Transportation Management Plan

UTSA CAMPUS MASTER PLAN

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OVERVIEW

DESCRIPTION OF THE UTSA CAMPUS MASTER PLAN AND ITS PURPOSE

As the University of Texas at San Antonio (UTSA) celebrates its 50th anniversary, the campus master plan initiative has been launched to guide the long-term development of the campuses. UTSA's strategic vision calls for significant growth in student enrollment, faculty and staff. The purpose of the campus master plan initiative is to guide the development of campus facilities and services to accommodate and support the expected growth with a strong vision of what UTSA can become. UTSA's campus master plan will provide critical links between the university's physical development, its academic mission and strategic priorities, integrating sustainability best practices while preserving natural resources and the culture of the campuses. UTSA retained Page to assist the university in master planning for the Main Campus, Park West Campus, and the Downtown Campus. As a part of the Page team, Alliance assessed priority transportation constraints and opportunities at the Main Campus and Downtown Campus.

PURPOSE OF THE TRANSPORTATION MANAGEMENT PLAN

The purpose of the Transportation Management Plan is to identify significant access and circulation issues that are likely to arise as expansion of the university occurs at its two campuses and to provide a blueprint for addressing those issues as the need arises. This blueprint provides recommendations for infrastructure improvements and modification as well as operational and programmatic demand management recommendations designed to address growth issues by managing how people travel to and from the campuses in a way that reduces the need for infrastructure improvements.

Main Campus Priorities

An initial assessment by the university administration and the campus master planning team, led by Page, suggested that the primary focus of the infrastructure recommendations of the Transportation Management Plan, to be completed by Alliance Transportation Group (ATG), should be on the Main Campus where a significant redesign of the parking and circulation system are needed to accommodate desired expansion of building infrastructure to meet growing academic, research, athletic and student housing needs on the campus.

Ring Road

Completion of what is now a partial ring-road system around the outer edges of the campus with parking garages along the ring-road will allow construction of more academic space in the core area of the campus, addition of more green space in the core and provision of safer pedestrian and bicycle connections between different parts of the campus. This Transportation Management Plan provides an analysis of the circulation infrastructure improvements and programs that may be necessary to make the ring-road concept work for the building expansion and the growth in campus population envisioned in the campus master plan.

Mode Shift

The plan also includes recommendations for how travel to, from and within the campus by transit, shuttle, carpooling, bicycling, walking and other modes besides driving alone can be promoted and accommodated safely.

Downtown Campus Priorities

The focus of the infrastructure improvements of the Transportation Management Plan for the Downtown Campus has less focus on circulation and access and more on how one change in the roadway infrastructure might make more space available for building expansion on campus. The analysis for the Downtown Campus focused on whether a reduction in the freeway ramp connections from southbound I-35/I-10 to the surface streets on the west side of the freeway is potentially feasible. The off-ramp currently has connections to South Frio Street and two connections to West Cesar Chavez Boulevard. Limiting the off-ramp to only the connection to South Frio Street could potentially make more space available for development of the site currently owned by TxDOT and used for surface parking by UTSA under agreement from TxDOT. The additional development could include additional academic space, a parking garage or housing. For this plan, ATG prepared an analysis of whether limiting the off-ramp access to only South Frio Street would result in unacceptable levels of driver delay on the off-ramp at its intersection with South Frio Street or at the intersection of South Frio Street with West Cesar Chavez Boulevard.

Overall Transportation Demand Management

The focus of the demand management recommendations, which apply to both campuses, is on encouraging students, faculty ,staff and visitors to use VIA Transit, the 'Runner shuttle service or other modes besides driving alone to get to and from the campuses. Recommendations of the plan include:

- encouraging VIA to expand transit service to and between the campuses;
- providing free transit passes to students, faculty and staff (already planned for fall of 2019);
- expansion of the university's 'Runner shuttle system;
- use of performance-based parking pricing strategies that charge more for higher-demand facilities and for faculty and staff who are better able to pay;
- building only the minimum amount of new or replacement parking needed to meet the university's needs;
- giving priority to the attractiveness and safety of pedestrian and bicycle facilities to encourage their use on the campuses;
- encouraging new technologies to increase the ease of ridesharing and other shared-use options;
- marketing demand management options;
- and adoption of university policies that promote the use of modes other than driving.

EXISTING CONDITIONS – MAIN CAMPUS

ROADWAY SYSTEM

The current roadway system serving the UTSA Main Campus is comprised of a circulatory road around the campus and seven ingress/egress points located at the following intersections:

- Barshop Boulevard and Tobin Avenue
- Brenan Avenue and Tobin Avenue
- Peace Boulevard and Bauerle Road
- East Campus Drive and Bauerle Road
- Bauerle Road and Ford Road
- Ximenes Avenue and Ford Road
- Barshop Boulevard and Brackenridge Avenue

Most of these ingress/egress points are stop-controlled, while two are controlled by a roundabout. UTSA's Main Campus and the existing traffic controls of the ingress/egress points are shown in Figure 1.

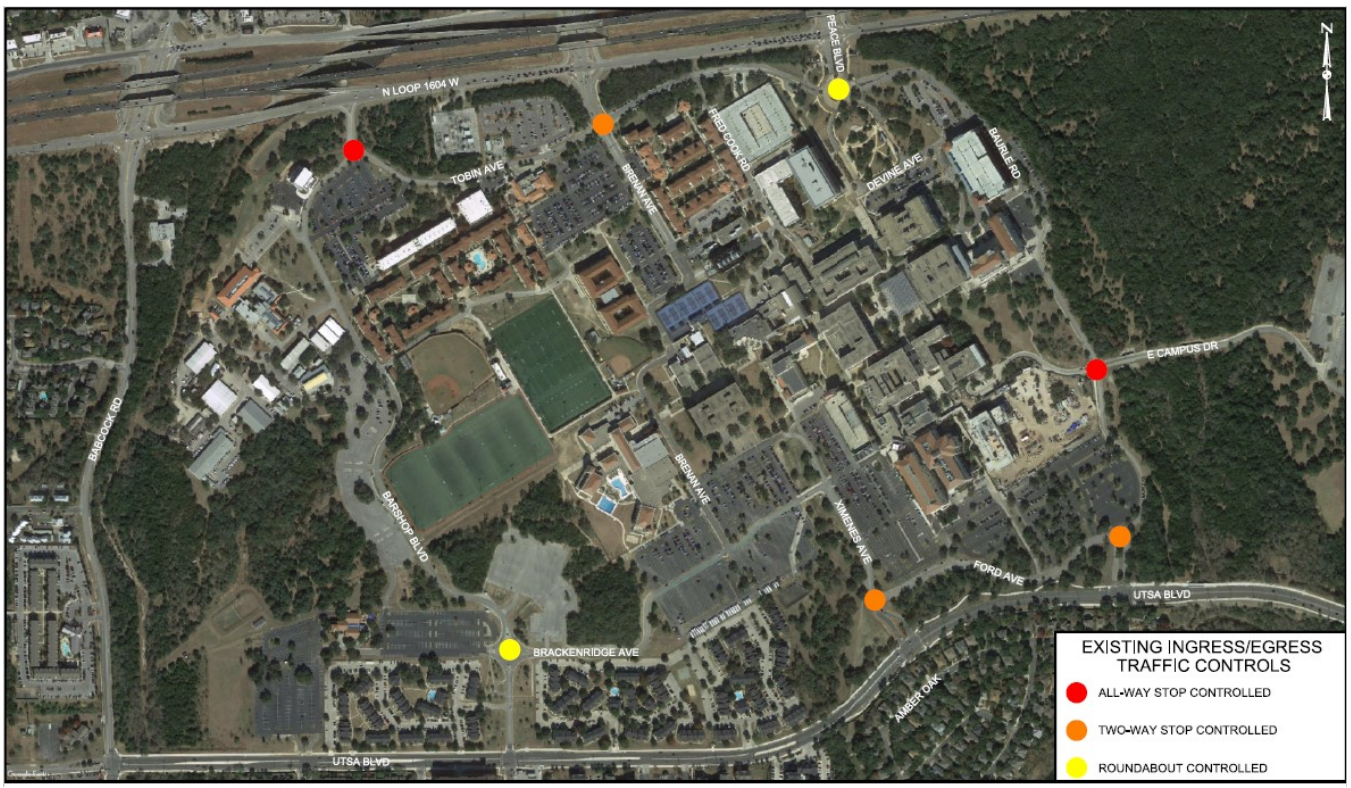
The following provides a description of the major transportation facilities within the Main Campus:

Barshop Boulevard

Barshop Boulevard is a northwest/southwest roadway that runs through campus beginning at the intersection with North Loop 1604 Frontage Road and terminating at the intersection with UTSA Boulevard. Barshop Boulevard is a two-lane roadway with a posted speed limit of 20 mph.

Brenan Avenue

Brenan Avenue is a northwest/southwest roadway that runs through the middle of campus beginning at the intersection with North Loop 1604 Frontage Road and terminating at the intersection with Brackenridge Avenue. Brenan Avenue is a four-lane roadway that narrows to two-lanes just north of the tennis courts located in the center of campus. The speed limit along Brenan Avenue varies from 10 mph and 20 mph.



Source: Google Maps for base map

Figure 1 Main Campus Existing Ingress/Egress Traffic Control

Peace Boulevard

Peace Boulevard is a north/south roadway that provides access to campus beginning at the intersection with North Loop 1604 Frontage Road and terminating at Peace Circle. Peace Boulevard is a four-lane roadway with a posted speed limit of 20 mph. Peace Boulevard provides access to the UTSA Oval, which currently serves as a bus drop-off location.

East Campus Drive

East Campus Drive is an east/west roadway that provides access to campus beginning at the intersection with Bauerle Road and terminating at the intersection with Valero Way. East Campus Drive is a two-lane roadway with a posted speed limit of 20 mph.

Bauerle Road

Bauerle Road is a northwest/southwest roadway that runs through campus beginning at the intersection with Peace Circle and terminating at the intersection with UTSA Boulevard. Bauerle Road is a two-lane roadway with a posted speed limit of 20 mph.

Ximenes Avenue

Ximenes Avenue is a northwest/southwest roadway that provides access to campus beginning at the intersection with UTSA Boulevard and terminating at the intersection with Brenan Avenue. Ximenes Avenue is a two-lane roadway with a posted speed limit of 20 mph.

Tobin Avenue

Tobin Avenue is an east/west roadway that runs through north campus beginning at the intersection with Barshop Boulevard and terminating at the Peace Circle roundabout. Tobin Avenue is a two-lane roadway with a posted speed limit of 20 mph. On-street parking is currently available along Tobin Avenue between Brenan Avenue and Cook Road.

Brackenridge Avenue

Brackenridge Avenue is a northeast/southwest roadway that runs through south campus beginning at the intersection with Barshop Boulevard and terminating at the intersection with Ximenes Avenue. Brackenridge Avenue is a two-lane roadway with a posted speed limit of 20 mph.

Ford Road

Ford Road is an east/west roadway that runs through south campus beginning at the intersection with Ximenes Avenue and terminating at the intersection with Bauerle Road. Ford Road is a two-lane roadway with a posted speed limit of 20 mph. On-street parking is available along Ford Road.

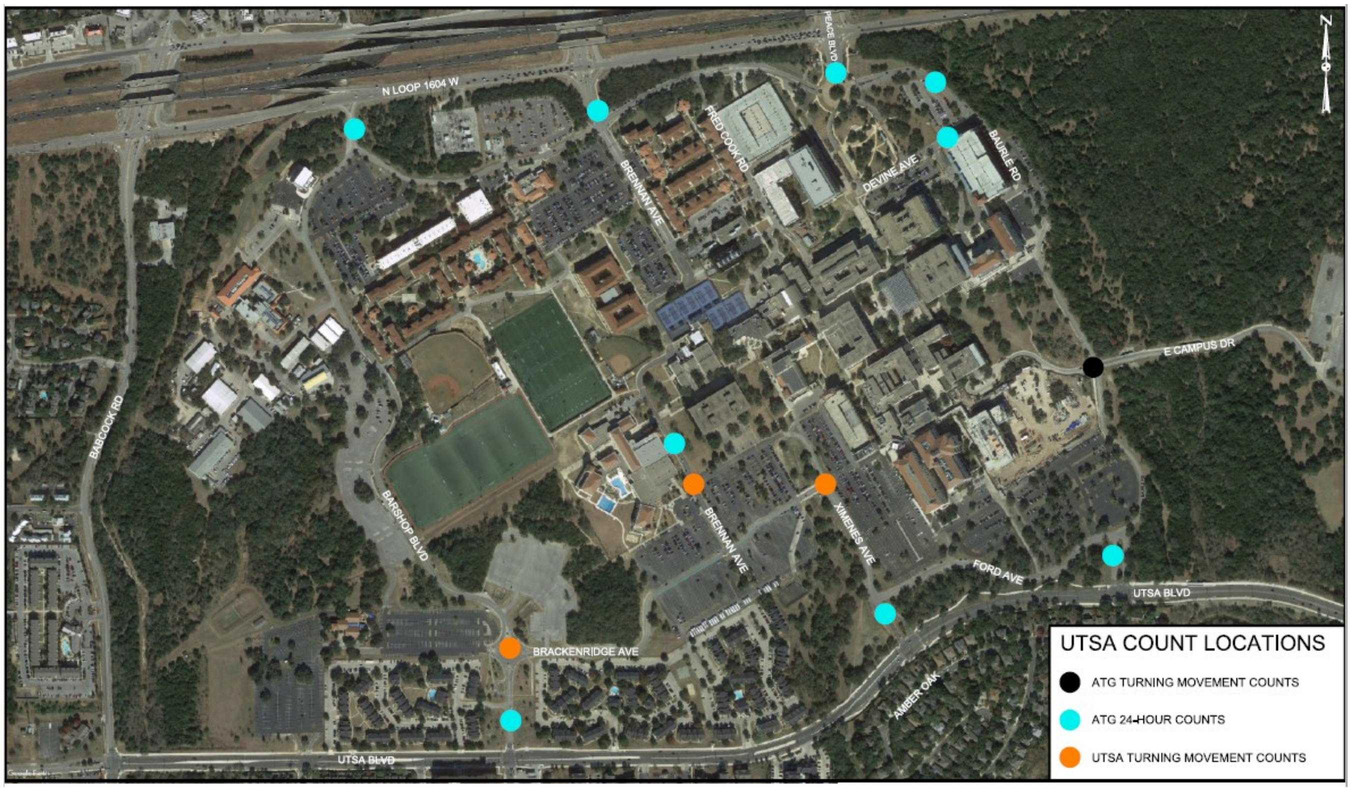
24-hour traffic counts were collected by ATG at the following locations:

- Bauerle Road east of Peace Circle
- Devine Avenue west of Bauerle Road Garage and parking lots
- John Peace Boulevard north of Peace Circle
- Brenan Avenue north of Tobin Avenue
- Bauerle Road north of UTSA Boulevard
- Ximenes Avenue north of UTSA Boulevard
- Barshop Boulevard north of UTSA Boulevard
- Brenan Avenue north of parking lots at Ximenes Avenue

In addition to the 24-hour counts listed above, turning-movement count data was collected at the intersection of Key Circle with Bauerle Road.

Tuning movement count data were also collected by UTSA at the following locations as shown in Figure 2:

Brenan Avenue and Ximenes Avenue
Ximenes Avenue and Brackenridge Avenue
Barshop Boulevard and Brackenridge Avenue



Source: Google Maps for base map

Figure 2 Main Campus Count Locations

Using 24-hour traffic counts and turning-movement counts collected by ATG, AM and PM peak hours for the campus were determined to be 8:00-9:00 AM and 5:00-6:00 PM respectively.

Daily entering and exiting volumes collected at the 24-hour count locations are presented in Table 1.

Table 1 Daily Entering and Exiting Traffic

Count Location	Daily Total	
	Entering	Exiting
Barshop Boulevard north of Tobin Avenue	1291	1948
John Peace Boulevard north of Peace Circle	4125	5535
Brenan Avenue north of Tobin Avenue	4525	3062
Bauerle Road north of UTSA Boulevard	3925	4401
Ximenes Avenue north of UTSA Boulevard	3554	3763
Barshop Boulevard north of UTSA Boulevard	3995	3544

AM and PM peak-hour entering and exiting volumes for the turning-movement count data collected at Key Circle and Bauerle Road are presented in Table 2.

Table 2 AM and PM Peak Hour Entering and Exiting Traffic for Key Circle and Bauerle Road

Count Location	AM Peak		PM Peak	
	Entering	Exiting	Entering	Exiting
Key Circle and Bauerle Road	73	23	169	44

PARKING

Currently there are 28 existing facilities (a combination of surface lots and parking garages) available for on-campus parking. Table 3 summarizes the available parking spaces for each existing lot, while Figure 3 presents the locations of existing surface lots and parking garages along with the existing buildings on campus and the 'Runner shuttle routes.

As indicated in Table 3, there are 12,361 total existing parking spaces available. These lots currently serve commuters, residents, employees, and short-term hourly parkers.

Utilization

Hourly occupancy for three parking garages and three surface lots located around campus during an average school week were provided by UTSA. Table 4 summarizes the maximum hourly occupancy for these parking facilities on the day of week with the highest occupancies.

Table 3 Existing Parking Spaces on the Main Campus

Parking Lot ID		Spaces
Bauerle Road Garage	BRG	1168
Ximenes Avenue Garage	XAG	462
Bauerle Road Lot 2	BR2	195
East Campus Lot 1,2,3	EC1,2,3	1967
Brackenridge Avenue Lot 1	BK1	715
Brackenridge Avenue Lot 2	BK2	625
University Oaks Lot 1	UOK1	390
University Oaks Lot 2	UOK2	391
University Oaks Lot 3	UOK3	366
Ximenes Avenue Lot	XL	724
Ford Lot	FL	251
Bauerle Road Lot 1	BR1	497
Bauerle Road Lot 2	BR3	86
Devine Avenue Lot	DL	131
Resident Lot 1	RS1	198
Resident Lot 2	RS2	450
Resident Lot 3	RS3	490
Resident Lot 4	RS4	280
Barshop Boulevard Lot 2	BS2	195
Barshop Boulevard Lot 1	BS1	649
Barshop Boulevard Lot 2	BS2	132
Brackenridge Avenue Lot 3	BK3	408
Brackenridge Avenue Lot 4	BK4	453
Brackenridge Avenue Lot 5	BK5	545
Tobin Avenue Garage	TAG	593
	Total	**12,361**

Source: UTSA Website - https://www.utsa.edu/campusservices/runner/Park-Trans_Map.pdf

Figure 3 Location of Existing Campus Buildings, Parking and 'Runner Routes

Table 4 Current Parking Utilization

Hour Beginning	Lot ID					
	Brackenridge Avenue Lot 3 (BK3)	Brackenridge Avenue Lot 4 (BK4)	Brackenridge Avenue Lot 5 (BK5)	Bauerle Road Garage (BRG)	Tobin Avenue Garage (TAG)	Ximenes Avenue Garage (XAG)
7:00	10	29	52	127	101	131
8:00	406	166	99	537	293	357
9:00	436	483	306	927	385	386
10:00	433	474	477	1047	428	421
11:00	434	475	552	1058	470	392
12:00	440	483	554	1084	474	313
13:00	412	461	505	1043	461	416
14:00	411	447	462	1049	459	437
15:00	437	359	381	931	418	412
16:00	317	318	331	799	363	364
17:00	241	253	253	723	264	172
18:00	147	179	153	755	160	165
19:00	109	150	115	711	123	155
20:00	58	102	80	521	81	111
21:00	31	57	54	145	35	43
22:00	15	40	35	82	25	20
23:00	4	32	32	52	21	5
Max Occupancy	440	483	554	1,084	474	437
Estimated Capacity*	408	453	545	1168	593	462

* The actual observed maximum occupancy on surface lots exceed the estimated capacity because of parking in locations not intended as parking spaces.

Pricing and Permitting

Annual parking permits are available to students, employees, alumni, contractors and vendors. Single-use daily permits are also available for several surface parking lots on campus. Table 5 displays currently available parking permits and their associated prices on the Main Campus for students and Table 6 displays similar information for employees.

Table 5 Existing Student Parking Permitting and Pricing

Permit	Allowed Parking	Academic Year Fall 2019- Spring 2020
	Student Surface Permits	
C – Commuter Student	Commuter Student spaces anytime Employee B spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$163
H – Housing Resident (Chaparral Village, Laurel Village, Chisholm Hall, Alvarez Hall)	Resident spaces anytime Employee B spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday Commuter Student spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$273
U – Housing Resident (University Oaks)	University Oaks spaces anytime Employee B spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday Commuter Student spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$273
Z – Twilight	Commuter Student Spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$79
M - Motorcycle	Motorcycle spaces	$68
	Student Garage Permits	
RT – Resident Tobin Avenue Garage	Tobin Avenue Garage anytime Employee B spaces and Commuter Student spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$825
ST – Student Tobin Avenue Garage	Tobin Avenue Garage anytime Commuter Student spaces anytime Employee B spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$825
SB – Student Bauerle Road Garage	Bauerle Road Garage anytime Commuter Student spaces anytime Employee B spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$825
XN – Ximenes Avenue Garage (Night Only)	Ximenes Avenue Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258
TN – Tobin Avenue Garage (Night Only)	Tobin Avenue Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258
BN – Bauerle Road Garage (Night Only)	Bauerle Road Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258

https://www.utsa.edu/campusservices/parking/index.html

Table 6 Existing Employee Parking Permitting and Pricing

Permit	Allowed Parking	Academic Year Fall 2019- Spring 2020
Employee Surface Permits		
A – Employee A	Employee A and Employee B spaces Commuter Student spaces	$363
B – Employee B	Employee B spaces Commuter Student spaces Employee A spaces – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$195
R – Employee Reserved	Reserved spaces Employee A, Employee B, and Commuter student spaces	$695
M – Motorcycle	Motorcycle surface spaces only	$68*
Employee Garage Permits		
ET – Employee Tobin Avenue Garage	Tobin Avenue Garage Employee A, Employee B, and Commuter Student spaces	$825
EX – Employee Ximenes Avenue Garage	Ximenes Avenue Garage Employee A, Employee B, and Commuter Student Spaces Reserved spaces in Barshop Lot 2, Resident Lot 2, Business Services Annex Lot, Center for Archeological Research Lot, Central Receiving Warehouse Lot, and the Science Research Laboratories Lot	$825
EB – Employee Bauerle Road Garage	Bauerle Road Garage Employee A, Employee B, and Commuter Student spaces Reserved spaces in Barshop Lot 2, Resident Lot 2, Business Services Annex Lot, Center for Archeological Research Lot, Central Receiving Warehouse Lot, and the Science Research Laboratories Lot	$825
TN – Employee Tobin Avenue Garage (Night Only)	Tobin Avenue Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258
XN – Employee Ximenes Avenue Garage	Ximenes Avenue Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258
BN – Employee Bauerle Road Garage (Night Only)	Bauerle Road Garage – 4:30 PM – 6:00 AM Monday- Friday, all day Saturday-Sunday	$258

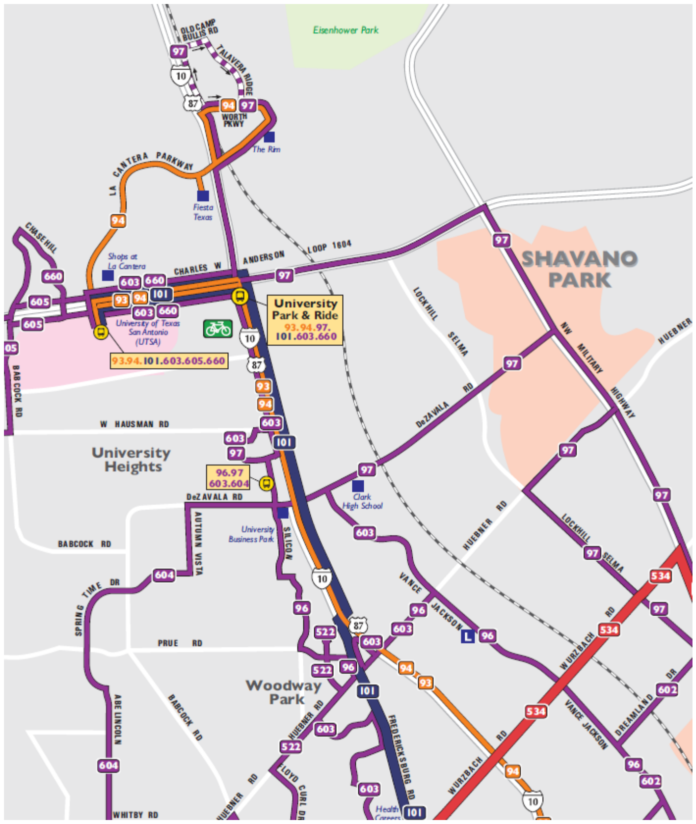
https://www.utsa.edu/campusservices/parking/index.html

TRANSIT

UTSA campus is served by the VIA Transit service as well as a UTSA shuttle service, the 'Runner. Transit provides students, staff, and visitors the ability to travel to and from campus without relying solely on an automobile. A continued effort to partner with VIA and enhancing the UTSA shuttle based on travel needs will help encourage commuters to use transit. Current transit services supporting the Main Campus are described below.

VIA Transit Service

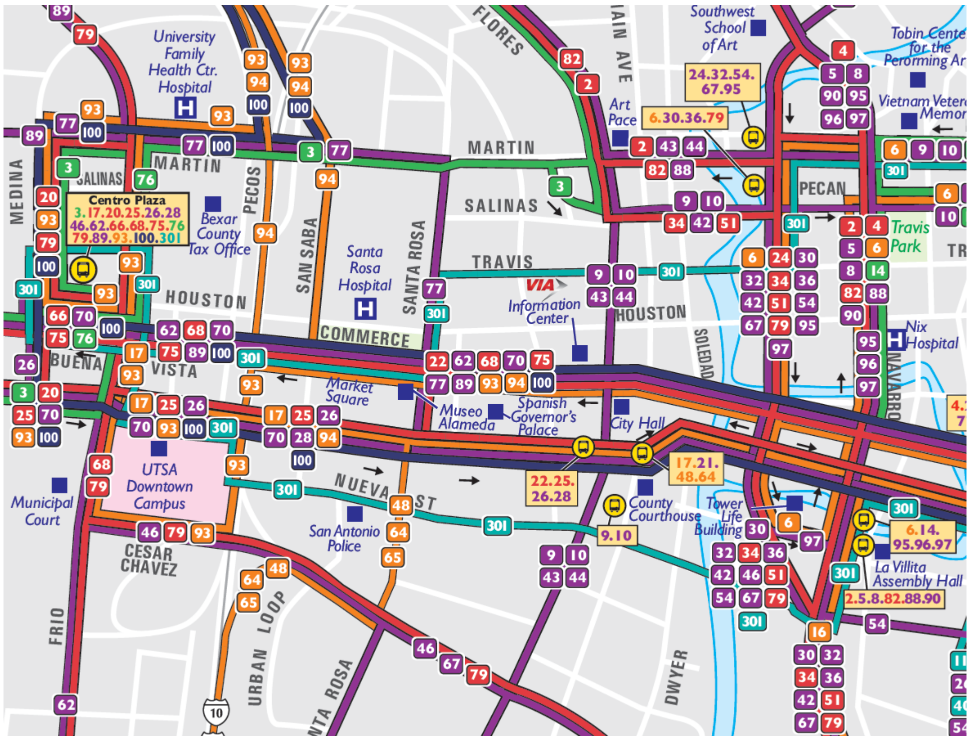
VIA serves the Main Campus with a total of sixteen routes extending across the San Antonio area (See Figure 4). Route 93 runs directly from the UTSA Main Campus to the Downtown Campus on weekdays between 6:00 AM and 11:00 PM. It operates every 30 minutes during the peak periods (6:00 AM – 9:00 AM and 3:00 PM to 6:00 PM) and the base period (9:00 AM-3:00 PM) and every 60 minutes in the evening period (6:00 PM and 11:00 PM). Route 94 also operates every 30 minutes in the peak periods but every 60 minutes the rest of the day. The other routes serving the campus operate every 60 minutes. All VIA routes servicing the Main Campus are located at the northeastern side of campus on Devine Avenue. East-west transit access from the Main Campus is limited to Route 660 and 97. Northern transit access from the Main Campus extends just north of campus along Route 94 that reaches to Fiesta Texas and The Rim. Most of the transit service for the Main Campus extends south towards the Medical Center and Downtown San Antonio. The University Park-and-Ride, located just west of campus, provides parking and access to campus as well as south towards downtown. Many of these routes run Saturday and Sunday service in addition to weekday service. The average daily boardings at UTSA's Main Campus was approximately 415 in the fall of 2018 and 375 in the spring of 2019.



Source: VIA Website -http://www.viainfo.net/wp-content/uploads/2018/01/VIA-System-Map-MAY2017-proof.pdf

Figure 4 VIA Transit Serving UTSA Main Campus

Figure 5 illustrates the VIA service to the Downtown Campus, which is just to the south of the Centro Plaza station served by 17 routes, with most operating seven days a week. Thirteen of the routes have peak-period headways 15 minutes or less and nine of those have headways of 15 minutes or less in the base period as well. For the stops on the campus, the average daily boardings for the fall of 2018 were 166 and the spring of 2019 were 172. Route 93 stop on Frio had 66 average daily boardings for both the fall and spring semesters. Estimates of the campus-related boarding at the Centro Plaza were not available.



Source: VIA Website -http://www.viainfo.net/wp-content/uploads/2018/01/VIA-System-Map-MAY2017-proof.pdf

Figure 5 VIA Transit Serving UTSA Downtown Campus

UTSA Shuttle Service

UTSA operates the 'Runner, a shuttle service that serves stops on and off the Main Campus, that carries roughly 15,000 riders per day. The service is paid for through student transportation fees and no fare is required for passengers. The 'Runner routes run along the perimeter of campus and extend to campus housing just outside of campus as was illustrated in Figure 3. Shuttles do not penetrate within the core of the campus, rather the routes run along the outside edge of the campus with stops at campus parking lots that terminate at the north- and south-eastern side of campus. The university is also considering providing a shuttle between the Main Campus and the Downtown Campus in the future as the two campuses expand and the volume of trips between the campuses increases.

Route 13 and 43 serve the outer campus parking lots and carry roughly 6000 riders per day. Routes 12, 14, 20, 22, 45 and 47 serve nearby apartment complexes and carry roughly 9000 riders per day. Figure 6 provides additional detail concerning the service of each route. The 'Runner operates on class days during the fall and spring semesters Monday-Thursday from 6:45 AM to 10:25 PM and Friday from 6:45 AM to 5:15 pm. All 'Runner routes run at high frequencies (generically every 5 to 10 minutes) with a maximum of 20 minutes between shuttles. Shuttle locations and arrival times can be accessed through the 'Runner GPS app or online.

Source: UTSA Website - https://www.utsa.edu/campusservices/runner/Park-Trans_Map.pdf

Figure 6 Destinations Served by 'Runner Service

TRANSPORTATION DEMAND MANAGEMENT PROGRAMS

Transportation demand management is the term that is generally used to describe a range of strategies designed to reduce the amount of automobile travel to and from a location or the amount of parking needed to accommodate automobile travel to the site. Demand management strategies have been implemented to reduce traffic and parking needs for colleges and universities of all sizes. These strategies can reduce the need for costly transportation infrastructure investments such as roadway expansion or construction of additional parking. In addition, such strategies also provide other benefits such as improved mobility for trip makers who do not have access to a car; safety for trip makers traveling by transit, bicycling, scooting or walking; reduced delay due to congestion; healthier trip making when made by bicycling or walking and reduced overall transportation costs.

Demand management strategies can be effective in meeting the objectives for which they are proposed in a variety of ways. By shifting trips from single-occupant automobiles (people driving alone) to other modes that are more efficient such as transit, university-operated shuttle, carpooling, bicycling, scooting or walking; the demand management strategy can reduce the number of private automobiles being driven to or from the campus during the peak times and reduce the number of parking spaces needed. The shifting of trips from single-occupant automobiles to more efficient modes can be achieved by providing more attractive options to driving alone or by increasing the cost of driving alone compared to the more efficient alternatives. Demand management strategies can also reduce congestion at peak travel times by changing the times at which people travel. This can sometimes be achieved by staggering start and end times for classes throughout the day to avoid the peak periods. This can be effective in reducing queuing and delay, but often does so without reducing the total amount of parking needed.

UTSA's existing Transportation Demand Management Program provides a baseline of strategies for reducing automobile trips to campus and reducing the need for parking. These current strategies include the following:

VIA services to campus;

- the ‘Runner shuttle between area apartment complexes and the Main Campus;
- free universal transit passes for students, faculty, and staff (starting in Fall 2019);
- and carpool ride-matching assistance from Alamo Commutes – a program of the Alamo Area Metropolitan Planning Organization.

The university was recently selected by Alamo Commutes as one of five regional “Champions” in its demand management program. The Champions will receive assistance form Alamo Commutes in developing and implementing a Demand Management Action Plan for the organization.

PLANNED CHANGES TO THE MAIN CAMPUS

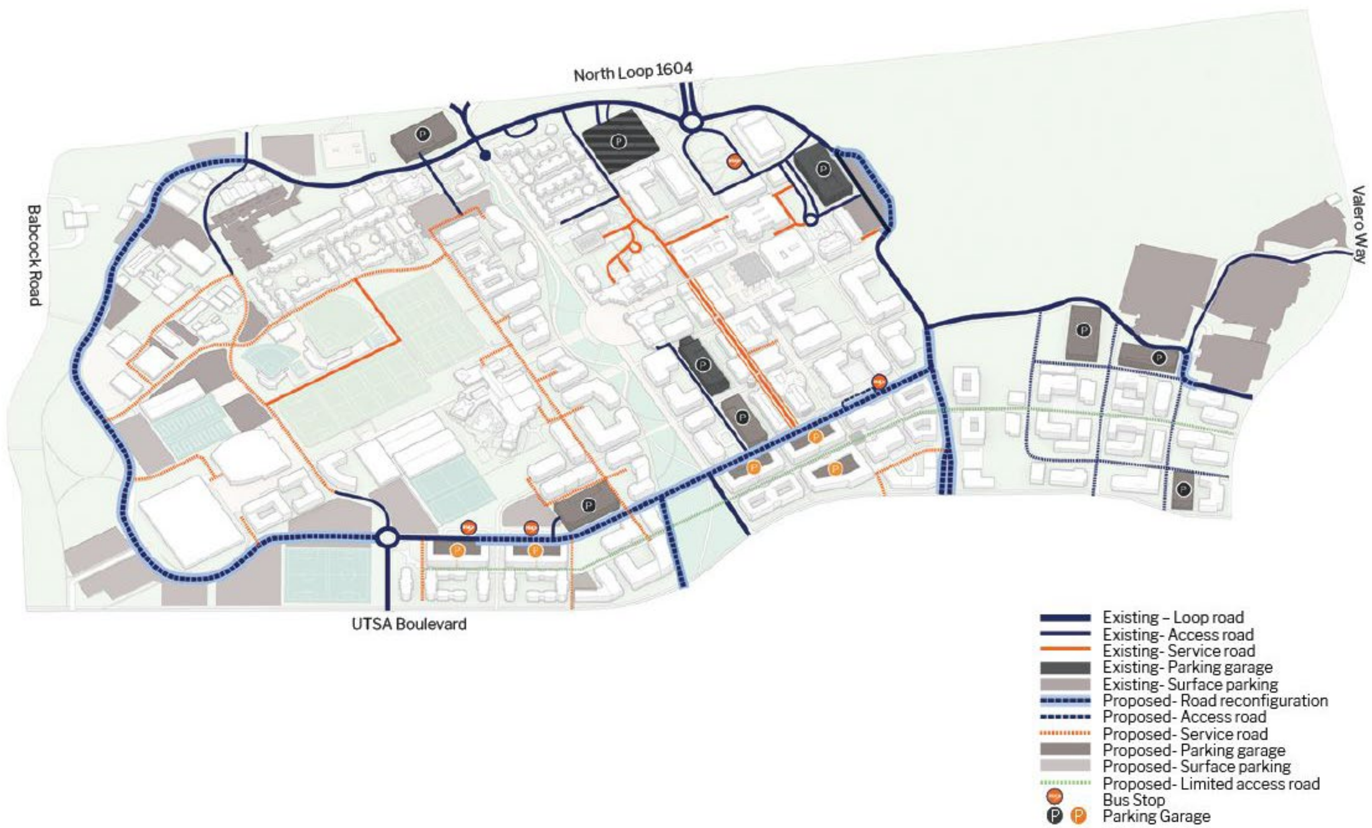
CHANGES TO INTERNAL ROADWAY NETWORK

In addition to new buildings and parking facilities, changes will be made to UTSA’s internal roadway network. The proposed roadway network is presented in Figure 7**.** As part of the campus master plan, a loop road will be completed around the campus. The loop road will extend west from the intersection of Barshop Boulevard with Tobin Avenue and loop to the roundabout located at the intersection of Barshop Boulevard and Brackenridge Avenue. This loop road will also extend east from the roundabout at Barshop Boulevard and Brackenridge Avenue and connect to Ximenes Avenue and Bauerle Road. In addition to the extension of the loop road, several limited access roadways are proposed.

REPLACEMENT PARKING

As part of UTSA’s master plan for the Main Campus, changes to existing surface parking lots and parking garages are anticipated. The campus master plan proposes the elimination of some parking lots, primarily in the center of the campus and near the existing academic core, to allow for the construction of additional academic buildings. A total of twelve lots are proposed for elimination and ten existing lots will be modified. Replacement parking is proposed in garages and surface lots on the periphery of the campus, primarily along the proposed loop road. Twenty-six new facilities could ultimately be added to campus to maintain the current ratio of parking spaces to campus population: students, faculty and staff. The current ratio is roughly 0.41 parking spaces per person that is part of campus population. Table 7 summarizes the proposed parking facility changes and indicates that a total of 17,377 future spaces are anticipated as part of UTSA’s campus master plan at full buildout.

The construction of new parking will be phased in over time as campus development occurs. The intent of the university is to only build enough parking to maintain the current ratio of spaces to campus population or a lower ratio if demand-management programs for the campus are successful in shifting trips to modes other than driving alone.



Source: Page

Figure 7 Proposed Future Roadway System and Parking

Table 7 Existing and Anticipated Parking Spaces

Facility ID		Current Spaces	Anticipated Spaces
Existing Facilities			
Bauerle Road Garage	BRG	1168	1168
Ximenes Avenue Garage	XAG	462	462
East Campus Lot 1,2,3	EC1,2,3	1967	1967
Bosque Lot	BOS	39	39
Removed Facilities			
Brackenridge Avenue Lot 1, 2	BK1, BK2	1340	0
University Oaks Lot 1, 2, 3	UOK1, UOK2, UOK3	1147	0
Ximenes Avenue Lot	XL	724	0
Ford Lot	FL	251	0
Bauerle Road Lot 1, 3	BR1, BR3	583	0
Devine Avenue Lot	DL	131	0
Resident Lot 1, 4	R1, R4	478	0
Modified Lots			
Resident Lot 2, 3	RS2	940	650
Barshop Lot 2	BS2	195	310
Barshop Lot 1	BS1	649	150
Barshop Lot 2	BS2	132	100
Brackenridge Avenue Lot 3	BK3	408	300
Brackenridge Avenue Lot 4	BK4	453	300
Brackenridge Avenue Lot 5	BK5	545	450
Bauerle Road Lot 2	BR2	195	155
Tobin Avenue Garage	TAG	593	1200
Residential Lot 5	R5	-	-
New Facilities			
	AD11	-	50
Brackenridge Avenue Lot 0	BK0	-	250
	FP1	-	100
	BR4	-	150
	GG1	-	55
Parking Lot 3	P3	-	150
Parking Lot 4	P4	-	250
Parking Lot 5	P5	-	50
Parking Lot 6	P6	-	100
Parking Lot 7	P7	-	250
Parking Lot 8	P8	-	250
Parking Lot 9	P9	-	300
Parking Lot 10	P10	-	250
Parking Garage 1	PG1	-	1200
Parking Garage 2	PG2	-	500
Parking Garage 3	PG3	-	1200
Barshop Boulevard Lot 3	BS3	-	120
Innovation Park Garage 1, 2, 3	IP1, IP2, IP3	-	2000
Innovation Park Surface Lot	IP Surface	-	500
Road Runner Lot 1, 2, 3, 4, 5	RR1	-	2000
	Total	12,361	17,377

ASSESSMENT OF TRANSPORTATION ISSUES AND NEEDS AND EVALUATION OF SOLUTION OPTIONS

FORECASTING TRAVEL PATTERNS AND TRANSPORTATION NEEDS METHODOLOGY

To determine the future travel patterns and transportation needs of the Main Campus, ATG forecast the future campus traffic at entry and exit points and on the internal roadway system using a combination of the 2019 ATG collected data at the ingress/egress points along the perimeter of UTSA's Main Campus and the existing and proposed parking facility locations and sizes. Future campus traffic was forecasted for two peak hours, an AM and a PM peak hour. The following methodology was used to estimate the future roadway volumes associated with the parking that will provided within the UTSA campus.

Estimating Future Internal Campus Roadway Volumes on the Main Campus

The process of estimating future internal campus roadway volumes began with the development of a AM peak-hour and PM peak-hour table of trips between the seven ingress/egress points for the campus identified in Table 1 and 2. The AM and PM peak hours were identified using the 2019 ATG collected data at the ingress/egress points along the perimeter of the campus. The peak hours were determined to be 8-9 AM and 5-6 PM. The estimate of the future volume of AM and PM entries and exits at the seven ingress/egress points was developed by multiplying the 2019 observed values by the ratio of total future parking to total existing parking.

The AM and PM traffic as a percentage of daily traffic was calculated for each ingress/egress point, and these percentages were used to estimate the pattern of entries and exits at the future parking locations. Entries from ingress/egress points were linked to parking facility entries by distributing the total for a peak hour based on parking capacity of the future parking facilities. The same process was used to link exits from ingress/egress points to exits from parking facilities.

The total number of vehicles entering and exiting all parking facilities in the future campus master plan buildout for the campus was determined by the total capacity of the future parking facilities and the distribution of entries and exits by facility by hour. Data on entries and exits by hour were not available for all existing parking facilities, so the future parking facilities were grouped into parking zones within the campus based on location and proximity to the ingress/egress points, and the data for the facilities within each group with entries and exits by hour were used to represent all of the facilities in the group. The resulting AM and PM entries and exits for each future parking facility are shown in Table 8. With the trip table of AM and PM movement between ingress/egress points and parking facilities, traffic volumes by segment were estimated by applying the trip table in a route simulation model.

Table 8 Future Trip Generation

Lot ID	AM Peak		PM Peak	
	Enter	Exit	Enter	Exit
BRG	551	432	146	499
BR2	92	72	24	83
IP1	26	6	20	5
IP2	51	13	41	9
IP3	26	6	20	5
IP Surface	26	6	20	5
EC1-3	100	25	80	18
TAG	637	154	458	694
PG1	637	154	458	694
R2	6	0	3	6
BS2	13	5	3	13
R3	2	0	0	2
P3	20	7	4	19
P4	33	12	6	31
FP1	13	5	3	13
GG1	7	3	1	7
BS3	16	6	3	15
AD11	7	2	1	6
BR2	41	15	8	39
BR4	67	24	13	64
BS1	20	7	4	19
BK4	52	34	53	51
BK3	52	34	53	51
P10	43	29	44	43
P9	52	34	53	51
P8	43	29	44	43
P7	43	29	44	43
P6	17	11	18	17
RR4	3	1	2	3
RR5	3	1	2	3
BK0	43	29	44	43
PG3	206	137	212	204
BK5	77	51	80	77
XAG	78	14	44	60
PG2	85	15	47	65
RR1	3	0	1	2
RR2	3	0	1	2
RR3	3	0	1	2
Total	**3197**	**1402**	**2059**	**3006**

Estimating Future Drop-Off and Pick-Up Traffic

Not all vehicles entering the campus at the seven ingress/egress points are destined for a parking location. Some enter the campus to drop-off or pick-up a passenger. The future percentage of entering traffic that is dropping off or picking up a passenger (the percentage of traffic that is not going into the core areas of the campus) is assumed to be the same percentage of traffic for the campus master plan buildout as for the existing condition.

The percentage may increase in the future if the ratio of parking spaces to campus population decreases or if the price of on-campus increases, but without being able to fully anticipate how the percentage might change, using the existing percentage to reflect the future condition provides a conservative estimate of the vehicle entering the core areas of the campus.

The percentage of entering traffic that is dropping off or picking up a passenger was estimated using existing data. The existing vehicles entering and exiting existing parking traffic, as estimated above, was subtracted from the total ingress/egress volumes at each of the seven ingress/egress points. The resulting volumes at each ingress/egress point represents the total existing drop-off and pick-up traffic during the peak hour. Table 9 below presents the existing pick-up and drop-off traffic for these peak hours.

Table 9 Estimated Future Pick-up and Drop-off Traffic Entering and Exiting the Main Campus

Ingress/Egress Point	AM Peak		PM Peak	
	Enter	Exit	Enter	Exit
John Peace Boulevard north of Peace Circle	176	149	158	192
Brenan Avenue north of Tobin Avenue	264	50	150	166
Barshop Boulevard north of Tobin Avenue	92	18	25	24
Barshop Boulevard north of UTSA Boulevard	245	60	171	125
Ximenes Avenue north of UTSA Boulevard	244	93	171	125
Bauerle Road north of UTSA Boulevard	163	210	105	156
Key Circle at Bauerle Road	53	88	34	158

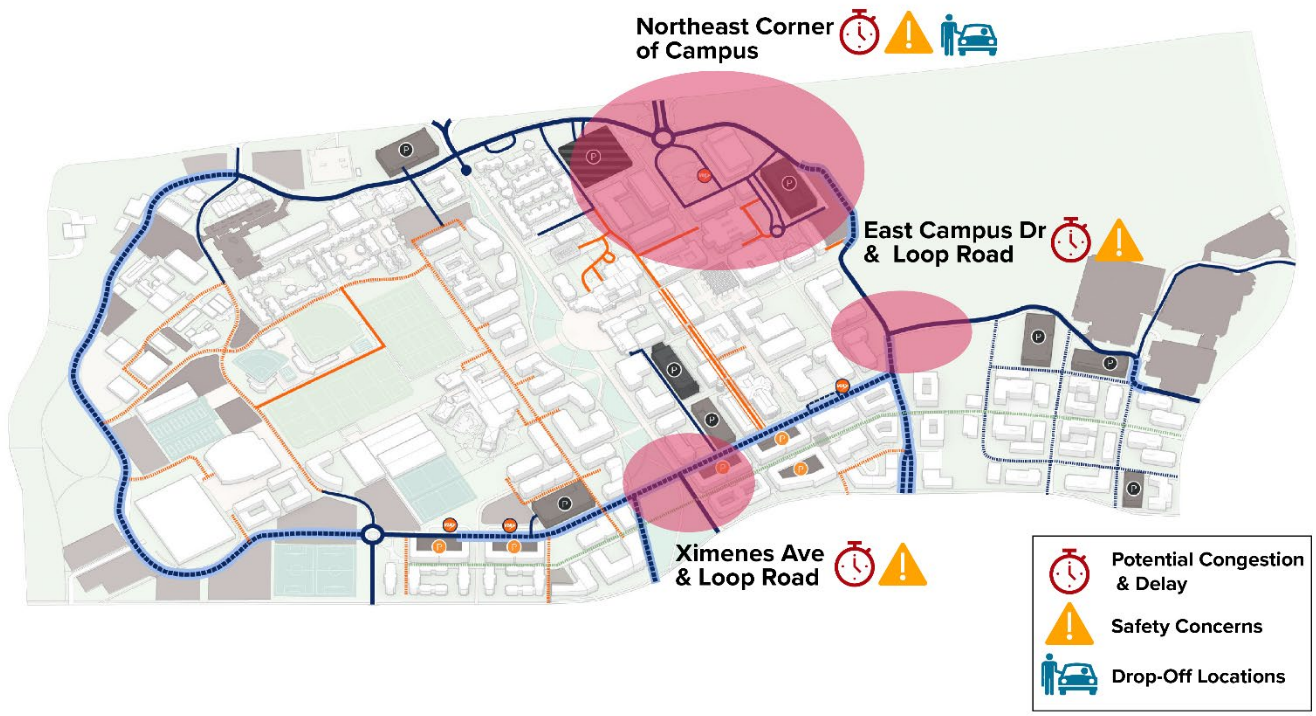
Using the results of the future parking volume determination and the existing pick-up and drop-off determination, the future total traffic traversing UTSA's campus was determined.

TRAFFIC CIRCULATION ISSUES AND NEEDS

ATG routed the future total traffic through the internal network using the methodology described above for both the AM and PM peak hours. Using the future projected traffic volumes, ATG identified locations of concern related to potential congestion and delay, safety concerns, and drop-off location conflicts. These are illustrated in Figure 8.

Potential Congestion and Delay

ATG identified locations that could potentially have excessive queuing and/or delay. It was assumed for the initial assessment that all internal roadways had one lane in each direction, were all-way stop-controlled at internal intersections (other than the two exiting roundabouts), and existing traffic control would remain in place at the ingress/egress points. Locations determined to have excessive queuing and/or delays were identified by using a maximum-volume-per-lane threshold. Typical controlled intersection approaches are considered over-capacity when the volume exceeds 600-800 vehicles per lane, depending on the control and volumes of the other approaches. For ATG's analysis, it was assumed the maximum volume per lane without significant delay would be 600 vehicles for the stop-controlled intersections. When lanes exceeded this volume at intersections within the campus, ATG examined the intersection and determined whether the location would likely need mitigation to prevent excessive delay or queuing.



Source: Page for base map

Figure 8 Main Campus Traffic Circulation Areas of Concern

ATG analyzed the future traffic volumes and determined the following locations would most likely require mitigation to alleviate potential queues and delays:

Northeast Corner of Campus – UTSA Oval, Bauerle Garage Entrances and Exits and Bauerle Road
Ximenes Avenue and Loop Road Intersection
East Campus Drive and Loop Road Intersection

Safety Concerns

ATG assessed the future roadway network and projected volumes to determine locations with potential safety concerns. Based on the initial assessment of locations with potential excessive queuing and delays, proposed bike lanes, proposed pedestrian routes; locations with safety concerns were identified. These areas were generally in locations with free-flow vehicular movement (not stop control for a movement) and no pedestrian accommodations to facilitate safe crossings. During ATG's assessment of future campus traffic, several locations were identified to have potential safety concerns. These locations were the following:

Pick Up and Drop Off Locations – UTSA Oval, Peace Circle, and UTSA Circle

Ximenes Avenue and Loop Road Intersection
East Campus Drive and Loop Road Intersection

In the evaluation of the projected roadway circulation within UTSA's campus, ATG assessed existing bus routes, bicycle paths, likely scooter routes, and transportation network company (TNC) routes and their interaction with vehicular circulation through the campus. ATG explored methods of alleviating mode conflicts such as modifying proposed circulation and/or repurposing roadway facilities.

To reduce conflicts between modes, separation of modes could be considered. Moving pedestrian crossings out from intersections reduces the amount of through traffic and turning traffic pedestrians must cross. It also allows drivers to clear the intersection before encountering the pedestrians allowing them to focus on the crossings. To facilitate this, pedestrian crossings should be separated from intersections and identified by a well-marked crosswalk with or without a flashing beacon or pedestrian hybrid beacon if warranted. Pedestrian hybrid beacons would allow breaks in traffic for pedestrians and prevent the possible queueing from the addition of a signal or all-way stop-controlled condition, as they are only activated when called. Pedestrian hybrid beacons should be placed at least 100 feet from the intersection. Speed tables may also be considered in locations where there are high pedestrian volumes and there is not traffic control to stop traffic for the pedestrians crossing.

Drop-off Locations and Use of Curb Space

Under the existing roadway configuration, the primary location for passenger pick-up and drop-off is within UTSA Circle, based on information provided by UTSA. To access this location, vehicles must use Peace Circle and Bauerle Road, adjacent to some of the largest and most frequently used garages. Assessment of this portion of the Main Campus under the proposed campus master plan buildout revealed the northeast corner of campus is projected to have the highest vehicular traffic. Volumes are projected to exceed typical capacity thresholds (600 vehicles per hour) at multiple intersections. ATG evaluated several alternative pick-up and drop-off locations that might alleviate some of the congestion. These alternatives included locations currently used for bus service and pedestrian and bicyclist crossings so additional mitigation measures such as removal of conflict between modes and safety improvements were also analyzed.

EVALUATION OF POTENTIAL IMPROVEMENTS

ATG's assessment of potential congestion and delay, safety concerns, conflicts between modes, and drop-off locations and curb space resulted in the identification of two intersections and one segment of the future campus that could experience improved and safer operations from additional physical improvements. These locations and potential improvements are described below.

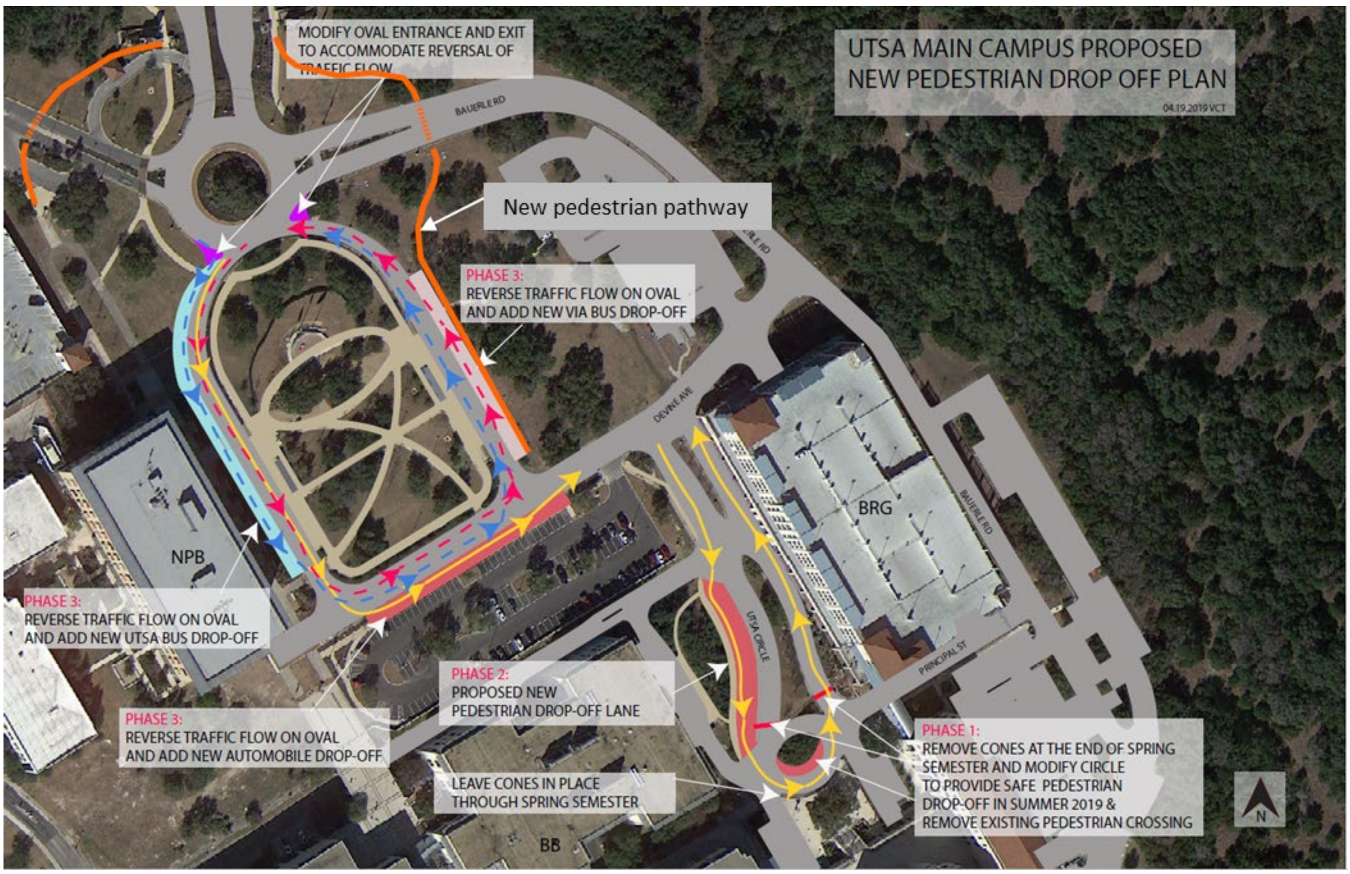
Northeast Corner of the Main Campus

This area of the Main Campus is anticipated to have the highest vehicular traffic due to its role in providing access to the academic core and the nearby location of the largest parking facilities on campus. In addition to high volumes, it has also been noted that passenger drop-offs and pick-ups frequently occur within UTSA Circle. For these reasons, this area of campus is expected to experience significant queueing and delay.

To alleviate this congestion, UTSA administrative staff have recommended a series of changes to accommodate drop-offs an pick-ups and to reduce the conflict between pedestrians and vehicles. The UTSA Oval is currently restricted to bus-only traffic to allow for 'Runner shuttles and VIA bus drop-offs and pick-ups. Buses and shuttles currently operate clockwise around the oval and drop-off and pick-up passengers in the center of the oval. This requires them to cross the lanes of bus traffic to get to and from their destinations on campus. Converting the UTSA Oval to counterclockwise operation would allow dropping off and picking up passengers on the outer edge of the oval and eliminate the need for passengers to cross the traffic lanes. Converting the UTSA Oval to also allow other traffic drop-offs and pick-ups to occur within the UTSA Oval rather than UTSA Circle could reduce delay in UTSA Circle and remove trips from the already congested portions of Bauerle Road. To facilitate this, the direction of travel in UTSA Oval would have to be reverse to operate counterclockwise. There is significant extra roadway and curb capacity in the UTSA Oval, and this arrangement would make more efficient use of the capacity.

In addition to converting the UTSA Oval to a counterclockwise operation for buses and automobiles, the existing blockade located along Devine Avenue east of UTSA Oval should be considered for removal. Removing this blockade would allow car drop-offs occurring within UTSA Oval to exit the area via Devine Avenue. This alternative would also relieve congestion at Devine Avenue and Bauerle Road. Vehicles exiting the Bauerle Road Garage from the north entrance/exit would be able to use the UTSA Oval as an exit from campus rather than making the existing eastbound left-turn at Devine Avenue and Bauerle Road, which would alleviate queueing and delay. The configuration of this alternative is shown in Figure 9.

As with all the circulation alternatives analyzed, special consideration should be given to pedestrians and bicyclists as more conflicts are presented. To reduce pedestrian and bicyclist conflicts at Peace Circle, crossings should be moved out along the approaches to the roundabout as shown by the red lines in Figure 7 and clearly marked with a crosswalk and or a flashing beacon or pedestrian hybrid beacon if necessary.



Source: Google Maps for base map and UTSA staff for content

Figure 9 Proposed Pedestrian Drop-off Plan

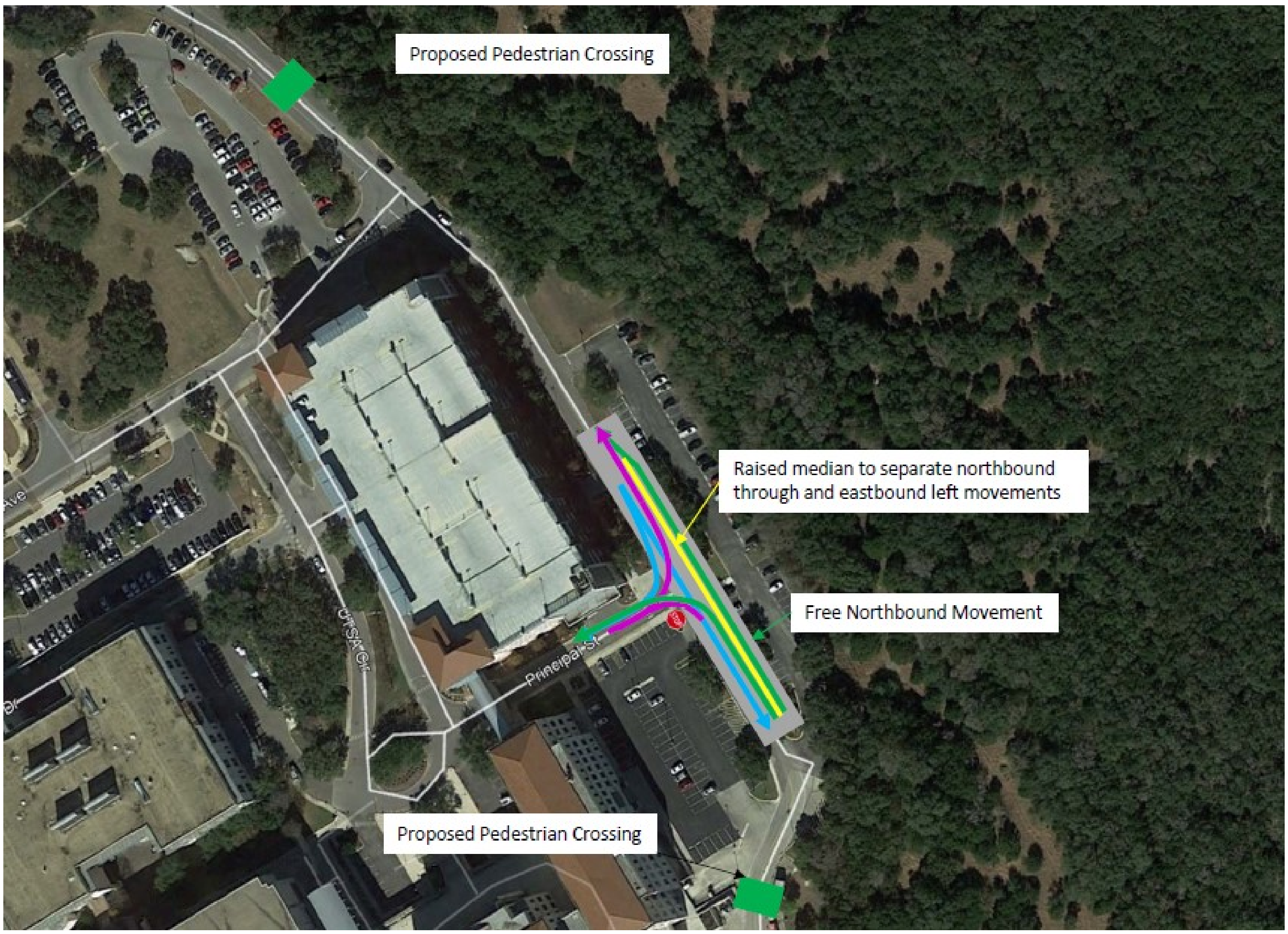
In addition to the potential changes at the Peace Circle, UTSA Oval and UTSA Circle, options were also explored for how to accommodate a substantial increase in traffic on Bauerle Road north and south of the Bauerle Garage. The following alternatives were considered at the intersections of Devine Avenue and Bauerle Road and Principal Street and Bauerle Road to reduce the expected congestion within at those intersections:

Installation of a roundabout
Installation of a High-T intersection

Installation of a northbound by-pass

Installing roundabouts at these intersections would significantly reduce the number of conflict points at the intersection as well as reduce stop-delay and start-up delay but require more right-of-way than is available.

The installation of a High-T at the intersections of Devine Avenue with Bauerle Road and Principal Street with Bauerle Road would separate northbound movements from both the southbound movements and garage traffic, thereby reducing queueing and delay. Northbound through movements, southbound through movements, and southbound right turns would all be uncontrolled movements. Northbound left turns would be yield-controlled, and eastbound left turns and right turns would be stop-controlled. The configuration of a High-T intersection at Principal Street is shown in Figure 8 as an example of what should also be considered at Devine Avenue. The installation of High-T intersections would require some additional right-of-way and present issues for pedestrians and bicyclists. Pedestrian crossings should be moved away from the intersection as shown in Figure 10.



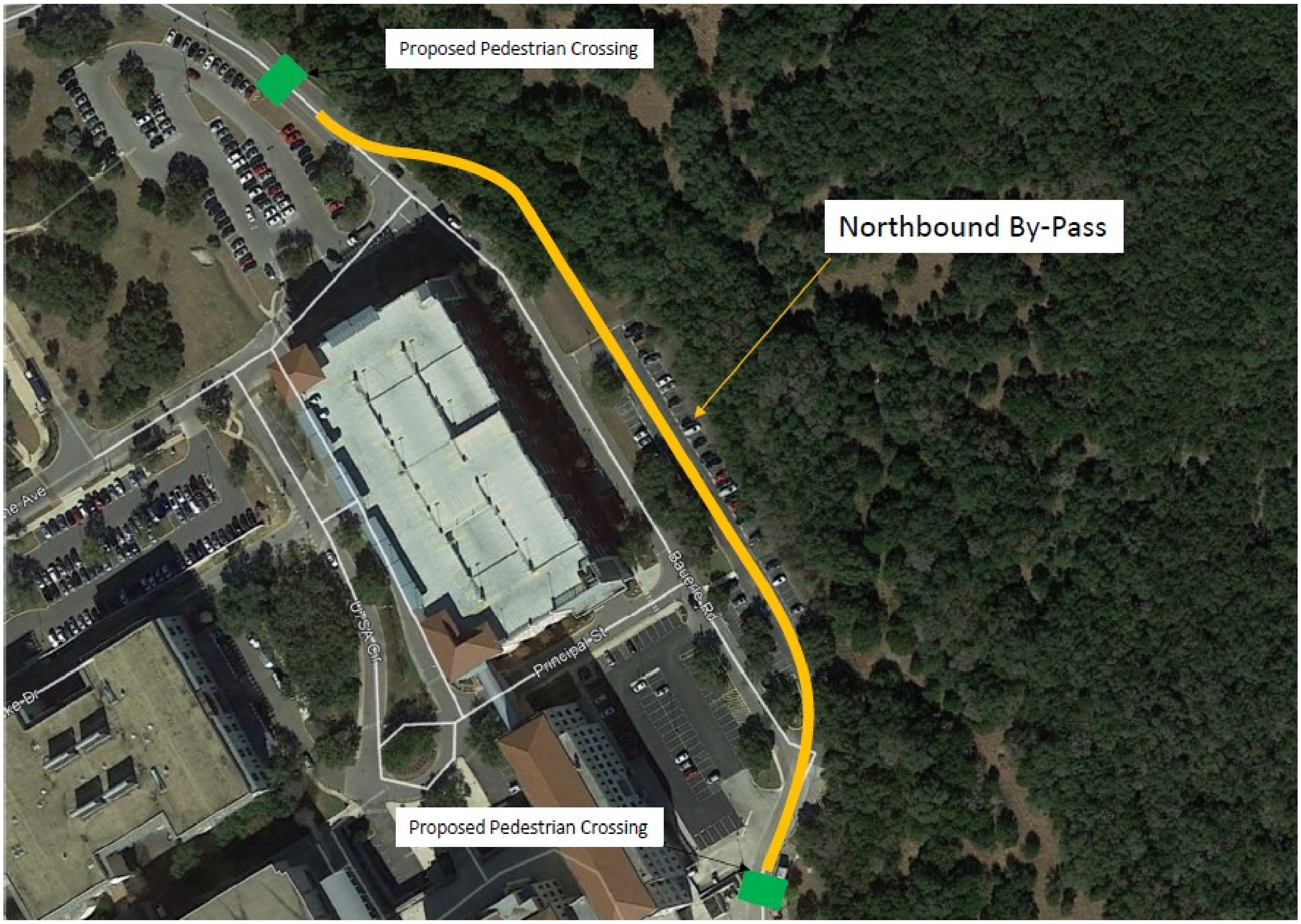
Source: Google Maps for base map

Figure 10 High-T Configuration at Principal Street and Bauerle Road

Alternatively, the installation of a northbound by-pass lane could also reduce the traffic load on the intersections of Devine Avenue with Bauerle Road and Principal Street with Bauerle Road by separating northbound though movements from southbound movements and garage traffic. The by-pass lane could be applied to both. The configuration of a northbound by-pass lane is shown in Figure 11.

With the bypass lane, northbound traffic to or from the Bauerle Garage would still use the existing northbound lane and the two intersections could be three-way stop controlled. The merge between the two northbound lanes (local access and bypass) at the north end of the bypass would require that the by-pass traffic yield to the local traffic.

It should be noted that the installation of a northbound by-pass lane would also require significant right-of way, and the wooded area east of Bauerle Road in this area is also a designated drainage area. The by-pass lane may require the elimination or modification of the parking lot on the east side of Bauerle Road, subject to a final evaluation as part of the design of the by-pass. A northbound by-pass lane would also present conflicts for pedestrians and bicyclists and could require additional safety precautions. This would include placement of pedestrian and bicycle crossings away from intersections and could include installation of a median for the by-pass at would provide a refuge for pedestrians and bicyclist crossing the bypass. Because of the extra complexity of operation of the by-pass road, the potential need to eliminate parking and make extra accommodations for pedestrian and bicyclists; the by-pass is not recommended if the High-T intersections on Bauerle Road and the recommended changes around the UTSA Oval and Devine Avenue are not adequate to accommodate the traffic at the two intersections on Bauerle road near the Bauerle Garage.



Source: Google Maps for base map

Figure 11 Northbound By-Pass at Devine Avenue and Principal Street

Ximenes Avenue and Loop Road Intersection

The intersection of Ximenes Avenue and the loop road is expected to have high volumes due to its role in providing access to the academic core and the location of nearby parking facilities. With the assumption that all internal intersections are all-way stop-controlled, this intersection is expected to experience significant queues and delays.

The following alternatives were considered to mitigate congestion at this intersection:

- Installation of a roundabout
- Addition of right-turn bays and left-turn bays
- Installation of a High-T intersection
- Convert Ximenes Avenue to a one-way northbound facility
- Add an additional leg to the intersection for southbound traffic

The installation of a roundabout at this intersection would significantly reduce the number of conflict points as well as reduce stop-delay and start-delay. However, the installation of a roundabout requires significant right-of-way. The area northwest and southwest of this intersection is a proposed greenway called the Paseo Verde, and the installation of a roundabout would impact the size and connectivity of the proposed greenway.

The addition of right-turn bays and left-turn bays at the intersection would remove turning traffic from through traffic and reduce queueing. The installation of turn-bays would also require additional right-of-way and create an additional lane of traffic for pedestrians to cross.

The installation of a High-T at this intersection would act similarly to those proposed in the northeast corner of campus and reduce queueing and delay. The eastbound through, eastbound right, and westbound through movements would be uncontrolled. The westbound left movements would be yield-controlled, and the northbound left and right movements would be stop-controlled. The configuration of a High-T at Ximenes Avenue and the loop road is shown in Figure 12. The installation of a High-T would require additional right-of-way and create conflicts for pedestrians and bicyclists. To mitigate this, the proposed limited access driveway east of the intersection between the two proposed Roadrunner Village parking lots would need to be converted to a one-way southbound facility and converting the limited access driveway to a southbound facility would put more traffic on that roadway, which is located between proposed dorms.

Source: Google Maps for base map

Figure 12 High-T Configuration at Ximenes Avenue and Loop Road

An additional improvement that could reduce delay at this intersection would be to add an additional access road to extend southbound from the loop road to UTSA Boulevard for southbound traffic, while converting the existing northbound leg along Ximenes Avenue to a northbound approach. However, this alternative would also take up right-of way dedicated to the proposed greenway west of Ximenes Avenue. The configuration of this option is shown in Figure 13. Converting Ximenes Avenue to a one-way northbound facility would also alleviate queueing and delay. Converting Ximenes Avenue to a one-way facility would eliminate westbound left-turns, reducing queueing and delay on the westbound approach. Northbound left-turns would also only have to yield to eastbound through movements and westbound through movements rather than also yielding to westbound left-turn movements. This would also decrease conflict for pedestrians.

Source: Google Maps for base map

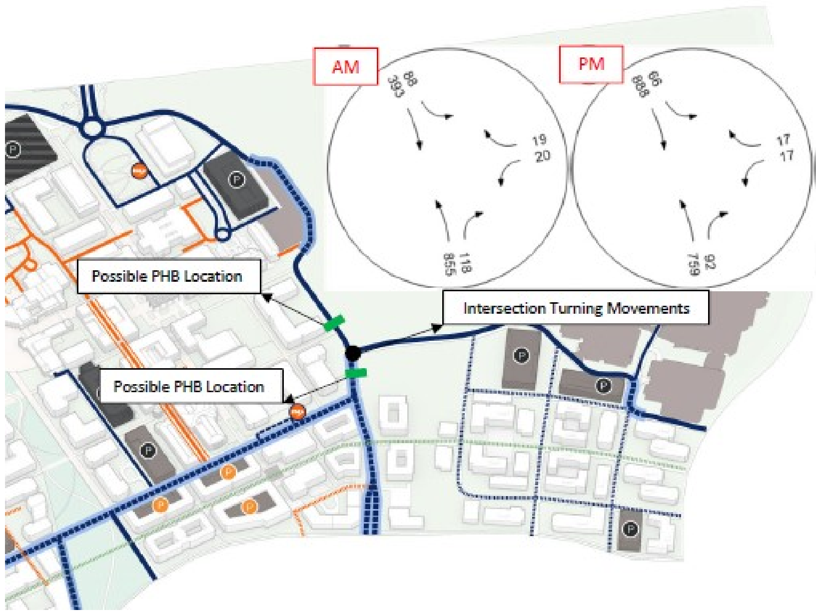
Figure 13 Proposed One-Way Facilities with Additional Approach at Ximenes Avenue and Loop Road

Pedestrian and bicyclist access and safety should also be considered with these alternatives. To reduce conflicts, pedestrian crossings should be moved at least 100 feet along the approaches and clearly marked with a crosswalk and flashing beacon or pedestrian hybrid beacon if necessary. Bicycling on the loop road near the two directional lanes for Ximenes Avenue would have to be discouraged because of the complexity of the traffic patterns, and special accommodations would have to be made for bicyclists' use of off-road shared-use pathways on the north side of the ring road. Because of the added complexity of the splitting the northbound and southbound Ximenes Avenue traffic onto to two roadway, the loss of green space and the impact on pedestrians and bicyclists; this alternative is not recommended unless the High-T intersection on Ximenes Avenue at the loop road is not adequate to accommodate the amount of traffic at the intersection.

East Campus Drive and Bauerle Road

This intersection is also anticipated to experience high volumes due to the location of nearby parking facilities. With the assumption that all internal intersections are all-way stop-controlled, this intersection is expected to experience significant queues and delays. To mitigate this congestion, converting this intersection from an all-way stop-controlled intersection to a two-way stop-controlled intersection should be considered. The northbound and southbound movements should be un-controlled, and the westbound movements should be stop-controlled. Implementing this improvement would reduce queueing and delay on the northbound and southbound approaches. This improvement could present access and safety conflicts for pedestrians, and pedestrian hybrid beacons should be considered at midblock locations north and south of the intersection.

Peak hour turning-movement counts as well as possible pedestrian hybrid beacons locations are shown in Figure 14.



Source: Page for base map

Figure 14 East Campus Drive and Loop Road Area Volumes and Proposed Pedestrian Hybrid Beacon Locations

DOWNTOWN CAMPUS FREEWAY OFF-RAMP RECONFIGURATION

ATG was also tasked with evaluating proposed modifications to UTSA's Downtown Campus as part of the UTSA campus master plan. To allow additional development within the Downtown Campus, the university and TxDOT may consider converting the existing I-35/I-10 exit ramp to South Frio Street and West Cesar Chavez Boulevard (three total exit points) to a single exit point, only providing direct access to South Frio Street. The following sections describe the data collection and analysis results and recommendations related to this university proposal.

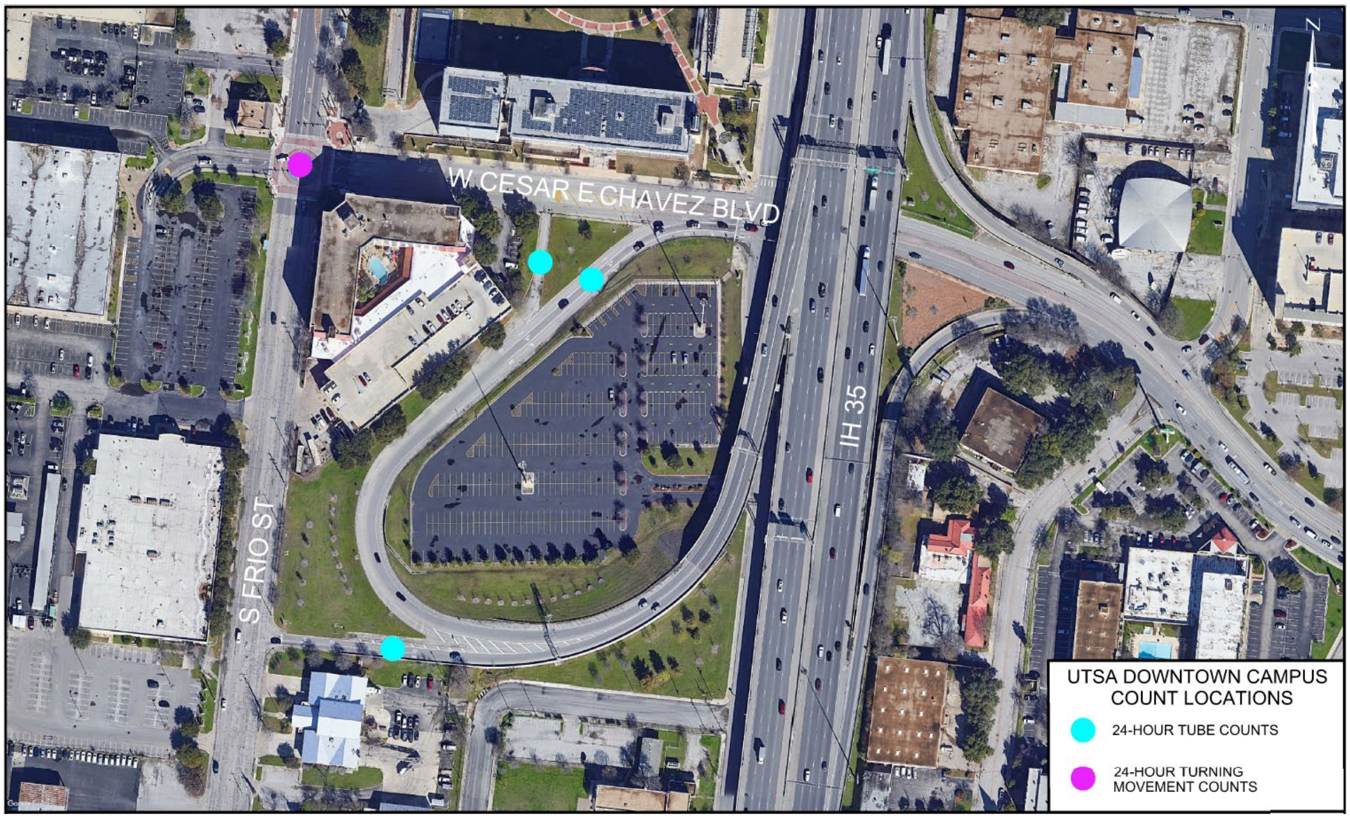
DATA COLLECTION

To assess the future ramp configuration, existing traffic counts were collected on February 19, 2019. These counts were collected while UTSA was in session and on a Tuesday, the day typically observed to have the highest traffic volumes.

24-hour tube counts were collected at the following locations:

- I-35/I-10 exit ramp to West Cesar Chavez Boulevard
- I-35/I-10 exit ramp to West Cesar Chavez Boulevard (eastbound)
- I-35/I-10 exit ramp to South Frio Street

In addition to 24-hour tube counts, turning-movement counts were also collected at the intersection of South Frio Street with Matamoros Street/West Cesar Chavez. The count locations are depicted in Figure 15.



Source: Google Maps for base map

Figure 15 UTSA Downtown Campus Count Locations

METHODOLOGY

Using collected data and traffic simulation software, Synchro Version 10, ATG analyzed the proposed ramp configuration. The proposed configuration removes direct access to West Cesar Chavez Boulevard, shifting all traffic previously using the I-35/I-10 exit ramp to West Cesar Chavez to the use the I-35/I-10 exit ramp to Frio Street. The following assumptions were made for the feasibility assessment:

- All traffic previously using the I-35/I-10 exit ramp to West Cesar Chavez would now use the I-35/I-10 exit ramp to Frio Street
- All shifted traffic is assumed ot make a right-turn onto Frio Street followed by a right-turn onto West Cesar Chavez Boulevard
- Lefting-turn traffic onto Frio Street from the I-35/I-10 exit ramp is unchanged from the existing condition; the existing left-turning traffic was estimated from tube counts and adjacent turning-movement counts collected February 19, 2019
- Per access change requirements with relocation of a ramp terminal, TxDOT and FHWA coordination would be performed

The alternative ramp configuration was analyzed using the methodology and assumptions above. The following section describes the results and considerations.

RESULTS AND CONSIDERATIONS

The results of the analysis are presented in Table 10. Synchro intersection level of service (LOS) and SimTraffic queue lengths for the westbound right-turn are presented below.

Table 10 Level of Service and Queue Length Estimates for Alternative Ramp Configuration

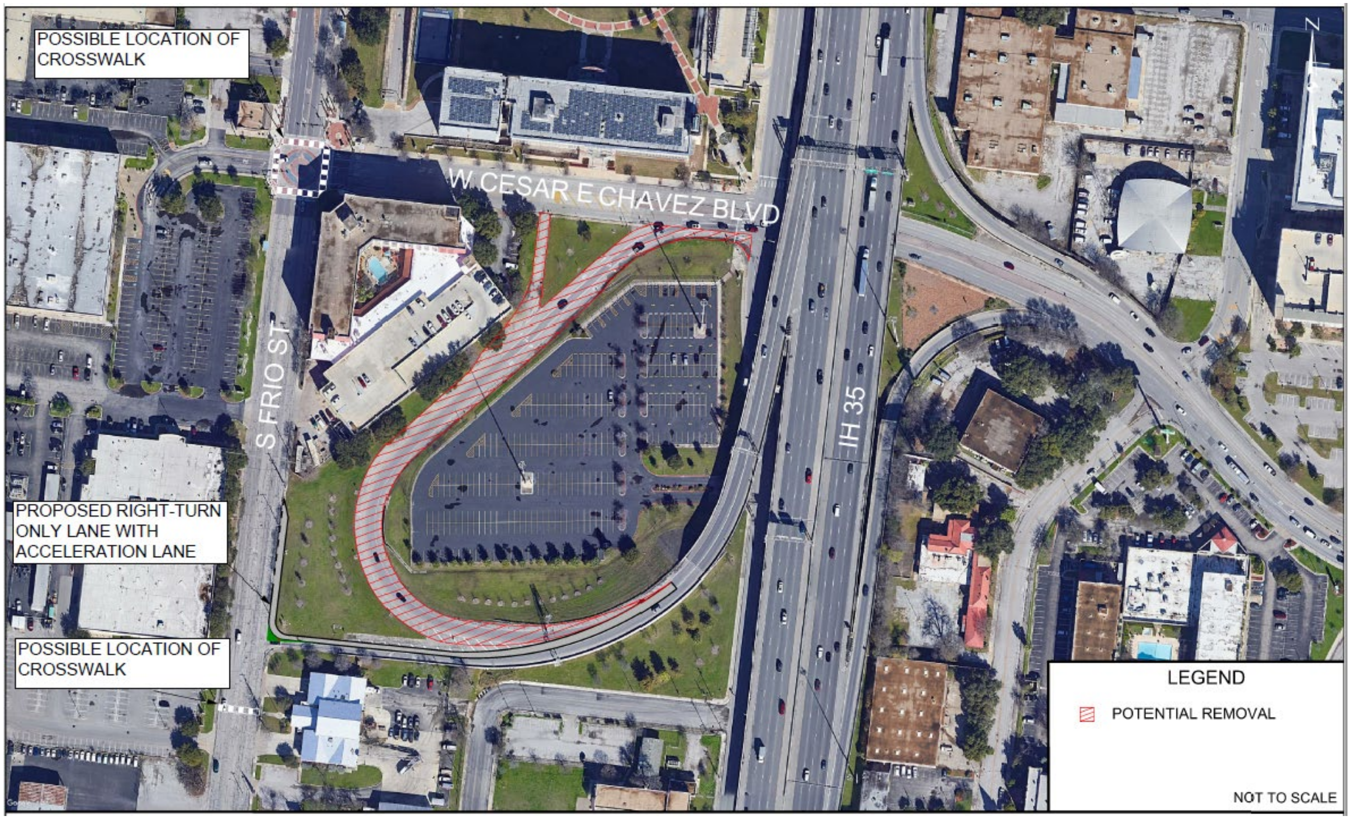
Intersection	MOE	Existing Configuration		Alternative Configuration	
		AM	PM	AM	PM
W. Cesar Chavez and S. Frio Street	LOS	B	A	A	A
	Delay(s)	10.4	9.4	9.7	8.8
I-35/I-10 Exit Ramp and S. Frio Street	LOS	A	A	A	A
	Delay(s)	3.9	2.3	1.7	1.6
	Right-Turn Queue (ft)	77	55	125	0*

**Volume on the approach is under capacity, therefore there is no queuing with the implementation of a free-right turn*

To faciliatate acceptable LOS at the intersection of the I-35/I-10 exit ramp with South Frio Street, the existing westbound right-turn bay should be converted to a channelized, free right-turn lane. A northbound acceleration lane along South Frio Street north of the intersection with the I-35/I-10 exit ramp should be provided to allow free right-turns. As indicated in Table 11, the proposed improvements are feasible. Minimal additional queuing is expereienced, provided a free right-turn is constructed at the itnersection. The intersection of South Frio Street with Matamoros Street/West Cesar Chavez Boulevard is not expected to require any geometric improvements to facilitate acceptable LOS.

In addition to intersection modifications, ATG evaluated pedestrian facilities. To safely accomadate pedestrians, crosswalks should be considered at either the signalized intersection of South Frio Street with Matamoros Street/ West Cesar Chavez Boulevard, or south of the intersection of South Frio Street with the I-35/I-10 exit ramp. The proposed configuration with recommended improvements is presented in Figure 16.

It should be noted, FHWA coordination may be required due to the modification of a ramp terminal. Additionally, turning-movement counts were estimated at the intersection of the I-35/I-10 exit ramp and South Frio Street. Although the added right-turn volume is not expected to cause queuing issues, provided a free-right turn was a downstream acceleration lane is constructed, additional data collection and analysis is recommended should engineering recommendations be desired. This feasibility analysis provides proof of concept and feasibility based on traffic volumes and available data.



Source: Google Maps for base map

Figure 16 Alternative Freeway Off-ramp Reconfiguration

CONSIDERATION OF FUTURE DEMAND MANAGEMENT OPTIONS

Previous sections identified options for accommodating, at acceptable levels of delay, the traffic volumes expected at key intersections of the Main Campus if the current ratio of parking to campus population is maintained and the parking facilities are fully utilized. Consideration should also be given to how demand management options might reduce the percentage of people traveling to the Main Campus and the number of parking spaces needed. ATG performed a review of potential demand management strategies in use at other university campuses and has identified options for UTSA with guidance on how to pursue implementation of an effective program for the two campuses but with emphasis on the Main Campus. Most of these options area also applicable to the Downtown Campus, though the Downtown Campus has a higher level of transit service connecting the campus with most of the rest of the metropolitan area.

The recommendations for options to consider reflect three key principles:

1. Demand management strategies for UTSA will only be successful if there are convenient, safe and reasonably priced alternatives to driving alone.
2. These strategies can reduce the need for costly transportation infrastructure investments such as roadway expansion or construction of additional parking.
3. While each individual strategy can provide a benefit to the overall goal, they work together as a holistic set of strategies for reducing automobile travel.

To best fulfill UTSA's goal of reducing automobile trips and the ever-growing need for parking capacity, strategies should include encouraging and supporting other modes of transportation. Marketing and education strategies in tandem with the other strategies will ensure students, faculty, and visitors understand and can easily choose alternative transportation options. While each individual strategy can provide a benefit to the overall goal, they work together as a holistic set of strategies for reducing automobile travel.

UTSA could benefit from a more proactive toolkit of demand management strategies because there is already a perceived shortage of parking and this shortage is likely to increase as the implementation of the UTSA campus master plan on both campuses displaces surface parking with new development. Most of the current parking supply can be replaced, but the replacement will be in parking garages and the cost per space will be higher. Table 11 provides a comparison of the UTSA Main Campus with several other large public universities in Texas with suburban campuses in terms of the campus population, number of parking spaces, ratio of parking spaces to campus population, rates charged for parking and elements of the demand management programs offered by each university. Table 11 illustrates that UTSA's Main Campus has the second highest ratio of parking spaces to campus population (students, faculty and staff) of the five campuses compared. The ratio for the UTSA Main Campus is roughly .41 spaces per person while the other universities have ratios between .30 and .50. If a successful demand management program on the UTSA Main Campus could reduce the ratio to .35, the amount of parking needed could be reduced by almost 15% and the amount of traffic to the campus would also be reduced.

Reviews of successful demand management programs consistently point to the increases in the cost of parking and provision of good alternatives as the keys to success in getting a meaningful reduction in the rate of single-occupant vehicle use. The setting of the campus relative to student housing, residential neighborhoods and the public transportation network play a part in determining how successful demand management programs can be, but the reports of the reduction of vehicle trip rates tend to vary between about 10% and 30% for most programs that have been evaluated after implementation.

Table 11 Comparison of Demand Management Programs at Texas Suburban University Campuses

University	Under-Graduate Students	Graduate Students	Staff	Parking Spaces and Ratio[1]	Parking Fee 2018-19	TDM Elements
University of Texas San Antonio - Main Campus	24,738	3,214	3,068	12,667 Ratio 0.41	Students: $158 - $815 per year Faculty & Staff: $189 - $815 per year	Universal Transit Pass (beginning fall of 2019) Transit Service to campus (6 routes) On-Campus Shuttle 'Runner Shuttle to UTSA Housing and area apts. (7 routes) Free secure bicycle parking
University of Texas El Paso	21,341	3,810	2,822	8,293 Ratio 0.30	Students: $138-320 per year Staff: $238-920 per year	Miner Metro – Shuttle Service – 4 routes Sun Metro – 2 campus express; 2 Brio stops (10-20min frequency) 7 fixed routes Free rideshare service Carpool Parking Permits – students $110-370; Faculty $195 – 256
University of Texas Arlington	29,606	12,327	2,165	15,000 Ratio 0.36	Students: $210-$1,850 per year Staff: $258-$1,850 per year	MavMover- Campus shuttle service – 5 routes Chartered bus service – up to 28 passengers Zipcar Park & Ride Carpool and van pool via tryparkingit.com Via – On demand ride share program through City of Bike repair stations Golf cart rental - $20-125 per hour
University of Texas Dallas	18,388	9,254	1,339	14,500 Ratio 0.50	Students & Staff: $140 per year	Comet Cruise – Neighborhood bus service – 5 routes Comet Cab – Campus shuttle service – 6 inner-campus routes DART – Fixed transit – 4 routes – Proximity to two trains DART transit passes available to students Zipcar Bike Parking VBikes – campus bike share program - $1 per hour
University of Houston Clear Lake	6,488	2,473	744	3,217 Ratio 0.33	Students: $85-$135 per year Staff: $85 per year	Campus shuttle service – one route Rideshare listing for students

[1] *Ratio is total parking supply divided by campus population (students and staff)*

Probably the most frequently cited example of a successful university campus demand management program is the University of Washington (UW) in Seattle[2]. Like most successful university campus demand management programs, the cornerstone of UW's program is the combination of parking pricing to discourage driving to the campus and provision of good alternatives to driving. UW pioneered the use of a Universal Transit Pass for the campus's students, faculty and staff. Over the years since the program was launched in the early 90s, the quality and frequency of transit service has increased to the campus and the use of transit has steadily increased. The overall rate of single-occupancy vehicle use has dropped from 33% to 17%. Despite substantial growth in the campus population, the university has been able to decrease the number of cars being brought to campus.

As is the case for peak-period commute travel to downtowns and big employment centers, demand management strategies for UTSA will only be successful if there are convenient, safe and reasonably priced alternatives to driving alone. The alternatives currently available for UTSA students and staff include carpooling, VIA Metropolitan Transit (VIA), UTSA shuttle service on the Main Campus, bicycling, scootering, or walking.

Continued efforts for developing additional strategies for reducing the number of automobile trips will not only reduce the need for parking on campuses, it will enhance mobility to UTSA campuses and encourage more sustainable and healthy trips. The demand management options outlined in the remainder of this memorandum represent a range of options for developing better alternatives to the use of the single occupant automobile and encourage other modes of travel by UTSA students, faculty, and visitors. This list of options and recommended actions draws heavily on the successful Transportation Demand Management program of the University of Washington cited earlier.

To best fulfill UTSA's goal of reducing automobile trips and the ever-growing need for parking capacity, strategies should include encouraging and supporting other modes of transportation. Marketing and education strategies in tandem with the other strategies will ensure students, faculty, staff and visitors understand and can easily choose alternative transportation options. While each individual strategy can provide a benefit to the overall goal, they work together as a holistic set of strategies for reducing automobile travel. Drawing inspiration and best practices from universities around the country including the University of Washington, the following Transportation Demand Management Strategies are recommended for UTSA and will be elaborated in further detail below:

- Transit improvement strategies
- Parking management improvement strategies
- Pedestrian improvement strategies
- Bicycle improvement strategies
- Shared-ride and shared-use mobility strategies
- Marketing and education strategies
- Policy improvement strategies

TRANSIT IMPROVEMENT STRATEGIES

Transit is a critical component to the transportation network and should be used as a key asset for UTSA mobility. Transit that is reliable and integrated within the city's transportation network has the potential to give students, staff, and faculty the flexibility to travel to and from the campuses rather than just driving alone. Transit serves people best when it takes them where they want to go, when they want to go, is reliable, and easy to navigate.

[2] University of Washington – Transportation Management Plan – July 2017 Final Plan https://cpd.uw.edu/sites/default/files/master-plan/2018_CMP/CMP_Chapters/2018%20CMP%20Ch%208%20-%20Transportation%20Management%20Plan.pdf

The UTSA campuses are locations that serve many people and activities, making them ideal locations to be fully integrated into the VIA network. Strategies to better incorporate transit at UTSA will require continued work with VIA to plan and implement transit enhancements that support those traveling to and campus and expansion of the 'Runner shuttle service. Specific actions that should be considered include the following:

- Work with VIA and other partner agencies to enhance public transit service to the UTSA campuses and to improve the frequency, transit speed and reliability along major bus corridors serving the two campuses.
- Work to enhance the connection between the Main Campus and the Downtown Campus either by partnering with VIA to increase the frequency and directness of the VIA service between the campuses or by providing UTSA shuttle service between the campuses.
- Continue to expand the very successful 'Runner shuttle service to connect the Main Campus with nearby apartments.
- With the redevelopment of the Main Campus and the completion of the ring road on the south side of campus, new 'Runner shuttle bus stops should be located along the loop road where shuttle buses can pull out of traffic. This could be in parking lots or in pull-out bays along the loop road and preferably near but just downstream of pedestrian cross walks. The main shuttle stop(s) on the south side of campus should be near the academic core between Ximenes Avenue and Bauerle Road.
- As the technology for shared autonomous vehicles (SAV) advances, consider partnering with VIA for a pilot test of SAV for the 'Runner shuttle service or new short VIA routes connecting the Main Campus with remote parking or nearby apartment complexes.
- Ensure that the transit system evolves and responds to changing travel patterns and demand, while preserving the campus environment.
- Review and analyze data for the universal transit pass launching in Fall 2019 to assist future transit planning.
- Work with VIA to improve multimodal access to major VIA stations with specific attention to pedestrian and bicycle access to bus service. This includes considering access to existing and planned multimodal infrastructure at existing/planned transit stops as well as multimodal transit stop infrastructure such as pedestrian lighting, ADA compliance, and bicycle storage racks.

PARKING MANAGEMENT IMPROVEMENT STRATEGIES

Parking management is a critical tool for transportation demand management. Parking at UTSA campuses can be managed in a way that supports necessary vehicular travel while also gently encouraging other modes of transportation. Special attention should be given to best practice strategies that both discourage driving and support alternative modes of travel such as walking, biking, and taking transit. It is critical to provide reliable, safe, and convenient alternative travel modes to driving if parking is being discouraged. The strategies described below build upon UTSA's current parking management strategies. Specific actions that should be considered include the following:

- Review and consider performance-based parking strategies including charging more for high demand parking facilities.
- Consider the feasibility of dynamic parking fee structure based on real-time demand in coordination with the current Real-Time Parking Occupancy app.
- Review parking pricing options and increase fees where reasonable.
- Increase enforcement on campuses to reduce parking violations.

- Consider using increased revenue from parking fees and violations as one source of funds to support multimodal/trip reduction programs efforts on campus along with other sources such as student fees and special grants such as regional Congestion Mitigation/Air Quality funding.
- Continue to improve wayfinding and real-time parking availability information.
- If additional parking facilities are necessary, they should be implemented in coordination with campus health and wellness goals, sustainability efforts, and multimodal infrastructure.

While using parking management as tool to encourage the use of alternative modes, there should be acknowledgement by the university of the equity issues associated with students or employees that are lower income and live far from campus or transit hubs. They may have no other option but to drive and park, so cheaper remote parking is more likely to be an option for them, rather than high-fee on-campus garage parking or incentive programs, as listed here.

PEDESTRIAN IMPROVEMENT STRATEGIES

Pedestrian facilities in and around the campuses that are safe, accessible, and connected to key destinations are a critical component to Transportation Demand Management. Whether people arrive to campus by car, transit, or bicycling, they must walk to their destination on campus in some manner. A pedestrian-oriented campus makes it safer and easier to navigate to and within campus on foot. When travel by foot is supported, short trips in vehicles may more easily be substituted for walking trips. A pedestrian-oriented campus also supports transit investments as it makes walking to and from transit stops comfortable and safe. Specific actions that should be considered include the following:

- Consistently prioritize pedestrian access on campus when making development and transportation policy or project choices.
- Enhance the quality and security of campus pathways through maintenance of pedestrian paths, pedestrian-oriented lighting, signage and wayfinding, and other investments.
- Study collision data to improve pedestrian safety challenges in areas adjacent to the campuses.
- Review feasibility of pedestrian and bicycle-only travel zones within campus to support safe and comfortable environment.
- Coordinate with the City of San Antonio to identify improvements to the City's pedestrian network such as repairing damaged sidewalks, improving safety at crossings, increasing non-motorized capacity of area bridges, removing ADA barriers, improving lighting, etc.
- Provide ADA accessible connections on the campuses.
- Implement pedestrian-oriented wayfinding in and around the campuses.
- Maintain easy-to-understand and well-signed or mapped ADA accessible routes through any campus construction zones.

BICYCLE IMPROVEMENT STRATEGIES

Bicycling can provide an efficient, reliable, sustainable, and healthy mode of travel to and from the UTSA campuses. A safe, comfortable, and connected bicycle network within and around the UTSA campuses can encourage those traveling to campus to do so by bike rather than by driving a vehicle. Encouraging bicycle travel takes the pressure off parking facility demand and providing bicycle infrastructure is space efficient. Providing a bicycle network within campus and connecting it to regional facilities also supports transit use. When bike infrastructure is connected to the transit network, traveling by bike makes transit stops that are not within a walking distance accessible. Routes planned for bicycle travel around campus are important to Transportation Demand Management as bike trips may also be substituted for driving trips when the distance is too far to walk. Specific actions that should be considered include the following:

- Plan and implement a comprehensive on-campus bicycle network that provides desirable bicycle facilities while reducing conflicts with other modes.
- Work with partners to develop key bicycle connections in coordination with existing and planned facilities from surrounding neighborhoods, regional destinations, bicycle routes and trails, and transit hubs.
- Develop a Bicycle Parking Plan to ensure adequate, creative, and space-efficient provisions for bicycle parking around campus and transit stops.
- Encourage VIA to identify strategies for accommodating increased bicycle travel demand on buses.
- Improve bicycle parking security and safety to deter theft.
- Review feasibility of pedestrian and bicycle-only travel zones within campus to support safe and comfortable environment.

SHARED-RIDE AND SHARED-USE STRATEGIES

Shared-ride and shared-use strategies transportation continues to expand personal mobility options as alternatives to single occupancy vehicle travel. These emerging modes of travel provide flexibility through ridesharing and sharing of transportation resources such as cars, bicycles, and scooters. Coordination and accommodation of shared-ride and shared-use transportation services should be considered as valuable elements of a Transportation Demand Management program. Specific actions that should be considered include the following:

- Encourage use of new technologies to increase the ease of forming, maintaining and tracking carpools and vanpools.
- Use the resources of Alamo Commutes to support carpool and vanpool formation. This could include surveys of the campus population about carpooling and vanpooling and formulation of recommendations for programs oriented to UTSA students, faculty and staff. It could also include assistance in promoting carpooling and vanpooling and computerized matching services.
- Support the expansion of mobility options such as ride-hailing companies (such as Uber and Lyft), taxis, car-share, bike-share, scooter-share and other shared-use service providers with priorities for connecting the campuses to transit hubs and student residences.
- Review potential need for defined pick up/drop off zones for ride-hailing.
- Actively manage UTSA-owned curb space at transit hubs to improve connections between transit and other shared-use transportation providers. Work to avoid operational conflicts and ensure safety.

MARKETING AND EDUCATION STRATEGIES

Marketing and education efforts are a key component to the success of the above-mentioned strategies as they ensure people know their travel options and are further encouraged to make trips on alternatives to vehicular trips. A useful element of a market approach can be offering incentives to the use of alternative modes – a reward for not driving alone or for not parking on campus. At a university, this could be in the form of credits at the school store or cafeteria. Some universities have found that making a competitive game of trip reduction can provide an effective incentive for changing travel behavior. Students could get game points by using an alternative mode and more points if their trip to and from campus does not involve a vehicular mode other than a bus. Students could compete as individuals or as teams. The competition could be organized by class, club, sport team or where they live so that students are competing against others with similar travel choices. Prizes could be in the form of gift cards, credits at the school store or cafeteria. Gamification platforms that track participation and mode use are available from private vendors and some regional public agencies. Specific actions that should be considered include the following:

- Develop and implement a Demand Management Marketing and Education Plan.
- Consider the use of gamification for use of transit and non-motorized transportation to encourage student, faculty, and staff to use alternative modes and to reduce vehicle trips.
- Focus efforts on new employees, students, and people moving into student residences.
- Encourage participation in local and national multimodal transportation days with campus-wide events.
- Improve transit information to UTSA students, faculty, staff, and visitors.
- Develop marketing strategy for the new universal transit pass for students, faculty, and staff.
- Provide and market individualized commute planning services to UTSA faculty and staff.

POLICY IMPROVEMENT STRATEGIES

The transportation network involves strategic partner involvement and coordination across many departments and agencies within and outside of UTSA in order to accomplish transportation demand management goals. The following strategic recommendations seek to establish Transportation Demand Management goals within all areas necessary. Specific actions that should be considered include the following:

- Fund a full-time Trip Reduction Coordinator position.
- Manage class schedules to reduce peak-period travel demand.
- Explore and develop remote learning for students. Communicate policies and promote telecommuting, flextime, compressed workweeks and other techniques that reduce peak-period travel for UTSA faculty and staff.
- Collaborate with all transportation associated partners and plans in and outside of UTSA to incorporate Transportation Demand Management goals in all plans and projects within the campus area.
- Continue the preservation/creation of student housing on campus by the UTSA and encourage the private sector to create housing for students, staff and faculty off campus but close to transit and bicycle network.
- Partner with Alamo Commutes for demand management support.