Underground Conversion - Median	\$	844,000.00
Utility - Underground Conversion - ROW	\$	1,248,000.00
<hr/>		
Project Subtotal	\$	17,877,000.00

TOTAL PROJECT \$ **17,877,000.00**

PREPARED BY: _____