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2016 MOBILITY BOND

ANDERSON MILL ROAD

REGIONAL MOBILITY IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT

September 2018

Revised December 2018

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REGIONAL MOBILITY IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT

Spicewood Parkway to US 183
Austin, TX 78750

PREPARED FOR:

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AUSTIN TRANSPORTATION DEPARTMENT
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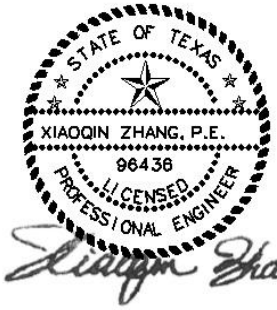

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September 2018
Revised December 2018

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DECEMBER 2018 SUMMARY OF CHANGES

Section	Page Number	Note
PER Cover Sheet	1	Changed date of the revised report
COA ESD Cover Sheet	2	Changed date and added Sealing
Table of Contents	4	Added PROJECT TEAM
Appendices – Appendix A	5	Changed to Preliminary Plan – Part 1-5: 1- Cover Sheet, Index Sheet and Legend Sheet 2- Existing Survey Conditions 3 – Typical Cross Sections & Intersection Plans 4 – ROW Maps and Proposed Typical Sections Part 5 – Drainage and Utility Maps
Executive Summary	10	Clarified Option A as recommended and Option B with 114' – 116' ROW as shown in **Appendix A-3** & **Appendix A-4** for future reference
Section 1.3	13	Revised Location Map – Project Limits
Section 1.3	23	Changed Appendix A to **Appendix A-2**
Section 4.5	47 - 50	Added Anderson Mill Road Crash Analysis
Section 5.3	63 – 64	Added Anderson Mill Road Pond Exhibit for proposed pond locations and **Appendix A-5** for Drainage Analysis
Section 5.4	66	Added in **Appendix A-5**
List of Acronyms	70	Added PDO for Property Damage Only
Project Team	71	Added this page with edits to the Bond Team
Professional Engineer/Consultant Information	72	Added additional professional engineer and landscape architect
Appendix A	-	Replaced Existing Conditions Survey with Preliminary Plan with Typical Cross Sections for Options A and B
Appendix F	-	Corrected Option B to Option A and added Option B for future 114 – 116' ROW Cost Estimate

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EXECUTIVE SUMMARY

Background and Funding

The 2016 Mobility Bond dedicates $101 million to regional mobility projects to address congestion and enhance safety. These projects are focused on major roadways and their intersections. Improvements may include roadway expansion, signal modifications, changes to the design of medians, driveway reconstruction, and improved bicycle and pedestrian facilities. Approximately $5.5 million in 2016 Mobility Bond funds will go towards design and construction of improvements on Anderson Mill Road between Spicewood Parkway and US 183. An additional $0.5 million in 2010 Bond Funding has been allocated toward preliminary engineering for the Anderson Mill Road project.

Program and Project Goals

The stated goal of the 2016 Mobility Bond is to address congestion and enhance safety. Primary metrics for addressing congestion include improving level of service and reducing delay for vehicles traveling through the corridor. Other metrics for reducing congestion include improving facilities for travelers utilizing alternate modes of transportation such as transit, bicycles and walking. This report analyzes existing and future conditions for all modes of travel and provides options and recommendations that achieve reduced congestion. Metrics for enhanced safety are focused on reducing potential for all types of crashes. Existing crash data is analyzed in this report, in order to identify any ongoing safety issues. Proposed options and recommendations are analyzed for their ability to ensure the safety of all roadway users. The ultimate goal of this preliminary engineering report is to reduce congestion and enhance safety through improvements within the project corridor, and prioritize the improvements to meet the project budget.

Process

The first step in determining the appropriate improvement recommendations is developing an understanding of context and purpose of the roadway. This is accomplished by reviewing applicable guiding plans and documents. The recommended improvements should bring the project into compliance with the roadway classification and align with the City Council adopted governing plans. The second step is identifying existing conditions and constraints for the project site. Existing land use, physical characteristics, traffic conditions, environmental constraints and any other unique features are documented so that they can inform the improvement recommendations.

Public input is a key element for ensuring that the project team has a true understanding of the priorities and concerns of the community that the project serves. Input from stakeholders provides an understanding of local context and can be utilized to help prioritize improvements in case of conflicting goals and/or limited resources. Finally, improvement recommendations are developed and prioritized. Cost estimates for each prioritized improvement allow for development of a final recommended scope that best meets the goals of the program while staying within the allocated budget.

Existing Characteristics

Anderson Mill Road between Spicewood Parkway and US 183 is classified as a four-lane, divided, major arterial roadway. However, it currently functions as an undivided roadway due to its lack of median or continuous center turn lane. The existing roadway pavement is approximately 50 feet wide with two five-foot striped bike lanes and four ten-foot travel lanes. The lack of dedicated center turn lane contributes to added delays and poor level of service for vehicles traveling along the corridor. There are a total of nine intersections within the project limits, four are signalized and the remaining are stop-controlled. Average Daily Traffic (ADT) counts for the project area are about 30,000 vehicles, and motorists experience significant delays during peak hour traffic. There have been, on average, 50 crashes per year in the project limits since 2012. Five crashes caused incapacitating injury and one was fatal. Over 100 crashes reported a non-incapacitating or possible injury.

Pedestrian facilities are sporadic, with sidewalks missing from the majority of the roadway both eastbound and westbound. Beaten paths are worn in the roadside vegetation indicating where people walk in lieu of using sidewalks. The project area is served by Capital Metro Route 383 with eastbound and westbound bus stops near the intersection of US 183. The bus stops are not connected to continuous sidewalks, forcing riders to utilize parking lots, worn paths, or other means to reach their ultimate destination(s).

The existing right-of-way width averages about 90 feet along the project limits. Outside of the roadway pavement, grass-lined drainage ditches convey stormwater runoff. Culvert pipe underdrains convey stormwater under driveways and cross streets. Many of the existing culvert pipes are clogged, damaged, undersized, or in disrepair. Drainage, flooding, and standing water complaints have been documented in specific locations along the project limits, most prominently at the intersection of Anderson Mill Road and Millwright Parkway.

Multiple aboveground and underground utilities serve the project area. Utility infrastructure and appurtenances have been mapped and documented to inform and guide the placement of any proposed improvements. Constraints include utility poles, manholes, valves, inlets, and telecommunications structures. Various species of mature trees line the roadway in and just outside of the public right-of-way. An environmental resource inventory was performed, identifying two protected karst sinkholes near the project limits.

Project Goals and Design Considerations

The goal of this project is to construct improvements that reduce congestion and enhance safety within the project limits. Design considerations for this project are based on maximizing the percentage of construction funding that is dedicated to mobility and safety improvements. Recommendations that require modifications to existing infrastructure must incorporate the additional cost of removing and/or replacing those items.

Design decisions and recommendations are guided by City Council adopted plans including Imagine Austin, the Austin Metropolitan Area Transportation Plan, Bicycle Plan, and Sidewalk Plan. The Austin Transportation Department's Draft Austin Street Design Guide,

released June 20, 2017and still in pilot mode, was utilized as a current best practice guide for street design. Analysis and modeling of existing and future traffic data is used to confirm and refine design recommendations, and to ensure that recommended improvements meet the project goals.

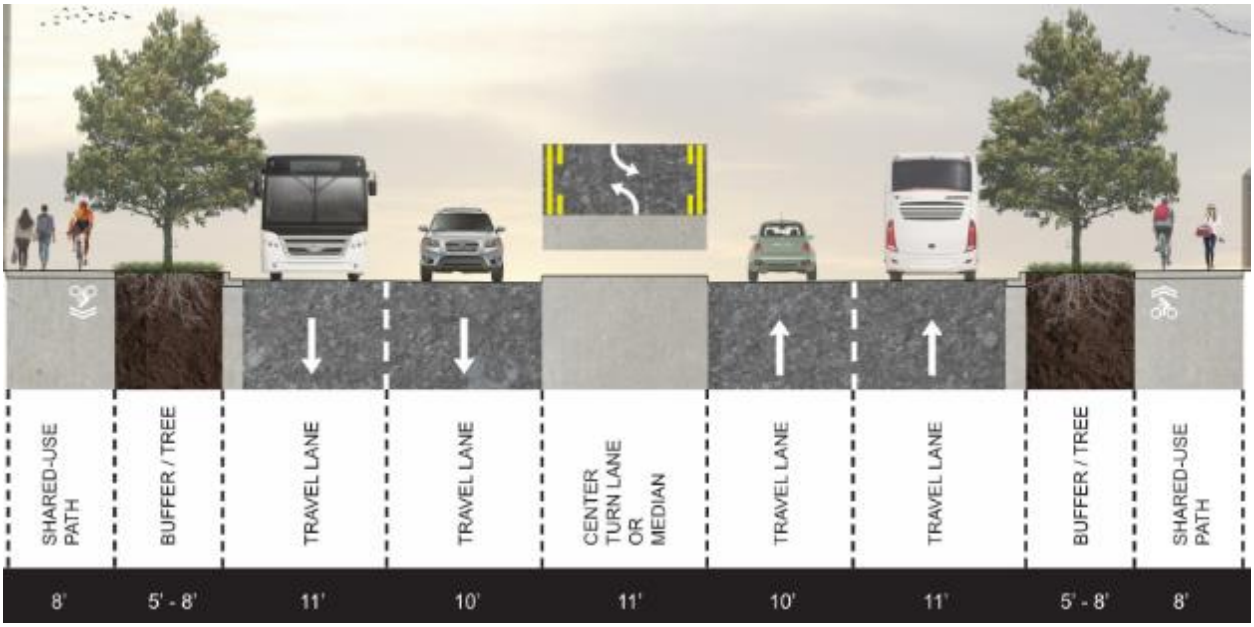
Recommended Improvements

The most compelling mobility and safety factors discovered during the research for this report are the lack of dedicated center turn lanes and sidewalks. The project team developed a strategy to add a continuous two-way left-turn lane throughout the project limits. This strategy focuses on removing the on-street painted bike lanes and creating a shared pedestrian and bicycle path outside of the roadway. The shared use path meets the goals of mobility and safety for all travel modes, and allows for an additional vehicle lane in the roadway. This concept is recommended throughout the project limits and is the foundation for the final recommendations. Additional recommendations were prioritized to ensure that the final recommended scope could be tailored to meet the project budget. A list of all prioritized recommendations is provided here.

1. Continuous two-way left-turn lane (or median) throughout the project limits. This improvement produces the greatest benefit for reducing congestion and enhancing safety. Due to constrained right-of-way, the additional roadway width to facilitate the added two-way left-turn lane should be made available by removal of the on-street, striped bike lanes. By removing two existing 5-foot bike lanes, ten feet of additional roadway width is made available for the two-way left-turn lane. Note: This option can have varying cost depending on final lane widths established during design phase. Minimum lane widths for a compact, constrained right-of-way will be the most cost effective option. If funding allows, the lanes may be widened as context dictates.

2. Continuous Shared Use Path for bicycles and pedestrians (eastbound and westbound). As noted above, the on-street bike lanes are recommended for removal in order to facilitate the high priority two-way left-turn lane. A shared use path is an upgraded bicycle facility that meets the Bicycle Plan recommendation for this roadway (protected or separated bicycle facility). The shared use path also meets the Sidewalk Plan recommendation to include pedestrian facilities along both sides of all major corridors. As noted in the Draft Street Design Guide, a combined bicycle/sidewalk shared use path is an acceptable option for constrained or compact right-of-way. Transit (bus service) is greatly enhanced by the shared use path, as it provides access from bus stops to homes, businesses, and the many civic uses along the corridor.

   Note: Recommendations 1 and 2 should be considered as the minimum baseline scope for a successful improvement project that achieves basic project goals.



Proposed "Compact Design" Cross-Section

3. Extend eastbound right-turn bay to 780 feet of storage with 100' taper at US 183. This improvement, at the busiest intersection in the project limits, facilitates the free flow of right-turning vehicles from Anderson Mill Road onto US 183. Currently, the dedicated right-turn lane is not long enough to extend past queued vehicles continuing straight on US 183.

   Note: Additional US 183 recommendations proposed in the traffic study are outside of the limits of this project, and are in TxDOT right-of-way and control. These recommendations are documented in the traffic report for future projects and/or partnerships.

4. Provide an eastbound right turn bay at Spicewood Parkway. The dedicated eastbound right turn lane at Spicewood Parkway would help accommodate the high volume of right turn traffic from Anderson Mill Road onto Spicewood Parkway in the a.m. peak traffic period.

5. Modify Olson Drive northbound approach lane configuration. This low-cost striping improvement will reallocate lane assignments for vehicles approaching Anderson Mill Road along Olson Drive, and provide dedicated right, left, and through lanes.

6. Install Traffic Signal at 9707 Anderson Mill Road. The traffic study recommended a signalized intersection at the commercial driveway entrances for a gas station and shopping center, respectively. A warrant study was not completed as part of the traffic report. An alternate option is to install traffic signal conduit at this location to facilitate a potential future signal if a warrant study verifies the need and funding become available.

The recommendations were prioritized by their potential to address mobility and safety for the roadway users. An iterative design approach was utilized to refine each recommendation in an attempt to minimize impact to existing infrastructure. Costs for each prioritized improvement recommendation include necessary ancillary work such as drainage improvements, temporary traffic control, environmental controls, and utility relocations.

Project Cost

Preliminary Construction Cost Estimates were developed for each of the recommended improvements, and separated in an attempt to evaluate the range of costs associated with the prioritized improvements. This is an iterative process, as costs for each improvement option must account for ancillary project costs such as temporary traffic control, environmental controls, and any necessary water quality, detention, etc. As options are combined, the additive cost needs to be reassessed holistically, and may be more or less than the cost of each individual improvement combined.

For cost estimating purposes, Recommendations 1 and 2 were combined as noted in the prioritization summary, since these two recommendations are so closely intertwined. Lane widths also had a significant impact on cost estimates, so a baseline assumption was made for the compact cross-section. As the project proceeds to design phase, lane width may be adjusted to ensure that the project cost falls within the project budget.
Construction Cost Estimate – Prioritized Improvements

1. Two-way Center Turn Lane	$1,000,000
2. Sidewalks (8' Shared-Use Path)	$1,000,000
Ancillary Costs (All Options)*	$1,000,000
3. Extend Eastbound turn bay at US 183	$500,000
4. Provide Eastbound turn bay at Spicewood Parkway	$50,000
5. Modify Olson Drive northbound approach	$50,000
Sub-Total	$3,600,000
Project Delivery Costs	$1,200,000
Contingency and Risk	$1,800,000
Grand Total Project Cost	**$6,600,000**

*Note: Ancillary costs includes Temporary Traffic Control, Drainage Improvements, Erosion and Sedimentation Controls, Mobilization, etc.

Given the project improvement costs are greater than the available budget, the project scope must be refined to fit within the available funding (refer to **Appendix F** for detailed Cost Estimates – Option A as recommended and Option B with 114' – 116' ROW as shown in **Appendix A-3** & **Appendix A-4** for future reference). Options include removal of individual scope elements and/or further reduction of the typical cross-section elements. Since the recommended traffic signal at 9707 Anderson Mill Rd. requires further warrant study, it should be deferred from this project and studied further once the remainder of improvements are in place.

The recommendation of this report is to proceed with design phase for the remainder of the prioritized improvements. As the project design phase progresses, the cost estimate can be refined at each milestone as potential risks are identified, addressed, and retired. Scope may be removed or reduced after the 60% milestone submittal to ensure that the final permitted plans are constructible within the allotted funds.

Next Steps

Detailed design and development of construction plans and specifications will further refine the estimated project cost. Every effort should be made to maximize the number of prioritized improvements that can be constructed within the project budget. An estimate of project phase durations is provided for planning purposes.

Phase	Minimum (months)	Maximum (months)
Design	18	24
Permitting	6	9
Contract Procurement	4	6
Construction		
Pre-construction	3	5
Construction duration	18	24
Total	**49**	**68**

1.0 INTRODUCTION

1.1 Project Purpose and Goal

This Preliminary Engineering Report has been prepared on behalf of the City of Austin Transportation Department for improvements to Anderson Mill Road from Spicewood Parkway to US 183, as part of the 2016 Mobility Bond Regional Mobility Program.

The goal of the 2016 Regional Mobility Bond Program is to address congestion and enhance safety. The goal of this report is to develop recommendations that meet the program goals and reflect the public's priorities.

Primary goals for reducing congestion include improving level of service and reducing delay for vehicles traveling through the project limits. Other goals for reducing congestion include improving facilities for travelers utilizing alternate modes of transportation such as transit, bicycles and walking. This report analyzes existing and future conditions for all modes of travel and provides options and recommendations that achieve reduced congestion.

Goals for enhanced safety are focused on reducing potential for all types of crashes. Existing crash data is analyzed in this report, in order to identify any ongoing safety issues. Proposed options and recommendations are analyzed for their ability to ensure the safety of all roadway users.

The ultimate goal of this preliminary engineering report is to optimize congestion reduction and enhanced safety through improvements within the project limits, and prioritize the improvements to meet the project budget.

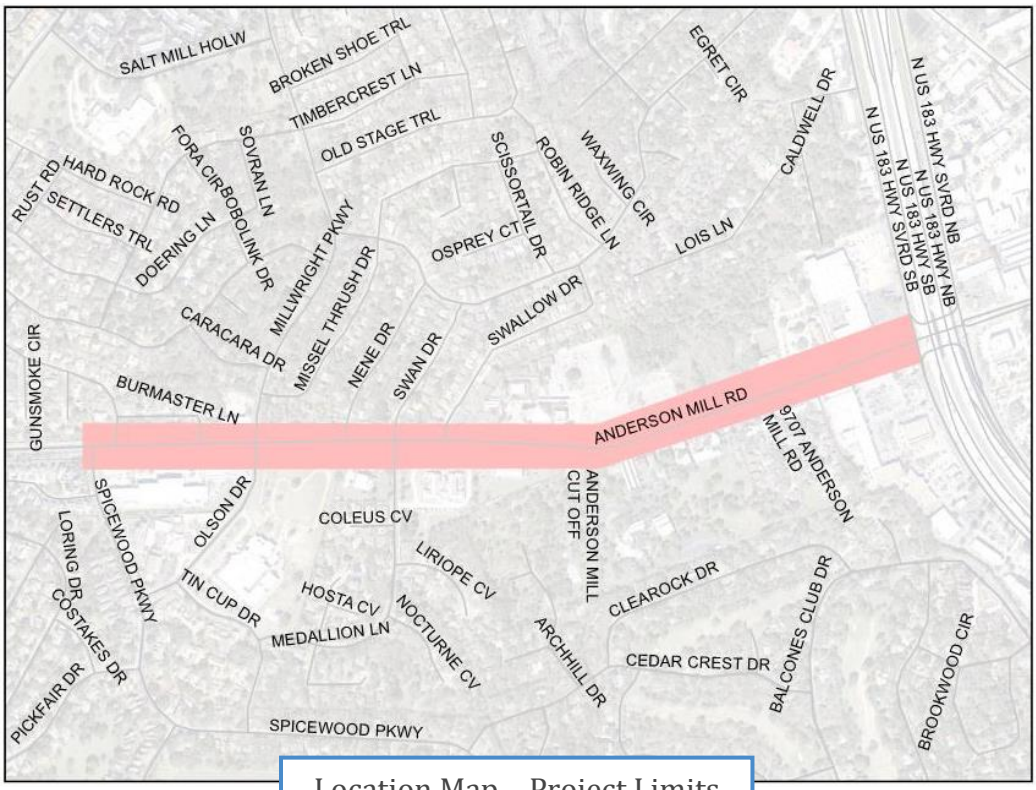
1.2 Project Funding

In November 2016, Austin voters approved $720 million in bonds for transportation and mobility improvements throughout the City (Resolution No. 20160818-074). $101 million of those funds were dedicated to Regional Mobility Projects. $30 million of the Regional Mobility funding was designated for improvements to Anderson Mill Road, intersection of RM 620 and RM 2222, and Parmer Lane between SH 45 and Brushy Creek. Of the $30 million, $5.5 million is assigned to the Anderson Mill Road project. Additionally, $500,000 from the City's 2010 Bond Program will be used to fund preliminary engineering, for a current total project budget of $6 million. During preliminary public outreach, an additional $1.25 million in Council District 6 funding was mentioned as a potential leveraging and partnering opportunity, in order to maximize the project improvements. This report must identify recommendations that fit both the $6 million available budget and also the potential increased budget of $7.25 million.

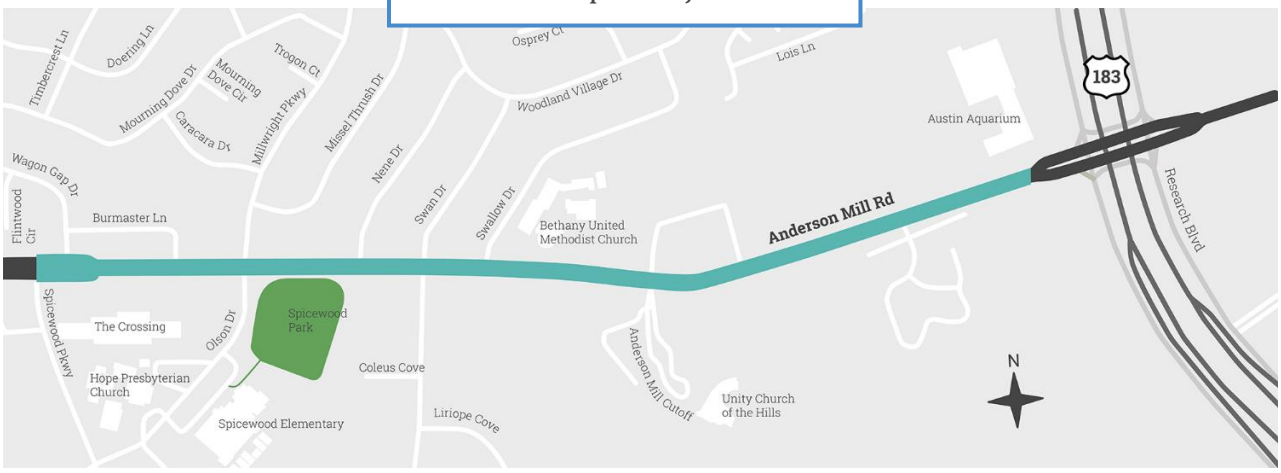
1.3 Project Area – Existing Conditions

Land Uses

This report presents the findings of the preliminary engineering analysis for Anderson Mill Road from Spicewood Parkway to US 183. Anderson Mill Road provides access to a variety of land uses. The majority of lots to the north and south of Anderson Mill Road are designated for single-family use. Fronting Anderson Mill Road are several civic uses, multifamily, and commercial developments. Most of the commercial developments are located at the eastern and western extents of the study limits at Spicewood Parkway and US 183.



Location Map – Project Limits



West Section - Spicewood Parkway to Anderson Mill Cutoff

The northern section along this segment includes mostly residential areas and a small shopping center. The southern section along this section includes assisted living care, a shopping center, commercial offices, Spicewood Elementary School, and residential areas.

Anderson Mill Rd. at Spicewood Parkway, looking east.

Anderson Mill Rd. at Millwright Pkwy / Olson Dr., looking east.

East Section - Anderson Mill Cutoff to US 183

There are several shopping centers and mixed used commercial uses along the northern and southern sections of this segment. The concentration of the larger shopping centers and commercial land uses are located closer to the US 183 Southbound Frontage Road (Research Boulevard). Land uses along the northern section include a gas station (Valero), a funeral home (Cook Walden-Chapel of the Hills), and a church (Bethany United Methodist Church). Land uses along the southern section include home care assistance providers (Home Care Providers of Austin, Visiting Angels), a church (Unity Church) and smaller commercial uses (Insurance Providers).

Anderson Mill Rd. at US 183 / Research Blvd., looking west.

Anderson Mill Rd., looking west toward US 183.

Roadway Characteristics

The subject section of Anderson Mill Road is defined by the Austin Transportation Criteria Manual as a four lane, divided, Major Arterial roadway, or MAD-4. Although it is characterized as divided, this section of roadway does not include a continuous center median or center turn lane that is typical of a "divided" roadway. The project extents are just over a mile at 6,200 linear feet.

In addition to being a Major Arterial, this roadway section is classified as a Critical Arterial by the Austin Transportation Department. Critical Arterial roadways are defined as those roadways that "carry the most commuter and vehicular traffic and provide essential connections to the transportation network", and are a subset of major arterial roadways as defined by the City of Austin. According to 24-hour counts collected on Anderson Mill Road, east of Spicewood Parkway, the average daily traffic volume (ADT) was 28,171 vehicles per day. Just west of US 183, it was recorded at 33,854 vehicles per day.

This report also refers to Anderson Mill Road as a Principal Arterial roadway, as defined and characterized by the Capital Area Metropolitan Planning Organization (CAMPO). CAMPO is a regional transportation planning entity consisting of Bastrop, Burnet, Caldwell, Hays, Travis and Williamson Counties. Principal Arterial roadways can be considered as analogous to Critical Arterials, with similar characteristics and function.

Existing roadway conditions for this section of Anderson Mill Road are primarily characterized by two through-lanes in each direction, with limited center turn lanes or medians. The existing pavement width is typically about fifty feet. Current lane allocation is four – ten-foot vehicle lanes and two – 5-foot striped bicycle lanes. The typical right-of-way width is ninety (90) feet, with some variation down to eighty-five (85) feet and as wide as one-hundred five (105) feet.

Signalized intersections exist (from west to east) at Spicewood Parkway, Olson Drive / Millwright Parkway, Anderson Mill Cutoff, and US 183 (Research Boulevard). Spicewood Parkway and US 183, at the east and west limits of the project limits, have dedicated turn lanes. Olson Drive / Millwright Parkway and Anderson Mill Cutoff do not have dedicated turn lanes or dedicated left-turn traffic signal cycles.

In addition to the four signalized intersections, there are five unsignalized, stop-controlled intersections with residential and collector streets. Each stop-controlled intersection has a stop sign for the intersecting roadway, and no stop sign for Anderson Mill Road. The intersecting streets include (from west to east) Wagon Gap Drive, Burmaster Lane, Nene Drive, Swan Drive, and Swallow Drive. No dedicated left-turn lane is present along Anderson Mill Road at any of the non-signalized intersections. Vehicles turning left from Anderson Mill Road onto any of the stop-controlled intersecting streets currently do so from the inside through travel lane.

Driveways are prevalent along this section of Anderson Mill Road, with approximately 24 distinct driveway access locations. Each driveway is accessible from both eastbound and

westbound travel lanes, and vehicles may turn left or right onto Anderson Mill Road from all except two driveways near US 183. Similar to the intersecting local and collector streets, vehicles turning left from Anderson Mill Road onto any of the driveways currently do so from the inside travel lane.

Anderson Mill Rd., westbound near US 183, driveways.

Bicycle Facilities

Continuous on-street striped bicycle lanes are present along the majority of Anderson Mill Road within the project limits. The exception is a small portion near US 183, with a 300-foot absent bicycle lane in the westbound direction, and 700-feet absent in the eastbound approach to US 183. Anderson Mill Road to the west of the project limits approaching Spicewood Parkway currently has six-foot striped on-street bicycle lanes. Anderson Mill Road to the east of the project limits, across US 183, currently has eight-foot, on-street, buffered bicycle lanes. Buffered bicycle lanes are characterized by a striped buffer or clear zone providing enhanced safety and comfort for cyclists.

Beginning of westbound on-street striped bike lane near US 183.

Missing bike lane at eastbound approach to US 183.

Sidewalks

Sidewalks exist only sporadically on either side of Anderson Mill Road within the project limits. The north (westbound) side has approximately 2,200 linear feet of sidewalk, or about a third of the project length. These sidewalks are predominantly in the center of the project limits, along recently developed properties. The south (eastbound) side of the roadway has only approximately 600 linear feet of existing sidewalks, or only about a tenth of the project limits. Outside of the sidewalk limits, the project area is characterized by beaten paths, or "desire paths", indicating makeshift pedestrian walkways worn in the grass or vegetation where people walk along the roadway. While most of the existing sidewalks are compliant with Americans with Disabilities Act accessibility requirements, none of the beaten paths are compliant or usable for people requiring accessible accommodation.

Missing sidewalk section at Spicewood Elementary School.

Missing sidewalk section near Anderson Mill Cutoff.

Transit Facilities

There are two existing bus stops along Anderson Mill in the project limits. Both bus stops are about one-eighth mile from the US 183 intersection, one westbound and the other eastbound. The bus stops are served by Capital Metro bus line Route 383 Research / Braker, classified by Capital Metro as a crosstown bus route. Service times are at 30 minute intervals from 5:45 a.m. to 11:15 p.m. weekdays. Currently, no sidewalk access is provided to facilitate riders that need to walk from the bus stops to the various residential, retail, commercial, and civic uses in the vicinity.

Eastbound and westbound Capital Metro Route 383 bus stops near US 183. Note lack of sidewalk connectivity.

Topographic Survey and Utilities

MWM DesignGroup completed an existing topographic and tree survey with existing paving and utility appurtenances on October 12, 2017. The survey documents existing conditions throughout the project extent, including right-of-way and property boundaries. The project team utilized surveyed utility appurtenances to reconcile record information provided by underground utility providers within the project extents. The survey data and mapped existing utilities will be the basis for mapping and designing any proposed improvements. For detailed survey of the project extents, please see **Appendix A-2**.

Multiple aboveground and underground utilities are present within the project limits. Aboveground utilities are typically Electric and Telecommunication and span from poles. Utility poles are generally located close to the outside right-of-way boundary at each side of the roadway. Underground utilities include water distribution mains, wastewater collection mains, gas mains, and stormwater drain pipes. As mentioned previously, the stormwater drain pipes are typically in the form of driveway culverts along the roadway drainage ditches. Underground utilities can be located and identified by their associated surface appurtenances such as valve casing, manholes, hydrants, standpipes, and pull boxes.

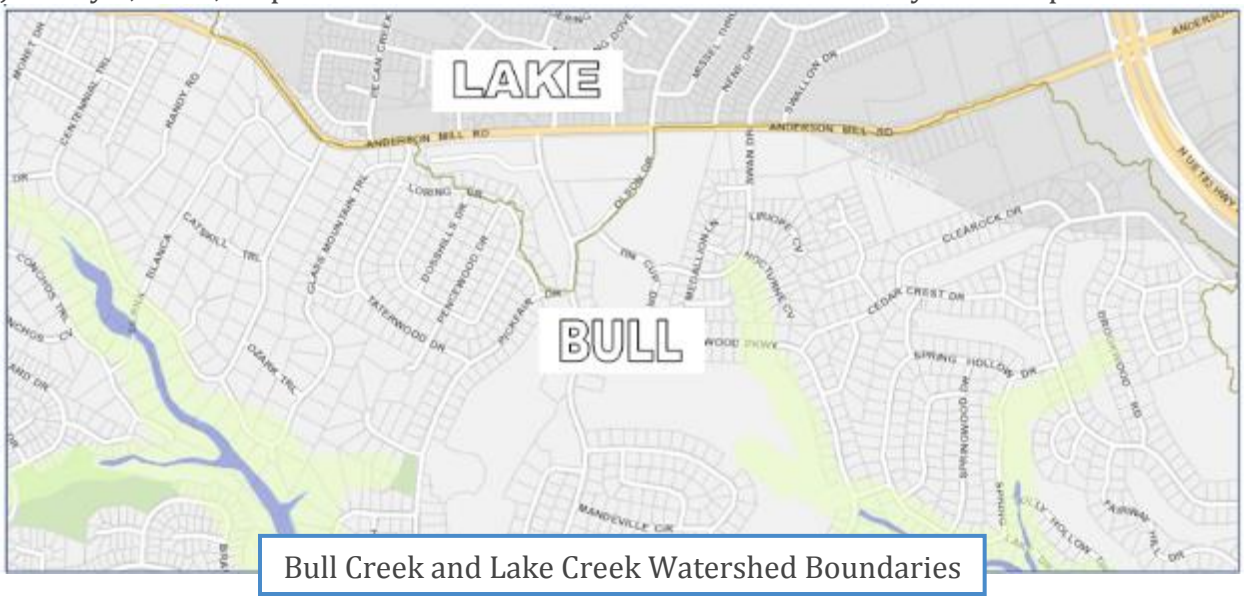
Utility Constraints

Utility Constraints

Utility Poles and driveway culverts, looking west toward Anderson Mill Cutoff.

Existing Drainage Conditions

The site lies within the Bull Creek and Lake Creek Watersheds, which are defined as suburban watersheds by the City of Austin. This site is partially located over the Edwards Aquifer Recharge or Contributing Zone from Swallow Drive to US 183 as defined by the Texas Commission on Environmental Quality (TCEQ) within Williamson County. According to the Federal Emergency Management Agency's (FEMA) flood insurance rate map (FIRM) for Travis County, Texas, Community Panel No. 48453C0235J & 48491C0610E, map revised January 6, 2016, no portions of this site are located within the 100-year floodplain.



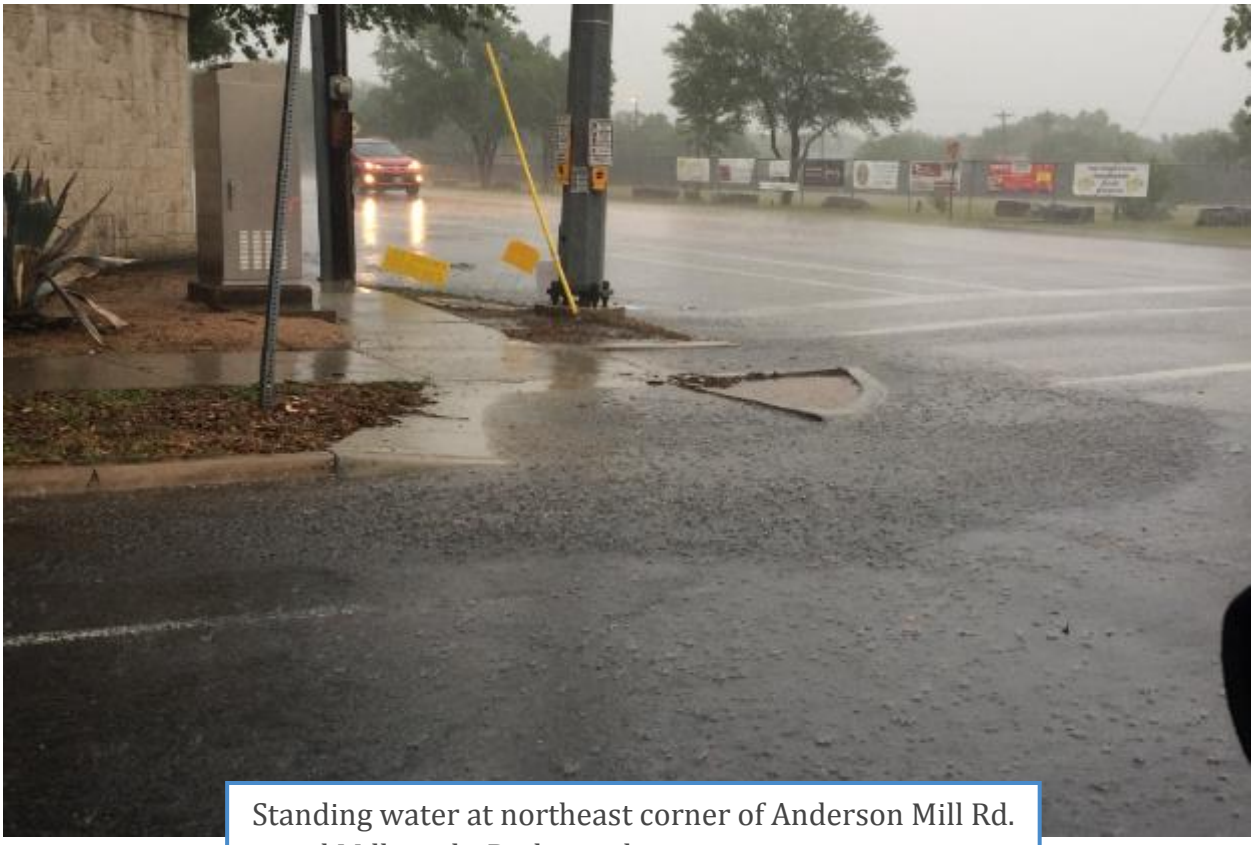
Bull Creek and Lake Creek Watershed Boundaries

The existing onsite drainage infrastructure is characterized by roadside ditches or swales that convey runoff along both sides of Anderson Mill Road. Driveways and intersecting roadways predominantly utilize various sizes and types of culvert pipes to convey drainage. Many of the driveway and roadway culverts are either clogged, partially crushed, or in various states of disrepair. Most of the roadway pavement edge drains directly to the roadside ditches, with some small sections of curb and gutter at each end of the project limits, each on the south (eastbound) side of the road.

Drainage swale and inlet, looking west from near US 183.

Evidence of standing water and flooding is present at the western limits of the project, specifically at the intersection of Anderson Mill Road and Millwright Parkway. Debris from drainage runoff was observed on a brick wall at the right-of-way edge, several inches above the pavement elevation. Residents in this area also shared anecdotal evidence of high water during storm events, causing flooding in the roadway intersection and nearby properties.

Damaged and clogged driveway culverts.



Standing water at northeast corner of Anderson Mill Rd. and Millwright Parkway during a routine rain event.

Environmental Features and Characteristics

A Phase 1 Environmental Site Assessment (ESA) has been conducted by AECOM (formerly URS Corporation) as part of this preliminary engineering report. The full report is available in **Appendix B**. A summary of the report findings is included in this section, and is intended to highlight key findings. The purpose of the Phase I ESA was to identify, to the extent feasible, recognized environmental conditions (RECs) in connection with the subject property. Elements of the Phase I ESA include a site visit, review of historical information, interviews with people familiar with the subject property including local government inquiries to obtain relevant information regarding the environmental conditions, and a review of regulatory agency databases that may provide an indication of environmental risk on or near the subject property. The report is primarily focused on identifying contaminants from previous activities that might impact proposed improvements. The report concluded that no evidence of recognized environmental conditions were revealed in connection with the project site.

An Environmental Resource Inventory was also prepared by AECOM in conjunction with this preliminary engineering report. The full report is available in **Appendix C**. The Environmental Resource Inventory (ERI) uses a City of Austin template to document key environmental features and constraints, and identify permitting regulations that may impact proposed development improvements. A key finding documented in the ERI is the presence of two karst groundwater recharge features on private property adjacent to the project limits. The recharge features are designated as Critical Environmental Features (CEF's) by City of Austin Code and are protected by city regulations. The karst recharge features are significant because they represent a direct connection between overland stormwater runoff and underground aquifer. Karst terrain is characterized by soluble limestone with caves, sinkholes and underground aquifer water storage. The direct connection from surface runoff to underground water creates a risk of pollutants entering the drinking water supply and habitat for underground fauna.

Karst Sinkholes near and downstream of the project limits.

Various tree species exist along the project extents, both in and adjacent to the right-of-way. Prominent species include Live Oak, Cedar Elm, Pecan, Ash and Hackberry. Trees larger than 24 inches in diameter may be classified as heritage trees, depending on species. Trees larger than 18 inches in diameter may be classified as protected, depending on species. Several trees in the project limits qualify as protected or heritage, by City of Austin Land Development Code. Construction of improvements in the vicinity of protected and heritage trees must meet approval criteria as outlined in Section 25-8 of the Land Development Code.

Mature trees south side of Anderson Mill Rd. near US 183.

Mature trees north side of Anderson Mill Rd. near Nene Dr.

1.4 Project Process

The City of Austin and the consultant team began the project by developing a public involvement program and reaching out to community stakeholders and neighborhood associations. Involvement from these groups was a vital component to better comprehension of the Anderson Mill Road conditions.

A detailed survey and mapping of existing conditions was completed in order to establish project constraints. The team performed multiple site visits and walks to verify survey data and familiarize themselves with the site characteristics. Property and right-of-way boundaries were established in order to determine available space for any proposed improvements, and to determine whether right-of-way or easement acquisition would be a feasible option.

Traffic/crash data and changes in traffic patterns in recent years were reviewed and analyzed. Conditions of the existing infrastructure along the arterial were documented and future area development and planned improvements were considered along with the vision and goals of the Imagine Austin Comprehensive Plan. Existing traffic metrics were collected including vehicle numbers in peak and off-peak hours, travel time and delay, and traffic signal timing and configuration. Future traffic volumes were estimated and modeled against existing roadway geometry and any proposed options for improvements.

In compliance with the 2016 Mobility Bond (Resolution No. 20160818-074), the following plans and policies were reviewed in order to determine recommended improvement options in alignment with each plan:

- Imagine Austin Comprehensive Plan
- 2025 Austin Metropolitan Area Transportation Plan (AMATP)
- City of Austin Strategic Housing Plan
- City of Austin Transit Priority Plan
- City of Austin Strategic Mobility Plan
- City of Austin Complete Streets Policy
- City of Austin Sidewalk Master Plan
- City of Austin Urban Trails Master Plan
- City of Austin Urban Bicycle Master Plan
- Capital Metro Connections 2025
- Capital Metro Service Guidelines and Standards
- 2040 CAMPO Plan
- Project Connect Regional High Capacity Transit Plan
- Vision Zero Plan
- National Association of City Transportation Officials (NACTO) Standards
- Watershed Protection Master Plan

Additionally, the project team coordinated with Capital Metro, TxDOT, CTRMA, Travis County and Williamson County.

2.0 PROJECT SCOPE

2.1 Scope of Work

The primary goal of this project is to identify infrastructure improvements that address congestion and enhance safety within the project limits. In order to ensure that the recommendations meet those goals, the preliminary engineering report focuses heavily on analysis and evaluation of existing and future traffic volumes, level of service, travel times, turning movements and access management This report analyzes existing and future conditions for all modes of travel and provides options and recommendations that achieve reduced congestion.

Goals for enhanced safety are focused on reducing potential for all types of crashes. Existing crash data is analyzed in this report, in order to identify any ongoing safety issues. Proposed options and recommendations are analyzed for their ability to ensure the safety of all roadway users.

Proposed alternatives and improvement options are developed and evaluated using guidance from adopted plans and guidelines. Each option is analyzed for constructability, cost, and alignment with the stated project goals. Options are reviewed against permitting requirements, schedule impacts, project budget, and alignment with public input.

2.2 Guiding Plans and Policies

This report is intended to provide recommended improvement options that meet the project goals of addressing congestion and enhancing safety. The recommended improvement options must also align with adopted city plans and policies. The following sections describe the most relevant and pertinent plans and policies that guide the selection and evaluation of various options.

City of Austin Complete Streets Policy

City of Austin Complete Streets Policy was adopted by the Austin City Council in 2014 in order to advance multiple long-term community goals defined by the vision and policies of the Imagine Austin Comprehensive Plan. Completion of the Complete Streets review is anticipated for project scoping and all major milestones. Other design guidelines referenced in the Policy include Urban Street Design Guide (NACTO), Urban Bikeway Design Guide (NACTO), Designing Walkable Urban Thoroughfares (ITE/CNU), 2014 Bicycle Master Plan, and Urban Design Guidelines for Austin.

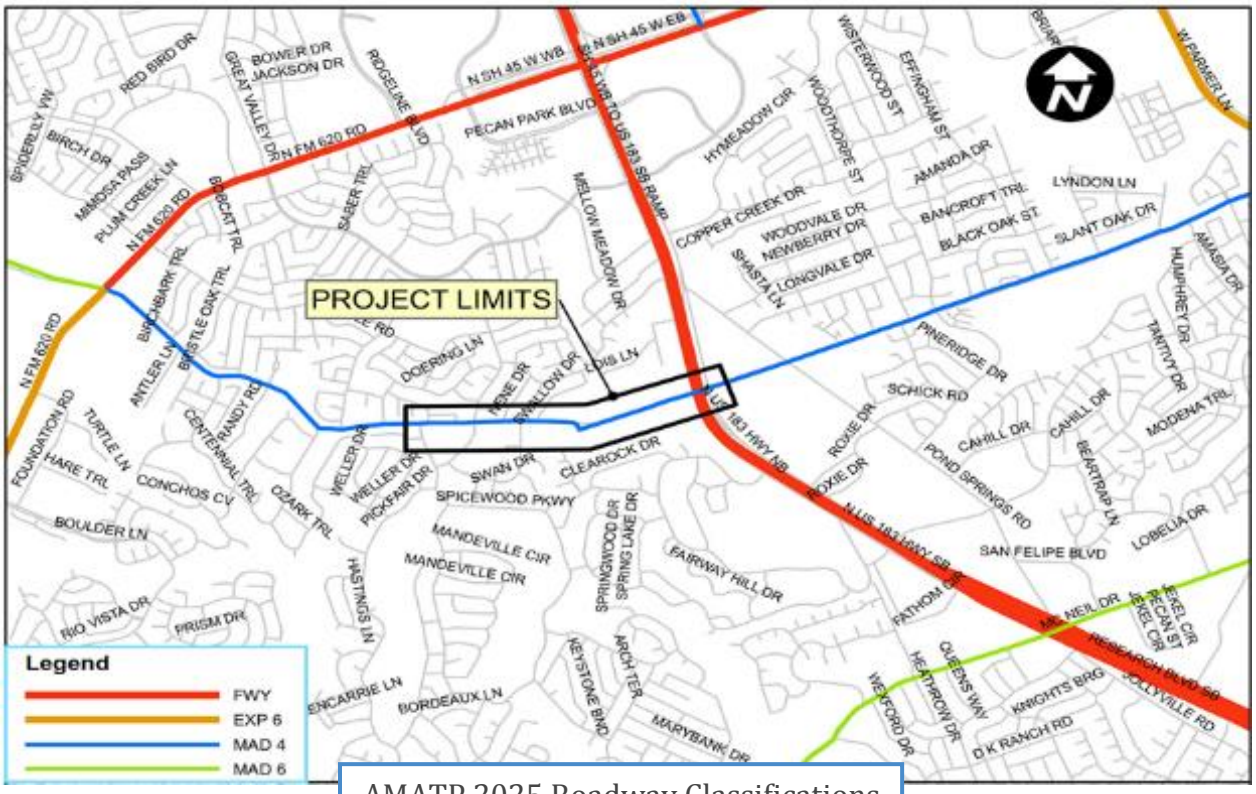
Draft Austin Street Design Guide

The Austin Street Design Guide is a modern guide for street design that considers street function, context and all transportation modes. Released June 20, 2017, the guide contains street cross-sections and serves as a precursor to updates to the City's Transportation Criteria Manual. The purpose of the City of Austin Street Design Guide is to assist street design professionals in applying a consistent approach to street design. Whether planning for a new street or the retrofit of an existing street, this guide is a first step in the application

of a consistent and predictable approach to street design. This approach can result in improved street design consistent with implementation of Imagine Austin and the City's Complete Streets Policy, and faster development application review times. While in a pilot phase now, the Austin Street Design Guide will be refined further, adopted into the Austin Strategic Mobility Plan and the Transportation Criteria Manual.

The Austin Metropolitan Area Transportation Plan

The 2025 Austin Metropolitan Area Transportation Plan (AMATP) guides planning for the future of transportation in Austin. The documents as part of the 2025 AMATP include 1995 Ordinance adopting the AMATP, Adopted Roadway Table, 2025 AMATP map adopted by Austin City Council and Section Maps for Central, Northeast, Southeast, Southwest and Northwest. Based on roadway function specified on AMATP map, Anderson Mill Road is classified as a Major Arterial Divided (MAD4) and Critical Arterial.



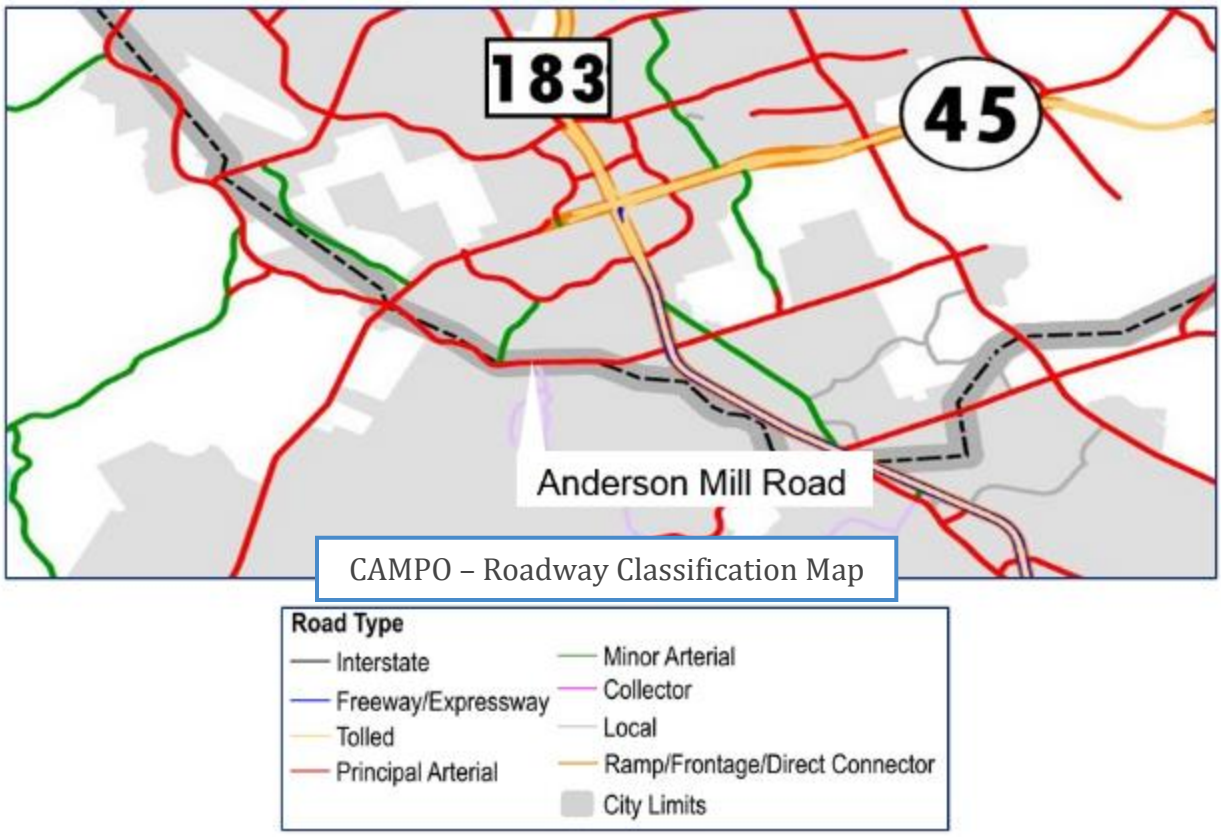
AMATP 2025 Roadway Classifications

Critical Arterial	Limits
5th St.	MoPac to I-35
6th St.	MoPac to I-35
7th St.	I-35 to Airport Blvd.
15th St.	MoPac to I-35
26th St.	Guadalupe St. to I-35
35th St./38th St./38th ½ St.	MoPac to I-35
45th St.	Burnet Rd. to Lamar Blvd.
Airport Blvd.	Lamar Blvd. to FM 969/MLK
Anderson Mill Rd.	FM 620 to Parmer Ln.

Excerpt from Austin Transportation Department Critical Arterial Roadway Table

The CAMPO 2040 Plan

The Capital Area Metropolitan Planning Organization (CAMPO) is the Metropolitan Planning Organization (MPO) for Bastrop, Burnet, Caldwell, Hays, Travis and Williamson Counties. CAMPO coordinates regional transportation planning with counties, cities, Capital Metropolitan Transportation Authority (CMTA), Capital Area Rural Transportation System (CARTS), Central Texas Regional Mobility Authority (CTRMA), and TxDOT. The CAMPO 2040 Long Range Transportation Plan is the active long-range plan for the greater Austin Area. It establishes a vision, plan and implementation strategy for developing a comprehensive multi-modal transportation system by 2040. Anderson Mill Road is defined as a Principal Arterial based on CAMPO Road Types 2040 in the City Limits.

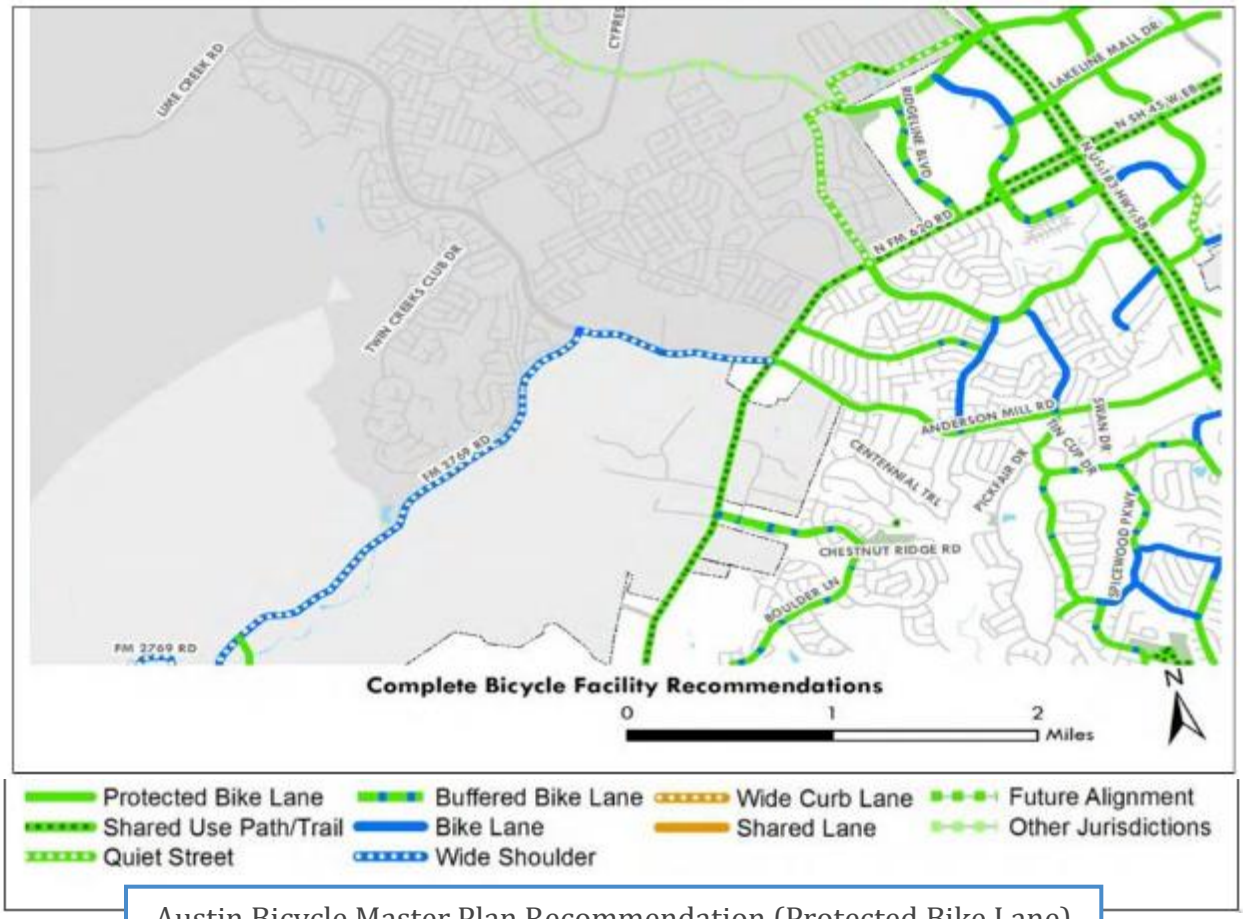


CAMPO – Roadway Classification Map

Bicycle Master Plan / Urban Trails Master Plan

The 2014 Bicycle Master Plan Update and Urban Trails Master Plan were both recently adopted by City Council. The Bicycle Master Plan incorporates elements of the Imagine Austin Comprehensive Plan by proposing the creation of a connected and protected active transportation network that will provide additional transportation alternatives for Austin residents and visitors. The Plan's goals are to significantly increase bicycle use and improve bicycle safety throughout Austin. These two strategies are projected to have positive impacts not just for people who bike, but for the community at large. These impacts include reduced traffic congestion, improved public health, economic development, affordability, sustainability and quality of life.

The Bicycle Master Plan and Urban Trails Master Plan together set forth a connected and protected, "all ages and all abilities", active transportation network of connected trails and on-street bikeways throughout Austin. Sometimes called "multi-use" or "shared-use" paths, Urban Trails are used by bicyclists, scooter-riders, skateboarders, walkers, joggers and others for both recreation and transportation purposes. The purpose of the Urban Trails Master Plan is to evaluate trails opportunities and policy changes to support a city-wide network of Urban Trails. The 2014 Bicycle Master Plan recommends protected bike lanes for Anderson Mill Road.



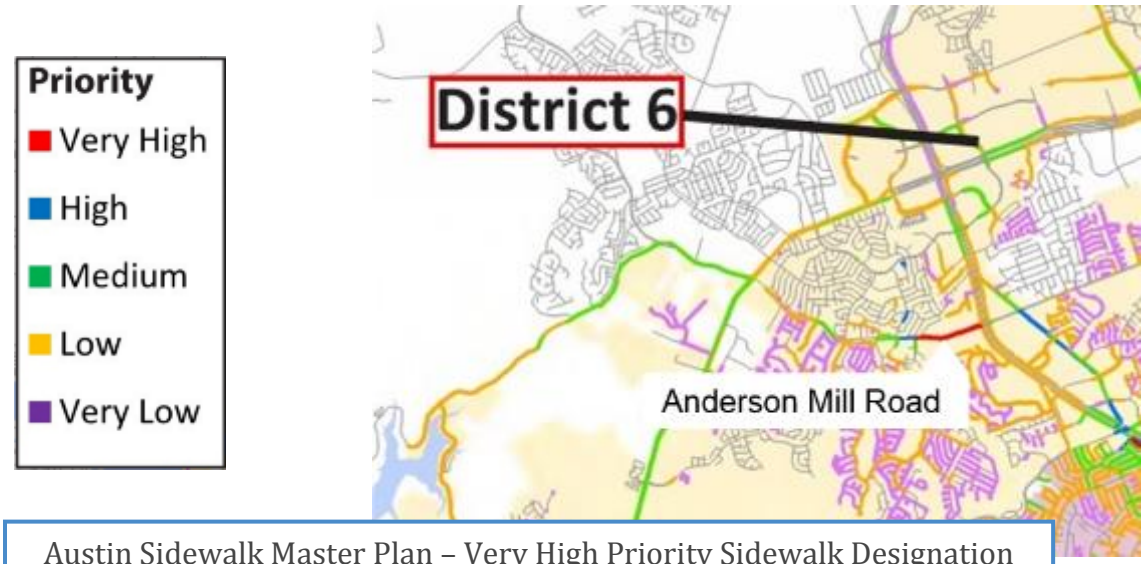
Austin Bicycle Master Plan Recommendation (Protected Bike Lane)

City of Austin Sidewalk Master Plan

The Sidewalk Master Plan provides guidance on creating an accessible and walkable city, and allows for prioritization and planning of future sidewalk projects and associated funding to improve connectivity. It also provides a foundation for associated City initiatives that involve the pedestrian realm.

An important tool in the Sidewalk Master Plan is the "Absent Sidewalk Prioritization Matrix", which defines priorities for implementing needed sidewalks. Additionally, public health data is incorporated into the Matrix, consistent with national trends in city planning that look at the effect of the built environment on public health.

Anderson Mill Road is listed as "Very High" priority in the 2014 Sidewalk Master Plan within District 6.

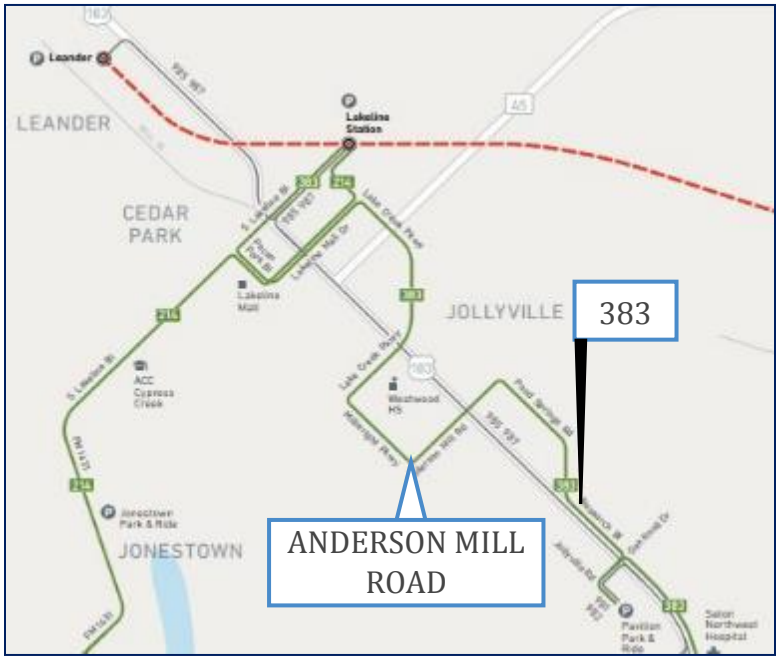


Austin Sidewalk Master Plan – Very High Priority Sidewalk Designation

Capital Metro – Connections 2025

Capital Metro's 2025 long-range transit plan, Connections 2025, is the agency's vision for a more frequent, more reliable, and better-connected transit system. Connections 2025 will guide Capital Metro route and service changes for the next five years, and includes long-range opportunities for implementation in the next ten years.

Connections 2025 has been adopted by the Capital Metro Board, and the agency has already begun implementation under the name "Cap Remap". The plan calls for combining the existing Route 383 with Route 392 to improve travel times. The new route will operate between Dessau Road/Braker Lane and the Lakeline Mall area with 30-minute frequency during both the week and weekend. The route will use Anderson Mill Rd. between Pond Springs Road (east of the Anderson Mill Road PER boundaries) and Millwright Parkway.



CAP Remap

There are additional local, state and federal ordinances, rules and regulations for design standards or criteria listed below:

- A Policy on Geometric Design of Streets and Highways (AASHTO)
- The Code of the COA Title 25 & 30
- The COA Parks and Recreation Long Range Plan
- The COA Urban Watershed and Comprehensive Watershed Ordinances
- The COA Drainage Criteria Manual (DCM)
- The COA Environmental Criteria Manual (ECM)
- The COA Complete Streets Ordinance
- The Transportation Research Board's Highway Capacity Manual (HCM)
- The COA Utility Criteria Manual (UCM)
- Americans with Disabilities Act (ADA) regulations
- Subchapter E: Design Standards and Mixed Use

3.0 PUBLIC INVOLVEMENT

The Anderson Mill Road Project began as a grassroots, community-led effort to address safety and mobility issues along Anderson Mill Road. This initiative was launched as a citizen-led corridor improvement effort that collected online and in-person feedback on present conditions, as well as likes and dislikes regarding the current roadway. During this citizen-led feedback period, residents expressed concerns about a range of issues, including congestion, unsafe left-hand turn movements, lack of sidewalks/ADA accessibility, and a high volume of cut-through traffic. For more information on the community-led corridor improvement project, view the **interactive map** on the Northwest Austin Coalition website.

The **2016 Mobility Bond**, approved by voters in November 2016, included $5.5 million of funding for improvements on Anderson Mill Road from US 183 to Spicewood Parkway. City of Austin staff launched the Anderson Mill Road Preliminary Engineering effort in February 2017. **A project website** was launched that included an overview of the project scope, the anticipated schedule, and information about ways for citizens to share feedback and receive project updates.

City staff presented information about the project during a public meeting on Saturday, March 11, 2017. The presentation explained that the project would evaluate existing conditions based on community input and transportation metrics, including vehicle, pedestrian and bicycle counts, speed, driveway analysis, crash pattern analysis, right-of-way width and availability, drainage, sidewalk condition, utilities, etc. Meeting attendees were invited to share feedback on their experiences using Anderson Mill Road between US 183 and Spicewood Parkway by writing comments on large printed maps of the area. The presentation also included information about the anticipated timeline and project constraints, as well as the project team and budget.

In addition to the March 11, 2017 project meeting, an **online mapping tool** was launched, inviting residents to share feedback on their experiences living, driving, walking, and biking in the project area. The results of this online comment tool provided information that formed the foundation of these recommendations. The project website also provided contact information if a neighborhood association or interest group wished to request a small group presentation.

For a full list of all citizen comments received during the public comment period, view **Appendix D**. Draft recommendations were shared with the public during a second public meeting on February 10, 2018. Input from the February 10, 2018 public meeting was used to further refine and finalize the proposed improvements.

4.0 TRAFFIC ANALYSIS

A detailed traffic and safety analysis was performed on existing and projected future conditions to determine transportation needs along the corridor and appropriate solutions. The full traffic study and associated exhibits, conducted by Stantec, is included in **Appendix E** of this report.

4.1 Existing Data Collection

Anderson Mill Road

Within the study area boundaries, Anderson Mill Road has a four-lane cross-section. There are isolated left-turn lanes throughout the study area: one (1) westbound left-turn lane onto Spicewood Parkway, one (1) westbound left-turn lane into the shopping center at 13450 Research Boulevard, an eastbound left-turn lane onto US 183 Northbound Frontage Road (NBFR) and a westbound left-turn lane onto US 183 Southbound Frontage Road (SBFR). Both east and westbound approaches at US 183 frontage roads have channelized right-turn lanes. There is also a dedicated westbound right-turn lane onto Millwright Parkway. The posted speed limit along Anderson Mill Road is 40 miles per hour (mph). The pavement condition of Anderson Mill Road between Spicewood Parkway and US 183 is in fair condition with longitudinal cracking and spot patching repairs.

In order to provide an accurate representation of existing traffic counts and patterns, traffic counts were collected along the corridor and at the study intersections. According to 24-hour counts collected on Anderson Mill Road, east of Spicewood Parkway, the average daily traffic volume (ADT) was 28,171 vehicles per day. Just west of US 183, it was recorded at 33,854 vehicles per day. Manual turning movement counts (TMC) were collected on May 17, 2017 and May 18, 2017 from 7:00-9:00 AM and from 4:00-6:00 PM during a typical school day. Additionally, Mid-Day (1:00-3:00 PM) manual turning movement counts were collected for two (2) of the study intersections: Anderson Mill Road and Spicewood Parkway, and Anderson Mill Road and Olson Drive. Peak Hour turning movement counts at the following intersections were collected:

7-9AM, 1-3PM, and 4-6PM Turning Movement Counts

- Anderson Mill Road and Spicewood Parkway*
- Anderson Mill Road and Wagon Gap Drive
- Anderson Mill Road and Burmaster Lane
- Anderson Mill Road and Millwright Parkway/Olson Drive*
- Anderson Mill Road and Nene Drive
- Anderson Mill Road and Swan Drive
- Anderson Mill Road and Swallow Drive
- Anderson Mill Road and Bethany Church/Unity Church Drive
- Anderson Mill Road and 9707 Anderson Mill Road
- Anderson Mill Road and Commercial Driveway
- Anderson Mill Road and US Highway 183 Southbound Frontage Road
- Anderson Mill Road and US Highway 183 Northbound Frontage Road

*Note: Mid-day (1-3 PM) manual turning movement counts were also collected for two (2) of the study intersections.
AM and PM peak hour turning movements and existing signal timing for the signalized intersections within the Anderson Mill Road between the limits of Spicewood Parkway and US 183 was made available by the City of Austin. Full 24-hour traffic counts were collected at the following locations.

24-Hour Average Daily Traffic Counts
- Spicewood Parkway south of Anderson Mill
- Millwright Parkway south of Anderson Mill
- Wagon Gap Drive north of Anderson Mill
- Burmaster Lane north of Anderson Mill
- Anderson Mill west of Burmaster Lane
- Anderson Mill east of Bethany Church/Unity Church

In addition to the traffic counts, traffic engineers drove the corridor to obtain existing road travel times along the corridor for the purposes of properly calibrating the Sim Traffic model. Corridor travel time runs were performed September 26, 2017 through September 28 between 7:15AM-8:45AM during the AM peak, 2:00PM-3:00 PM during the mid-day peak and 4:30PM-6:00PM during the PM peak while all schools are in session. Data was then evaluated and averaged to be utilized within the model. Detailed information of the data collected from the travel time run is available in the Traffic Study.

4.2 Future Characteristics

Existing traffic counts were utilized to extrapolate and predict future traffic volumes along the corridor. Projected traffic volumes for 2027 were calculated and used to determine predicted metrics including level of service, travel time, and delay.

Methodology
Between 2017 and 2027, traffic within the study area is expected to increase along with the natural growth of the area. In order to develop traffic volumes for the horizon year 2027, existing data were evaluated against TxDOT historical average annual daily traffic counts. Based on this evaluation, a growth rate of 3% was obtained and applied to AM and PM peak hour turning movement volumes at each intersection to forecast traffic volumes for the projected year 2027.

2027 Forecasted Volumes

The forecasted growth rate of 3% was applied to all existing AM and PM peak hour turning movement counts at each study area intersection. The Table below shows the 2017 existing and 2027 forecasted AM and PM peak hour volumes.

Direction	Location	2017 AM Peak 7-9 pm (vph)	2017 PM Peak 4-6 pm (vph)	2027 AM Peak 7-9 pm (vph)	2027 PM Peak 4-6 pm (vph)
WB/EB	Spicewood Parkway	2,134	2,313	2,868	3,108
WB/EB	Wagon Gap Drive	1,943	2,265	2,611	3,044
WB/EB	Burmaster Lane	1,936	2,219	2,602	2,982
WB/EB	Millwright Parkway/Olson Drive	1,922	2,230	2,583	2,997
WB/EB	Nene Drive	2,215	2,558	2,977	3,438
WB/EB	Swan Drive	2,133	2,501	2,867	3,361
WB/EB	Swallow Drive	2,296	2,636	3,086	3,543
WB/EB	Anderson Mill Cutoff	2,158	2,722	2,900	3,658
WB/EB	9707 Anderson Mill Road	2,240	2,850	3,010	3,830
WB/EB	Commercial Driveway	2,233	2,774	3,001	3,728
WB/EB	US 183 S. Frontage Road	2,403	3,234	3,229	4,346
WB/EB	US 183 N. Frontage Road	1,574	1,965	2,115	2,641

2017 and Forecasted 2027 Peak Hour Traffic Volumes.

4.3 Traffic Operations Analysis

Analyses of existing and future traffic operations of Anderson Mill Road were performed to identify improvements that will accommodate future growth, as well as improve mobility for cyclists and pedestrians. This section describes the methodology used in the traffic analysis, as well as the results yielded for both the existing 2017, and horizon 2027 conditions.

Traffic modeling software was used to perform capacity analysis at each intersection. The capacity analysis functions are based on the Transportation Research Board's Highway

Capacity Manual (HCM) 2010. The HCM is a nationally recognized standard for performing capacity analyses. The user defines street geometry, signal control with AM peak or PM peak traffic movement counts for simulation outputs or Measure of Effectiveness (MOE's), such as average delay per vehicle, average queue length, and intersection Level of Service (LOS), etc. LOS A (excellent) through D are generally considered acceptable and LOS E to F (poor) are considered unacceptable. The LOS thresholds from the Highway Capacity Manual are shown in the Table below. In cases where intersections and/or approaches did not meet an acceptable level of service, recommendations were made for improving the intersection. For stop-controlled intersections, the LOS for the worst approach was reported.

Level of Service (LOS)	Signalized Intersection Average delay per vehicle (seconds)	Stop-Controlled Intersection Average delay per vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	>80	>50

Highway Capacity Manual Intersection Level of Service Thresholds

In addition, the measure of effectiveness parameters available from Sim Traffic Simulation were calculated to understand the operating characteristics along the corridor.
The existing model created for the corridor was calibrated as follows:

1. The existing signal timing plans provided by the City of Austin and TxDOT were inputted into the Synchro model. The signal timing plans were field verified to ensure that they match the signal timing worksheets made available.
2. The correct lane widths and lane geometry were field verified and inputted into the Synchro model.
3. The posted speed limit along the corridor was checked with field verification.
4. The distance between the existing intersections and multiple driveway location along the corridor was field verified and inputted into the Synchro model.
5. The offsets between the intersections were field verified.

4.4 Traffic Modeling Results

Existing Conditions

The 2017 existing traffic analysis includes only the traffic volumes obtained by counts and the current geometric conditions and signal programs. The 2027 horizon year traffic analysis includes the natural growth of the existing traffic volumes identified earlier within this report. Table 6 below provides a summary of the overall intersection performance for each intersection for 2017 existing conditions and 2027 horizon year conditions.

Intersection	Control Type	2017 Existing			2027 Horizon		
		LOS AM Delay(s)	LOS PM Delay(s)	LOS Mid-day Delay(s)	LOS AM Delay(s)	LOS PM Delay(s)	LOS Mid-day Delay(s)
Spicewood Parkway	Signal	A	B	B	C	C	B
		9.6	17.6	10.2	21.2	26.8	12.4
Wagon Gap Drive	Stop	E	F	-	F	F	-
		45.1	81.4	-	>200	>200	-
Burmaster Lane	Stop	C	C	-	F	C	-
		19.7	17.9	-	52.4	22.6	-
Olson Drive/ Millwright Parkway	Signal	D	F	B	F	F	D
		51.9	>200	14.3	133.2	>200	35.5
Nene Dr.*	Stop	E	F	-	F	F	-
		39.2	>200	-	90.0	>200	-
Swan Dr.*	Stop	F	D	-	F	E	-
		76.3	30.5	-	>200	55.2	-
Swallow Dr.*	Stop	F	C	-	F	F	
		83.5	20.6	-	>200	35.6	
Bethany United Methodist/ Unity Church Drive	Signal	A	A	-	A	A	-
		2.8	9.3	-	8.6	18.1	-
9707 Anderson Mill Road*	Stop	F	F	-	F	F	-
		92.1	>200	-	>200	>200	-
Commercial Driveway*	Stop	E	F	-	F	F	-
		42.8	>200	-	>200	>200	-
US 183 S. Frontage Road	Signal	F	E	-	F	F	-
		103.2	61.5	-	>200	157.4	-
US 183 N. Frontage Road	Signal	C	D	-	D	F	-
		30.2	43.9	-	41.0	165.8	-

Intersection Level of Service & Delay (2017 Existing & 2027 No Build)

A summary of the capacity analysis results for the study area intersections within the corridor under the 2017 Existing Conditions and the 2027 Horizon Year conditions is provided below.

Anderson Mill Road & Spicewood Parkway

This signalized intersection operates at an acceptable LOS C and better in the 2017 Existing Conditions as well as the 2027 Horizon Year conditions under the AM, PM, and Midday peak hours. Although the overall intersection operates at acceptable LOS C or better, the

northbound approach along Spicewood Parkway at this intersection falls below LOS D under the 2017 Midday and PM peak hour as well as under the 2027 Midday and PM peak hour. This is due to the high volumes of left turns at this intersection along the northbound approach of Spicewood Parkway.

Anderson Mill Road & Wagon Gap Drive
This intersection is stop-controlled along the Wagon Gap Drive approach with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along Wagon Gap Drive to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approach.

Anderson Mill Road & Burmaster Lane
This intersection is stop-controlled along the Burmaster Lane approach with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along Burmaster Lane to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approach.

Anderson Mill Road & Olson Drive/Millwright Parkway
This signalized intersection operates at an unacceptable LOS E and below in the 2017 Existing Conditions under the PM peak hour and operates at an unacceptable LOS E and below as well as the 2027 Horizon Year conditions under the AM and PM peak hours. This intersection experiences high volumes during peak hours. Additionally, the eastbound and westbound queues exceed available capacity due to stoppage of thru-traffic behind left-turning vehicles.

Anderson Mill Road & Nene Drive
This intersection is stop-controlled along the Nene Drive approach with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along Nene drive to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles at the stop approach.

Anderson Mill Road & Swan Drive
This intersection is stop-controlled along the both approaches of Swan Drive with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along Swan Drive to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approaches.

Anderson Mill Road & Swallow Drive
This intersection is stop-controlled along the both approaches of Swallow Drive with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along

Swallow Drive to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approaches.

Anderson Mill Road & Bethany United/Unity Church Drive
This signalized intersection operates at an acceptable LOS D and better in the 2017 Existing Conditions as well as the 2027 Horizon Year conditions under the AM and PM peak hours. Although this intersection operates at LOS D or better, the queues along the eastbound and westbound direction also exceed capacity due to stoppage of thru-traffic behind left-turning vehicles.

Anderson Mill Road & 9707 Anderson Mill Road
This intersection is stop-controlled along both the approaches with free-flowing traffic along Anderson Mill Road. The northern leg of this intersection services a gas station and the southern leg of this intersection services an existing commercial lot. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along both the driveway approaches to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approaches.

Anderson Mill Road & Commercial Driveway
This intersection is stop-controlled along both the driveway approaches with free-flowing traffic along Anderson Mill Road. The contributing factor for this intersection operating at LOS E or below is the insufficient gap available for stopped vehicles along both the driveway approaches to enter Anderson Mill Road due to high traffic volumes. The insufficient gap results in longer waiting times for vehicles waiting at the stop approaches.

Anderson Mill Road & US 183 S. / N. Frontage Road (SBFR & NBFR)
This signalized intersection of US 183 and SBFR operates at an unacceptable LOS E and below in the 2017 Existing conditions as well as the 2027 Horizon Year conditions under the AM and PM peak hours. The contributing factor for this intersection operating at LOS E or below is the high volume of vehicles traveling through this intersection.

The signalized intersection of US 183 and NBFR operates at an acceptable LOS D and better in the 2017 Existing Conditions under the AM and PM peak hours as well as the 2027 Horizon Year conditions under the AM peak hour. This intersection operates at an unacceptable LOS E and below in the 2027 Horizon Year conditions under the PM peak hour. The contributing factor for this intersection operating at LOS E or below is due to the high volume of vehicles traveling through this intersection.

Future Conditions (2027)

Optimization of the network within the traffic modeling software develops a best-case level of service and delay across the entire corridor. The geometric improvement options all assume two through lanes in each direction, based on the roadway classification and to match the through lanes at each end of the project limits. Options for improvement at each intersection were considered and modeled. The improvement options include addition of center turn lanes and/or dedicated right turn lanes. Options for additional left and right turn

lanes were considered at each intersection and modeled. The physical modifications necessary to add turn lanes will be considered in the options and recommendations sections of this report.

Recommended improvements for each intersection were used to create a 2027 Horizon Year with Improvements and Optimization scenario. A comparison showing the variation in the LOS and Delay between the 2027 Horizon Year (No improvements/no build) and 2027 Horizon year (Improvements + Optimization) is shown below.

Intersection	Control Type	2027 Horizon (No Build)			2027 Horizon (Opt.+Imp.)		
		LOS	LOS	LOS	LOS	LOS	LOS
		Delay(s)	Delay(s)	Delay(s)	Delay(s)	Delay(s)	Delay(s)
		AM	PM	Mid-day	AM	PM	Mid-day
Spicewood Pkwy	Signal	C	C	B	B	B	B
		21.2	26.8	12.4	12.8	16.0	10.7
	Improvements	• PM Cycle Length reduced from 150 to 140 sec. • Provide an EB right-turn bay • Maintain the WB left-turn bay • Build a two-way left-turn lane east of Spicewood Pkwy terminating at Olson Drive/Millwright Pkwy • AM /PM peak hour delays were reduced by 40%					
Wagon Gap Dr.*	Stop	F	F	-	C	C	-
		>200	>200	-	25.4	53.4	-
	Improvements	• Build a center two-way-left-turn (TWLT) lane					
Burmaster Lane*	Stop	F	C	-	F	C	-
		52.4	22.6	-	50.1	23.2	-
	Improvements	• Build a center two-way-left-turn (TWLT) lane					
Olson Dr.*/ Millwright Pkwy	Signal	F	F	D	E	F	B
		133.2	>200	35.5	69.0	113.5	20.0
	Improvements	• AM /PM Cycle Length changed (130 to 140 Sec., 150 to 140 Sec.) • Provide 100' min. left-turn bays on EB /WB approach • Modify NB lane group assignment (1L-1T-1R) • AM or PM delays were reduced by 48% or 93%					
Nene Dr.*	Stop	F	F	-	C	F	-
		90.0	>200	-	24.6	>200	-
	Improvements	• Build a center two-way-left-turn (TWLT) lane					
Swan Dr.*	Stop	F	E	-	D	C	-
		>200	55.2	-	32.4	20.8	-
	Improvements	• Build a center two-way-left-turn (TWLT) lane					
Swallow Dr.*	Stop	F	F	-	F	D	-

		>200	35.6	-	115.5	33.7	-
	Improvements	• Build a center two-way-left-turn (TWLT) lane					
Bethany United Methodist/ Unity Church Drive	Signal	A	A	-	A	A	
		8.6	18.1	-	2.6	6.6	-
	Improvements	• AM /PM Cycle Length changed (65 to 140 Sec., 150 to 140 Sec.) • Provide 100' min. left-turn bays on EB /WB approach • A right-turn bay for WB was not proposed due to limited ROW, and shared right-turn provided for EB • AM or PM delays were reduced by 70% or 34%					
9707 Anderson Mill Road*	Stop/ Signal**	F	F	-	A	A	-
		>200	>200	-	3.0	3.0	-
	Improvements	• Install a traffic signal, if warrants are met • Provide 100' min. left-turn bays on EB /WB approach • Significant reduction in AM & PM peak hour delays					
Commercial Driveway	Stop	F	F	-	E	E	-
		>200	>200	-	36.4	31.3	-
	Improvements	• Restrict the NB and SB approach by adding a raised median between 9707 Anderson Mill Rd and US 183 • Significant reduction in AM & PM peak hour delays					
US 183 S. Frontage Rd*	Signal	F	F	-	F	F	-
		>200	157.4	-	90.8	97.6	-
	Improvements	• AM/PM Cycle Length changed (130 /150 Sec. to 140 Sec.) • Extend EB right-turn bay to 780 feet of storage with 100' taper • A 200' right-turn bay with 50' taper for SB approach • An acceleration lane with 720 storage and 230 taper for SB approach (south side of Anderson Mill Rd.)					
US 183 N. Frontage Rd	Signal	D	F	-	F	F	-
		41.0	165.8	-	105.1	103.2	
	Improvements	• Provide a 300' right-turn bay with 50' taper • Remove the WB approach median to provide transition into the left-turn lane • AM/PM peak hour delays reduced by 27% or 38%					

Intersection Level of Service & Delay (2027 Conditions)

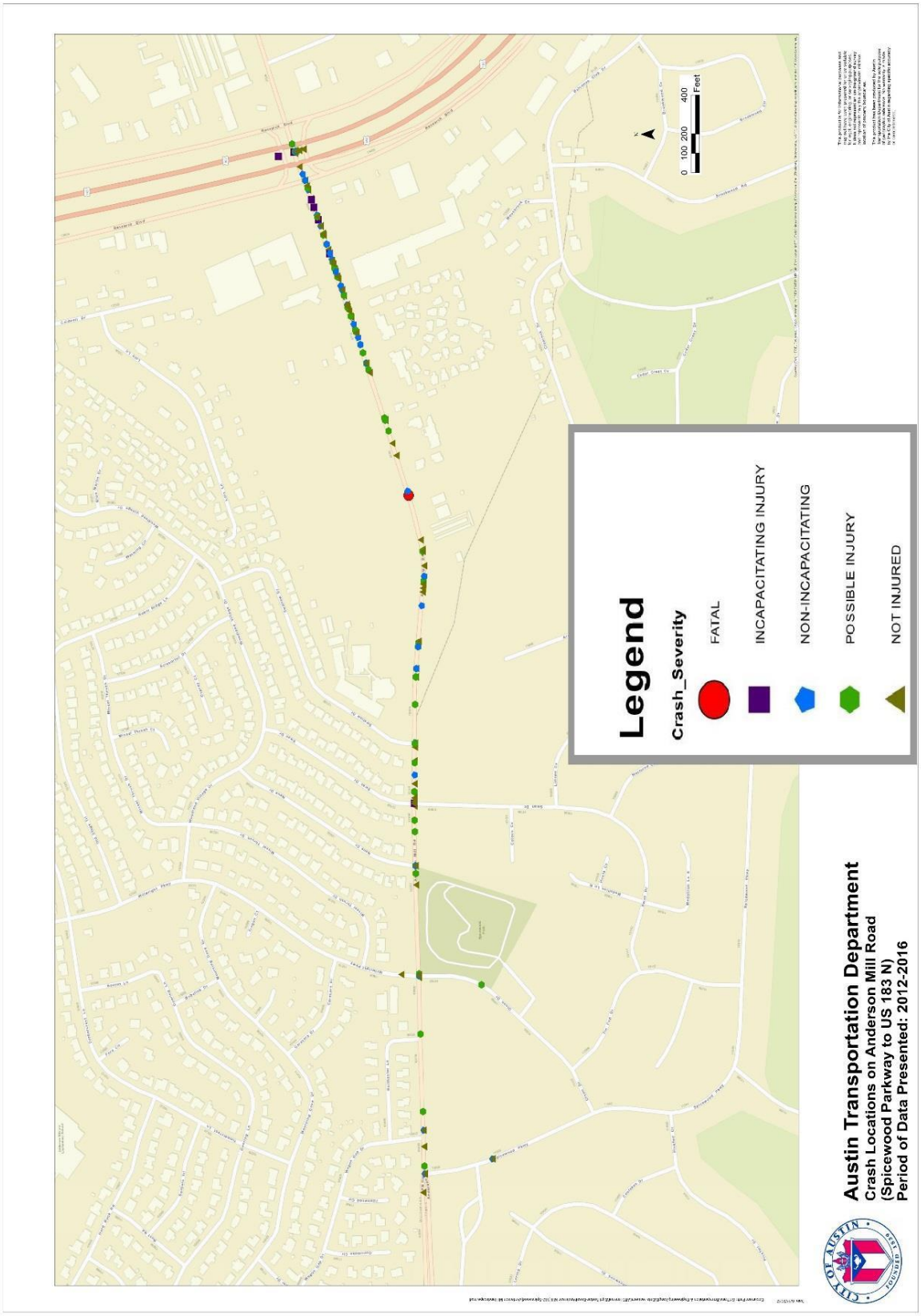
4.5 Crash Analysis

City of Austin and Texas Department of Transportation crash analysis data for collisions occurring in the study area between June 13, 2012 and June 13, 2017 was evaluated. The existing crash data was analyzed to provide recommendations to improve safety throughout the corridor. Of 236 total crashes (47 per year), five crashes caused incapacitating injury and one was fatal. Over 100 crashes reported a non-incapacitating or possible injury.

A review of crash type data revealed that the top contributing factors were (1) angled crashes for vehicles travelling straight along the same direction, (2) stopped vehicle crashes, (3) rear end crashes, and (4) angled crashes between straight and left-turning vehicles. Based on field observations during the travel time runs performed for the corridor study, it was noted that there is periodic stoppage of vehicles intending to turn left along the study corridor due to unavailability of left-turn bays at some intersections, as well as insufficient storage lengths where left-turn lanes are available, which results in queue formation behind the left-turning vehicles.

Vehicles queuing behind stopped vehicles may attempt a sudden maneuver to access the adjacent travel lane and misjudge the gap available to merge into adjacent lanes. Additionally, the vehicles waiting at signalized intersections to turn left under yield conditions experience pressure to complete a quick left-turn movement to avoid delaying the stopped traffic waiting behind them, which can result in angled crashes. Angled crashes are also likely to occur between vehicles entering the thru lanes from the access driveways along the study corridor due to insufficient gaps and misjudgment of the time needed to enter the thru-travel lanes. Rear end crashes typically occur due to driver inattention.

The multitude of access drives combined with the lack of a center turn lane on Anderson Mill Road creates significant safety and mobility issues along this roadway. There is a history of collisions occurring from Anderson Mill Cutoff to US 183. In particular, there is a significant crash history and patterns related to left-turn conflicts on Anderson Mill Road between the US 183 Southbound Frontage Road and the private driveway at approximately 9707 Anderson Mill Road.



Anderson Mill Road Crash Analysis

Anderson Mill (Vanity Spot – US 183) 2012-2016 06/27/17

Anderson Mill
(Anderson Mill Cutoff – State Farm)
2012-2016

Anderson Mill Rd. at Swan Dr.

5.0 PROPOSED IMPROVEMENTS

The ultimate goal of this preliminary engineering report is to optimize congestion reduction and enhanced safety through improvements within the project corridor, and prioritize the improvements to meet the project budget.

5.1 Methodology

The first step in developing proposed improvements that meet the project goals is understanding existing conditions, context, and constraints. The next step is researching the guiding plans and policies that govern and inform proposed development and infrastructure improvements. As improvements are developed in accordance with the guiding plans, the team must consider feasibility and cost of the recommended improvements given the existing context and constraints. Finally, if there are conflicting recommendations in the guidance documents, prioritization may be necessary to ensure that the proposed improvements maximize community benefit and achieve as many of the project goals as possible.

The project team identified improvements to reduce congestion by studying the guiding transportation plans including the Austin Metropolitan Area Transportation Plan, the CAMPO 2040 Plan, and the draft Austin Street Design Guide. All of these guidance documents classify Anderson Mill Road as a major arterial roadway with two through lanes in each direction plus a median or center turn lane. Currently, this section of roadway lacks one of the key defining features of a roadway of this context – the median or center turn lane.

A review of the traffic simulations and modeling confirms that the addition of left-turn lanes dramatically improves metrics to determine congestion reduction. For this reason, a top priority of the project recommendations is to include a continuous median and/or center turn lane throughout the project limits. As noted in the traffic modeling section of this report, left-turn lanes and medians also serve to enhance vehicle safety, another stated goal of the mobility bond program.

In order to address multi-modal transportation options (a congestion-reduction strategy directed by Imagine Austin), the team researched the Austin Street Design Guide, Sidewalk Plan and Bicycle Plan. All of these guiding documents place a high emphasis on dedicated pedestrian and bicycle facilities along major corridors. The existing four- to five-foot on-street bicycle lanes do not meet the recommendations of the Street Design Guide or the Bicycle Plan. Each of these plans recommends separated, buffered or protected bicycle facilities on a corridor with the traffic speeds and volume of Anderson Mill Road.

The Street Design Guide and Sidewalk Plan both recommend continuous pedestrian sidewalks along both sides of all major arterial roadways. The bicycle and pedestrian facilities not only reduce congestion by providing alternate means of transportation, they also enhance safety for the most vulnerable roadway users that may be too young or old to drive a vehicle. New buffered or protected bicycle facilities and sidewalks are another top priority to include in the recommended improvements.

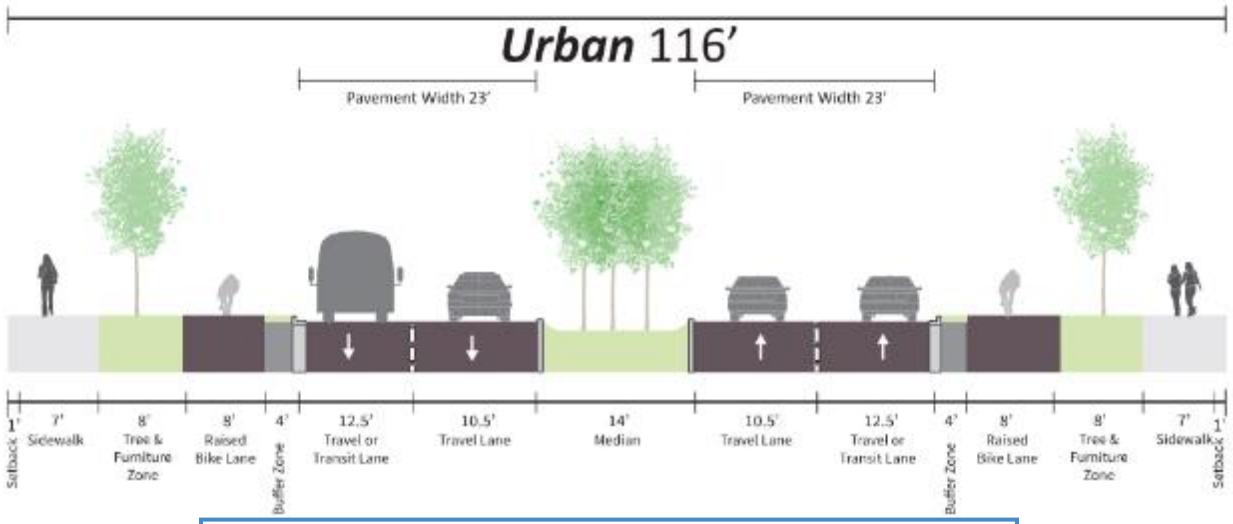
5.2 Recommendations

According to the draft Austin Street Design Guide, the street design process can be broken into distinct elements.

1. Community Context is derived from urban planning principles and nomenclature used to describe places. During the pilot phase of this guide, context will be selected by designers using professional judgment. In the future, it will be determined by a map adopted in either CodeNEXT, Austin Strategic Mobility Plan, or both.
2. Street Level is a modernization of the street functional classification naming and indicates the role the street plays in the network.
3. Right-of-way (existing or future) for each segment of the street network determines the limitations of street design by defining the width of the street.
4. Mode Specific Plans & Design Considerations like the Bicycle Plan, Urban Trails Plan, Sidewalk Plan, Capital Metro Service Plan, Project Connect, and the CAMPO Regional Transportation Plan should be used to identify aspirational goals for each travel mode and allow for an integrated strategy of implementation.
5. Number of lanes (either existing or planned) ensures that adequate capacity is accounted for vehicles, while balancing the need for other modes on streets.
6. Street Design is the culmination of these elements to determine the cross-sections of these roadways. The ultimate design of the corridor will also include an analysis of street operations at the intersections to determine appropriate traffic control based on performance measures and community context.

This report has established the foundation for determining the ultimate appropriate design for Anderson Mill Road between US 183 and Spicewood Springs Road. Due to budget and right-of-way constraints, a combination of "Compact Design" and "Prioritization of Elements" is necessary to ensure that a constructible solution is proposed that meets the project goals, budget, and schedule.

Given the Community Context (Urban/Suburban) and Street Level (Major Arterial), the Street Design Guide Ultimate preferred cross-section would encompass 116' right-of-way width for Urban Street Level 3. Available right-of-way, as detailed in the existing conditions section of this report, varies, but averages about 90' width. This is a significant discrepancy between ideal width and available space. Additional right-of-way is not feasible on a large scale due to impact to developed properties, cost of acquisition, and schedule.

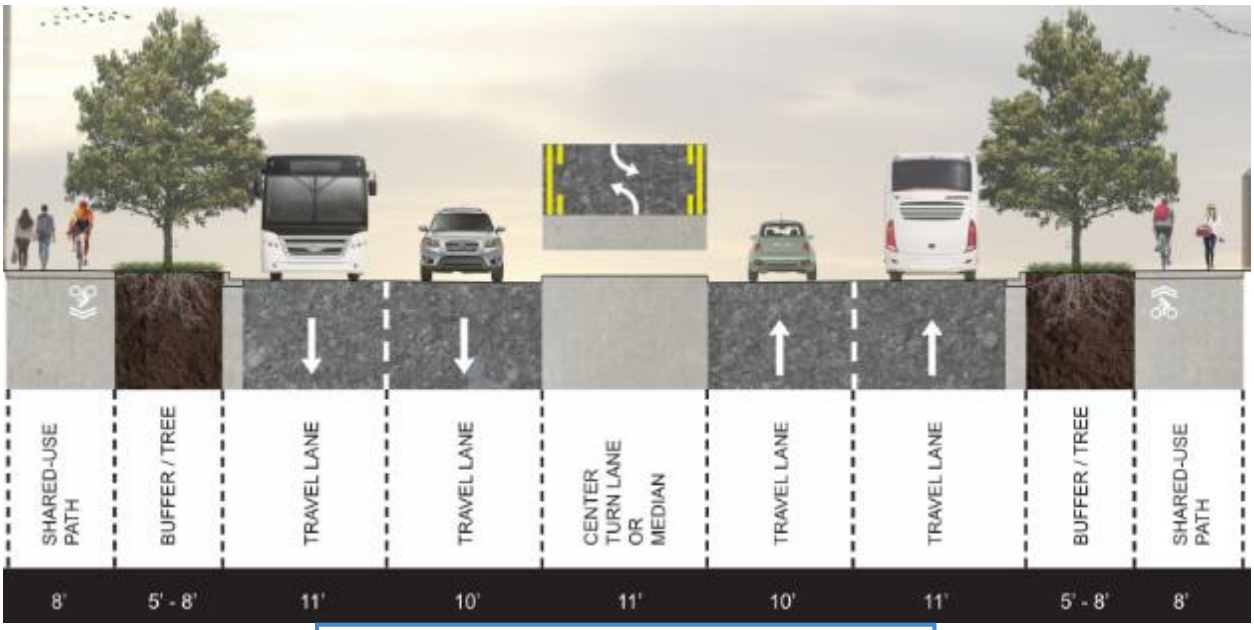


Austin Street Design Guide Recommended Cross-Section

The first step in tailoring the recommended street cross-section to meet the existing constraints is "Compact Design." Each roadway element has maximum, recommended, and minimum widths. The Street Design Guide provides options to combine Bike Lanes and Sidewalks into a single "Shared Use Path." A shared use path provides protection from vehicular traffic and can be striped to designate specific zones for bicycle and pedestrian traffic. Shared use paths are recommended as 12' width but may be reduced to 8' wide in constrained sections. Similarly, buffer zones, tree and furniture zones, and setback can all be reduced in order to create a more compact cross-section. A shared use path meets both the Sidewalk Plan and Bicycle Plan recommendations, and allows for maximizing travel lanes for vehicles and transit.

Travel lanes and medians may be reduced in width in order to optimize available right-of-way, and obtain the desired number of travel lanes. Travel lanes may be reduced to 10' width in a constrained cross-section. Medians may be reduced to 4' or less if needed. Center turn lanes are recommended to have a 12' minimum width.

Applying the compact cross-sectional elements, the design team developed an alternate compact cross-section that meets the context, goals and intent of the Street Design Guide and the project. Each element was analyzed to maximize functionality, while delivering the reduced congestion and enhanced safety goals of the project.



Proposed "Compact Design" Cross-Section

Individual cross-section elements may be further tailored during design phase to meet specific site constraints. For example, the buffer/tree zone is currently a roadside drainage swale along most of this section of Anderson Mill Road. The existing swale may either be incorporated into the final cross-section or replaced with an underground drainage pipe and inlets, if needed.

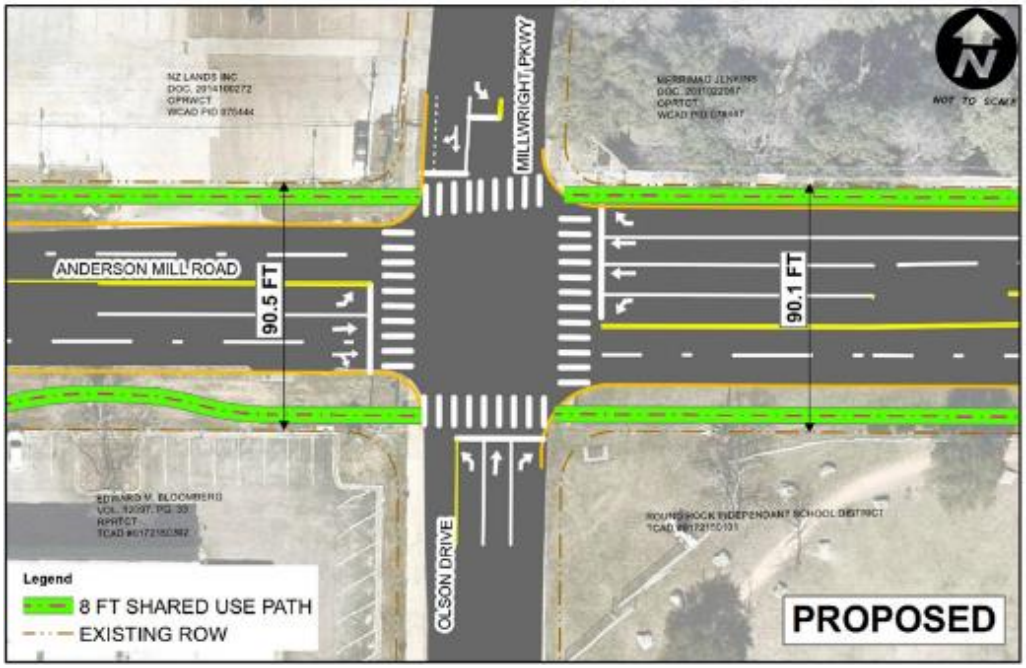
With the proposed cross-section optimized to meet the project constraints, the recommendations can focus on optimizing intersection treatments. Each intersection was analyzed during the traffic study and recommendations were made based on modeling results for level of service and travel time in the corridor.

According to the Street Design Guide, "the ultimate corridor design will also include intersection improvements, which can have the largest impact on the operation of a street facility in terms of both capacity and context." The recommended intersection improvements detailed in the traffic study were reviewed for feasibility and proposed benefit to reduction of congestion and improved safety. This report makes final recommendations for intersection improvements that maximize the traffic benefits and fit within the available budget.

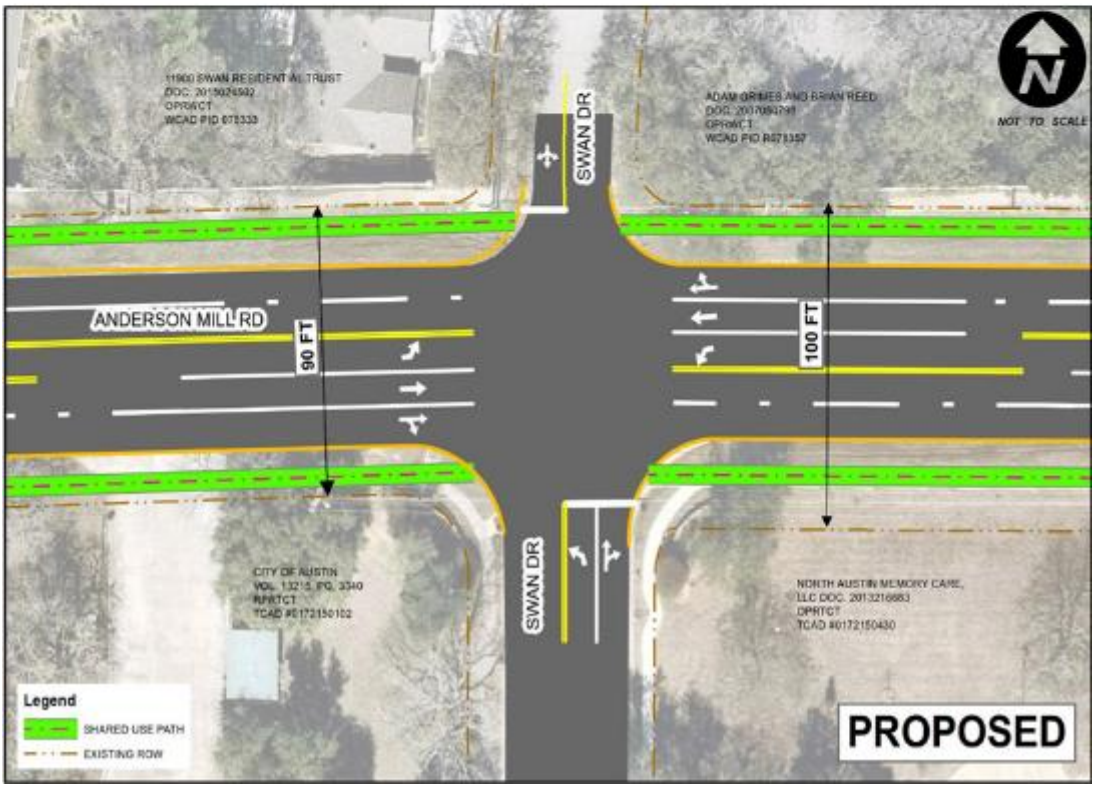
Stop-Controlled Intersection Improvements

All of the stop-controlled intersections include a consistent, similar recommendation to add a center two-way left-turn lane. This is consistent with the recommended street cross-section and can be accommodated largely within the existing pavement. This improvement is facilitated in the proposed improvements for all stop-controlled intersections and will improve level of service and delay for each intersection. The two-way left-turn lane will also enhance safety by providing a refuge for vehicles waiting to turn left, minimizing blockage of the through travel lanes.

Additional improvements recommended at the stop-controlled intersections are based on reconfiguring travel lane assignments on cross-streets approaching the intersection with Anderson Mill Road. These reconfigurations are intended to improve level of service for vehicles turning onto Anderson Mill Road from the stop-controlled cross streets. All of the recommended cross-street reconfigurations can be accomplished by re-allocation of existing pavement width through updated lane striping. These are low-cost improvements, and all recommended reconfigurations are included in this report's proposed improvements.

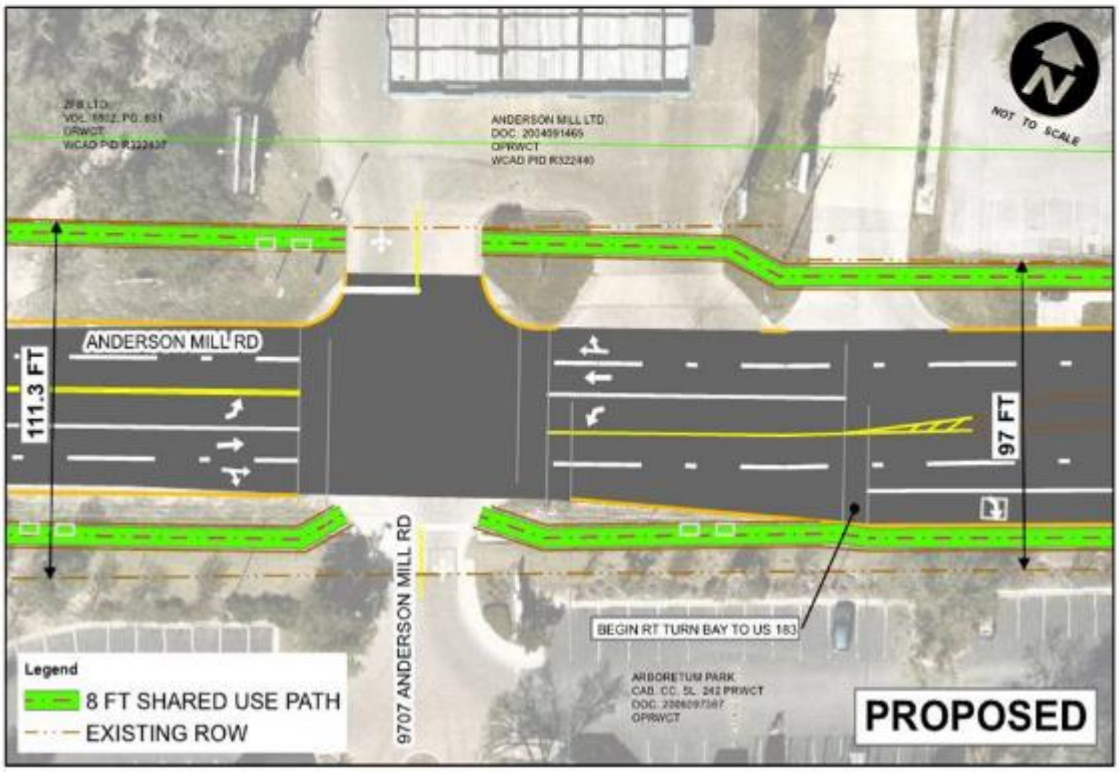


Olson Drive Recommended Improvements
• Provide 100' min. left-turn bays on EB /WB approach



Swan Drive Recommended Improvements

- Provide a center two-way-left-turn (TWLT) lane
- Modify NB lane group assignment (1L-1T&R)



9707 Anderson Mill Road

- Install conduit for a future traffic signal, if warrants are met
- Provide 100’ min. left-turn bays on EB /WB approach

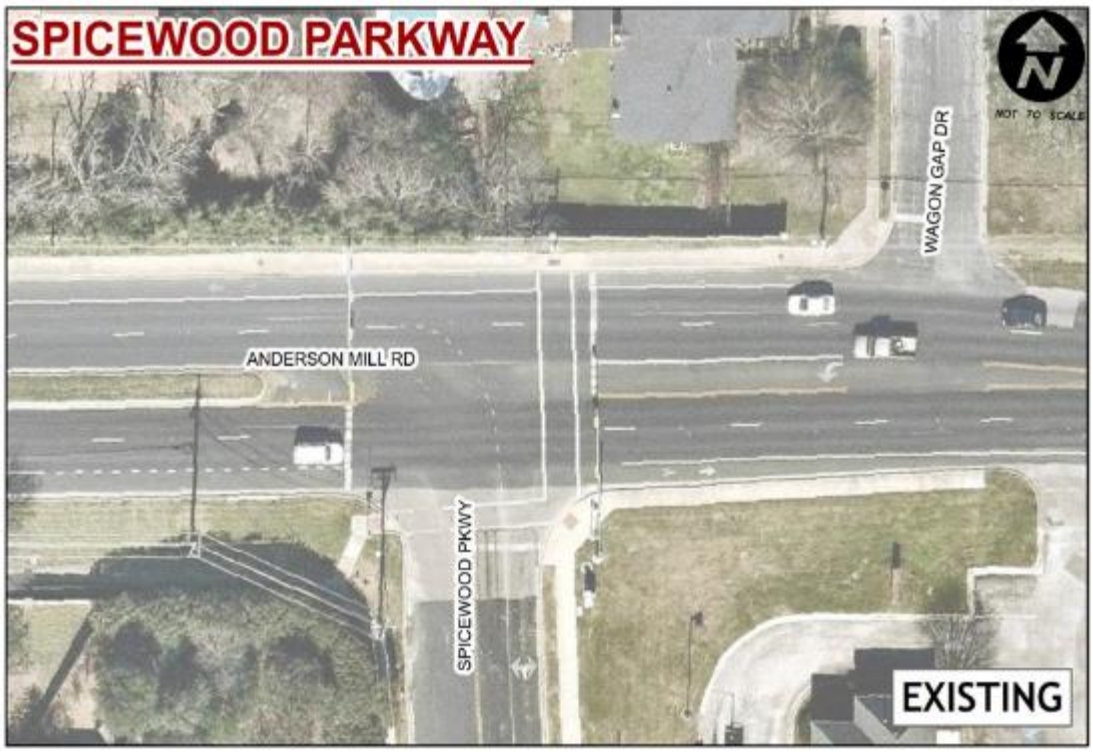
Signalized Intersection Improvements

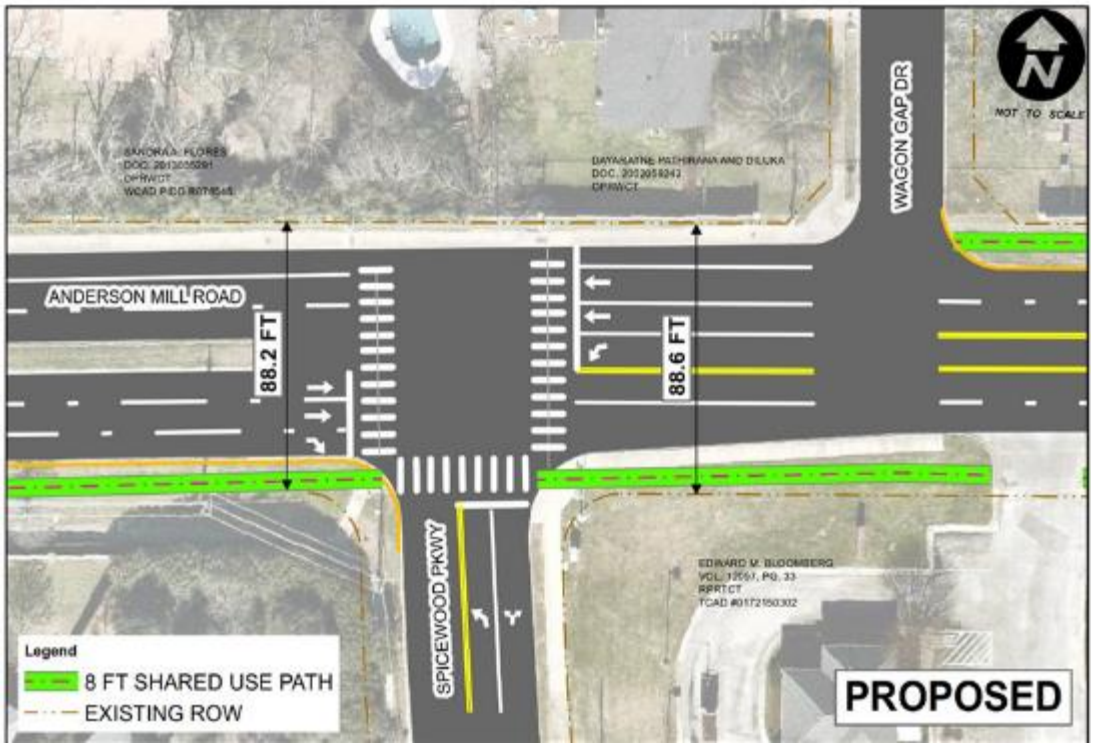
All four existing signalized intersections in the project limits were analyzed in this report's traffic study to determine existing level of service and delay, and to make recommendations for optimization and improvement. Recommendations for timing adjustments and cycle length can be implemented by staff through adjustments to the traffic signal operations. Several timing recommendations were made in the traffic study and these will be made available for consideration by the traffic signal staff.

Additional recommendations for improved traffic signal performance included physical modifications such as additional turn bays, additional storage lengths, and modified turn lane assignments on approaching roadways. Again, a recurring recommendation across all traffic signals, as was the case with stop-controlled intersections, was to add dedicated left-turn lanes along Anderson Mill Road. The center turn lanes are included in the improvement recommendations as part of the cross-section improvements. The signal improvement recommendations also provided guidance for the length of dedicated left-turn bays at each intersection approach, to ensure adequate queueing lengths for left-turning vehicles.

The most extensive and significant improvement recommendations for traffic signal operation are at the Anderson Mill Road eastbound approach to US 183. The traffic volumes at this intersection are the highest in the study area, and through traffic often backs up past the dedicated right turn lane onto southbound US 183. The traffic study recommends 780' of right turn storage on the eastbound approach to US 183. Although this is a constrained area, the congestion reduction that can be achieved is significant, and warrants the effort and expense of providing the additional turn lane storage.

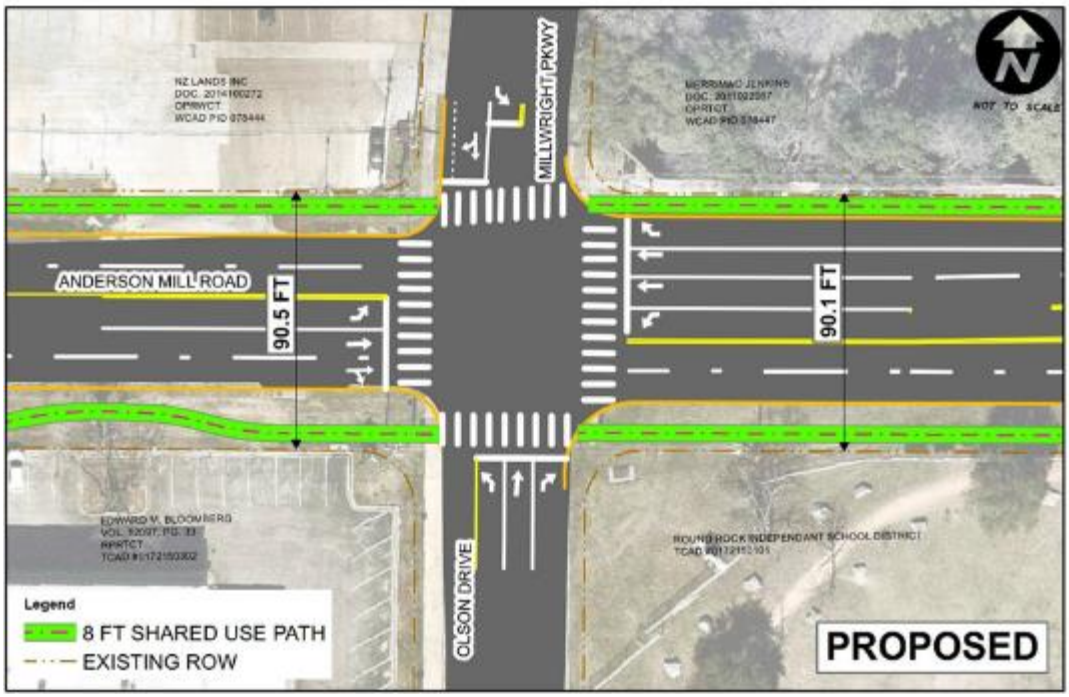
A raised median is also recommended at the eastbound approach of Anderson Mill Road to US 183. The raised median is intended to prevent vehicles from attempting to make left turns across multiple lanes of traffic in this high volume section of roadway. Vehicles waiting to turn can cause back-up and delay, and also present a safety risk if traffic volumes do not allow sufficient gaps to make the left-turn movement. The extent of the raised median should be refined in design phase to balance access to businesses and properties with the safety and mobility benefits of the raised median.





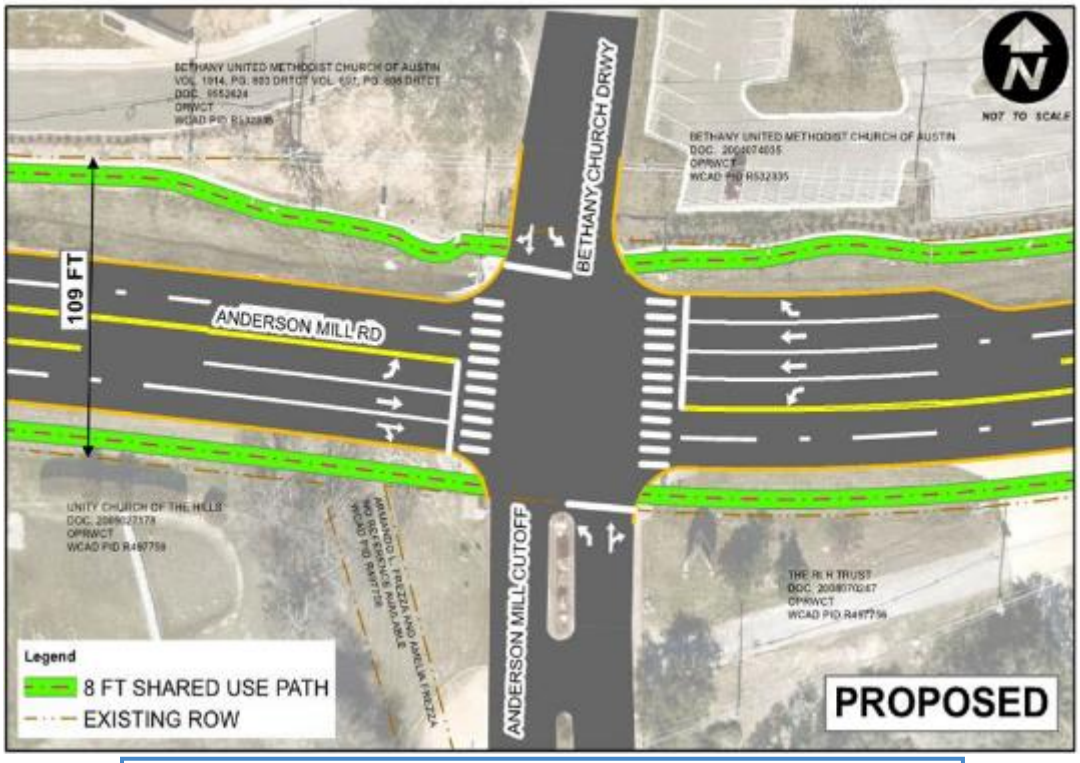
Spicewood Parkway

- Provide an EB right-turn bay
- Maintain the WB left-turn bay
- Provide a two-way left-turn lane east of Spicewood Pkwy terminating at Olson Drive/Millwright Pkwy



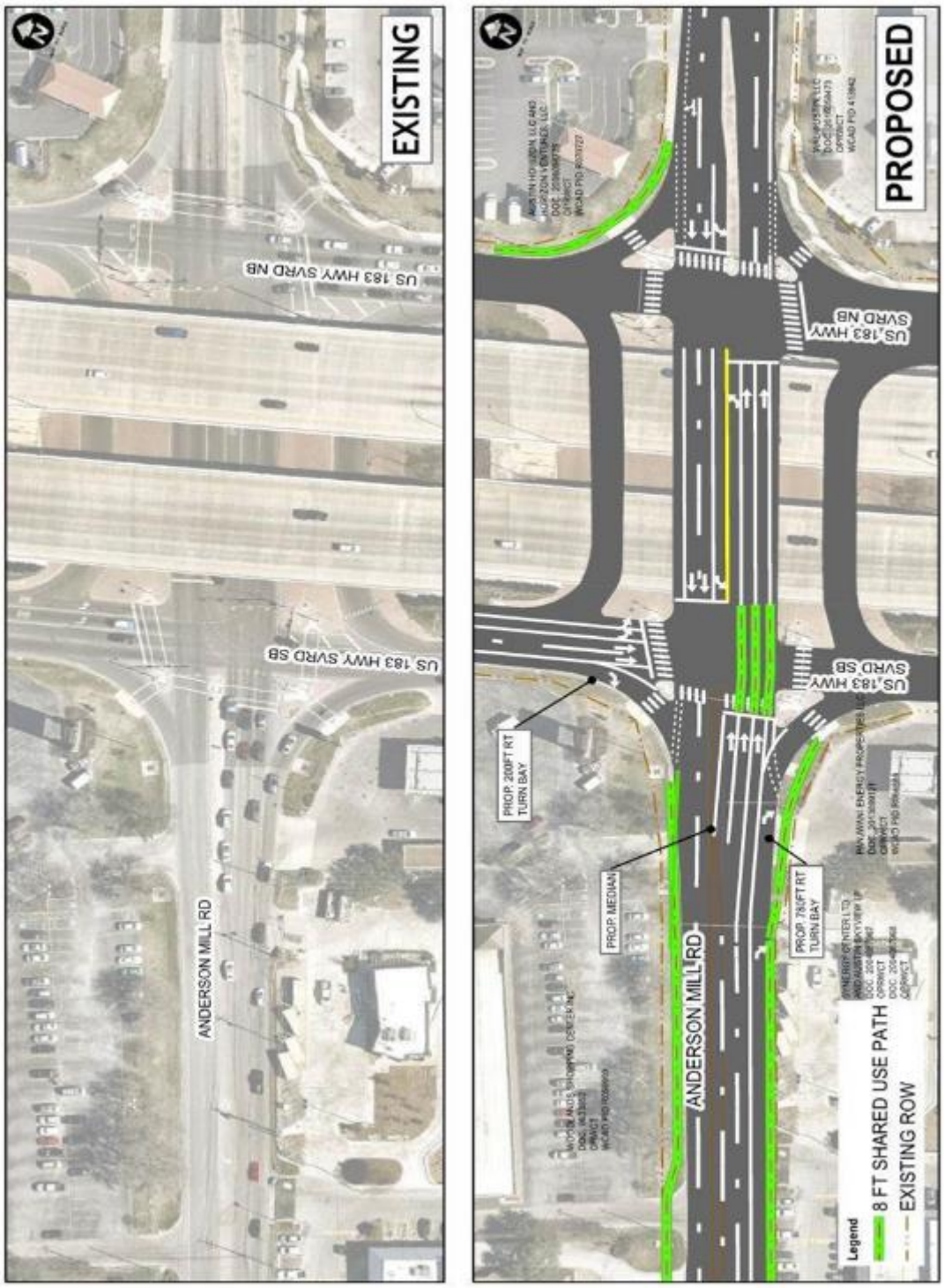
Olson Drive / Millwright Parkway

- Provide 100' min. left-turn bays on EB /WB approach
- Modify NB lane group assignment (1L-1T-1R)



Bethany United Methodist/ Unity Church Drive

- Provide 100' min. left-turn bays on EB /WB approach
- Consider potential right-turn bay for WB approach
- Shared right-turn provided for EB approach



US 183

- Extend EB right-turn bay to 780 feet of storage with 100' taper
- Extend median from US 183 to the west as far as practical

5.3 Proposed Drainage Improvements

During preliminary investigation of the project area, existing drainage conditions and patterns were observed and documented. Though the primary objective of this report and project is improved mobility, several factors directly and indirectly compel the project to address drainage deficiencies and recommend improvements.

Existing Drainage Deficiencies

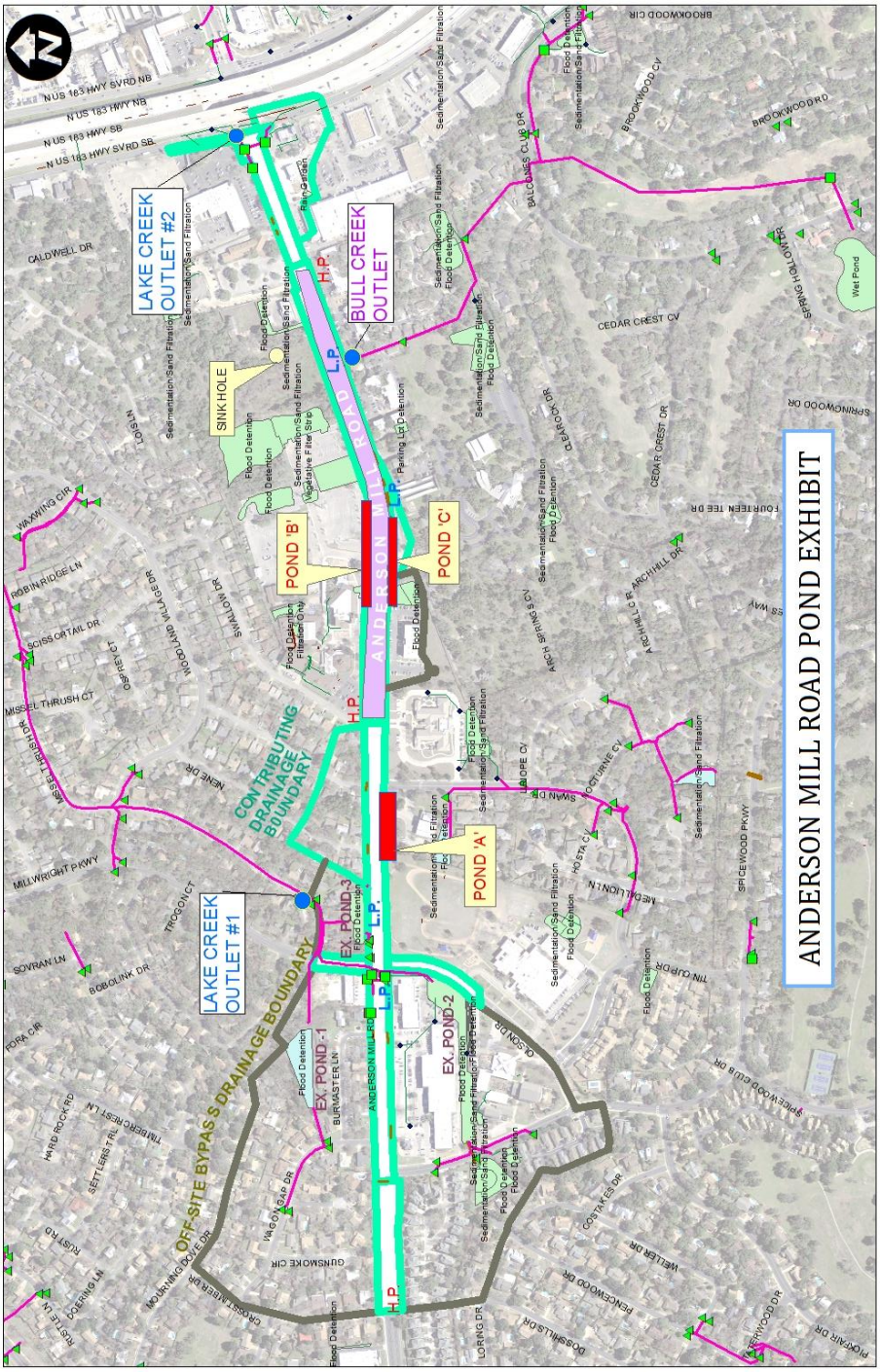
As noted in the existing conditions section of this report, there have been documented flooding complaints at the intersection of Anderson Mill Road and Millwright Parkway (northeast corner). Investigation of the cause of flooding will continue into design phase and recommendations will be made to ensure that the roadway is brought to compliance with City of Austin Drainage Criteria Manual requirements.

Also noted in the existing conditions section of this report are the drainage ditches and multiple driveway culvert pipes along the corridor. Failed, deteriorated, and/or undersized culvert pipes will be identified during design phase and recommendations will be made to replace or repair existing deficient culvert pipes.

Drainage Improvements

In some constrained areas of the roadway, proposed improvements are likely to encroach into the existing grass-lined drainage conveyance swales. As these swales serve as the storm drain system along most of Anderson Mill Road, any swale that is encroached upon must be altered or replaced to maintain (or increase, if needed) the conveyance capacity to meet Drainage Criteria. Options include modification of the swale geometry to a narrower section with more vertical side slopes, or full replacement of the swale with underground storm drain pipe.

In addition to stormwater conveyance, some proposed improvements may trigger requirements to capture runoff for detention and water quality treatment. This will be discussed in more detail in the implementation and permitting section of this report, but generally any new impervious cover must meet drainage and environmental criteria requirements for capturing, detaining, and treating stormwater runoff before releasing it into the conveyance system. Any proposed improvements that generate additional impervious cover, with some exceptions, must meet these requirements (refer to Anderson Mill Road Pond Exhibit proposed pond locations and **Appendix A-5** for Drainage Analysis).



Schematic Pond Location Map

- Pond 'A' located within City of Austin EMS just across Nene Dr.
- Pond 'B' located near Bethany United Methodist Church
- Pond 'C' located near Unity Church Dr.

5.4 Potential Utility Relocations and Improvements

Existing utility infrastructure is prevalent throughout the project limits, as documented in the topographic survey and the Existing Conditions section of this report. Utility infrastructure may be considered as a constraint during preliminary layout and design of any proposed improvements. The design team should evaluate proposed improvements and existing utility infrastructure, to determine the appropriate course of action.

Minor adjustment or relocation of surface features such as manholes, valve covers, fire hydrants, etc. may be possible and cost effective in order to achieve the project goals. Other utility infrastructure such as drainage swales and utility poles may require more costly solutions to implement, and should be weighed against design alternatives. Utility pole relocations can have longer lead times for implementation and may involve coordination with multiple internal and external agencies and organizations. Each utility constraint or conflict should be evaluated during design development to discern whether an acceptable modification of the proposed improvement can eliminate or reduce the need to relocate existing infrastructure.

Coordination with other Improvement Projects

This project has been submitted to the Austin Utility Location Coordination Committee (AULCC) and has been mapped in the City of Austin geographic information systems (GIS) maps in order to ensure that any projects that overlap in area, schedule or scope are coordinated. The project has been assigned a Utility Coordination Committee tracking number and any other entities planning proposed improvements in the vicinity will be required to coordinate with the project team. As this project develops, milestone design deliverables are required to be submitted to the AULCC for continued and refined coordination.

Preliminary coordination with the Utility Location Committee revealed potential overlapping projects in **Appendix A-5**. One is a trenchless wastewater rehabilitation project, and another is a telecommunications installation. This project should continue to coordinate with these and any other projects that are identified as part of the ongoing utility coordination process. The goal of utility coordination is to avoid conflicting construction zones, and to identify “dig once” opportunities to minimize disruption to residents and stakeholders.

6.0 PROJECT IMPLEMENTATION

In order to recommend improvements that meet the project goals of reduced congestion and enhanced safety, this report must consider the project budget against the cost of any proposed improvements. In addition to the construction cost of proposed improvements, funding also needs to include project delivery costs (engineering, project management, inspections) and account for unknown risks and contingency.

Utilizing historic project cost data and accepted industry standard for preliminary cost estimating, the project team identified a construction cost budget that aligns with the available overall project budget of $6.0 million. Thirty (30) percent of the overall project budget is allocated to project contingency and risk mitigation. An additional twenty (20) percent of the project budget is allocated to engineering, project management, construction inspection and other related fees. The recommended project improvements must fall within the remaining $3.0 million available budget.

6.1 Improvement Prioritization and Cost Estimates

Given the construction cost budget for the project is established at $3.0 million, the team can begin to quantify costs of individual improvement components and, if needed, prioritize and determine a recommended project scope. The project team has evaluated existing conditions and constraints, and analyzed the recommended improvements for addressing congestion and enhancing safety. Based on the evaluation and analysis, the following prioritized list of improvements is recommended:

1. Continuous two-way left-turn lane (or median) throughout the project limits. This improvement produces the greatest benefit for reducing congestion and enhancing safety. Due to constrained right-of-way, the additional roadway width to facilitate the added two-way left-turn lane should be made available by removal of the on-street, striped bike lanes. By removing two existing approximately 5-foot bike lanes, ten feet of additional roadway width is made available for the two-way left-turn lane. Note: This option can have varying cost depending on final lane widths established during design phase. Minimum lane widths for a compact, constrained right-of-way will be the most cost effective option. If funding allows, the lanes may be widened as context dictates.

2. Continuous Shared Use Path for bicycles and pedestrians (eastbound and westbound). As noted above, the on-street bike lanes are recommended for removal in order to facilitate the high priority two-way left-turn lane. A shared use path is an upgraded bicycle facility that meets the Bicycle Plan recommendation for this roadway (protected or separated bicycle facility). The shared use path also meets the Sidewalk Plan recommendation to include pedestrian facilities along both sides of all major corridors. As noted in the Street Design Guide, a combined bicycle/sidewalk shared use path is an acceptable option for constrained or compact right-of-way. Transit (bus service) is greatly enhanced by the shared use path, as it provides access from bus stops to homes, businesses, and the many civic uses along the corridor.

Note: Recommendations 1 and 2 should be considered as the minimum baseline scope for a successful improvement project that achieves basic project goals.

3. Extend eastbound right-turn bay to 780 feet of storage with 100' taper at US 183. This improvement, at the busiest intersection in the project limits, facilitates the free flow of right-turning vehicles from Anderson Mill Road onto US 183. Currently, the dedicated right-turn lane is not long enough to extend past queued vehicles continuing straight on US 183.

   Note: Additional US 183 recommendations proposed in the traffic study are outside of the limits of this project, and are in TxDOT right-of-way and control. These recommendations are documented in the traffic report for future reference as other projects develop.

4. Provide an eastbound right turn bay at Spicewood Parkway. The dedicated eastbound right turn lane at Spicewood Parkway would help accommodate the high volume of right turn traffic from Anderson Mill Road onto Spicewood Parkway in the a.m. peak traffic period.

5. Modify Olson Drive northbound approach lane configuration. This low-cost striping improvement will reallocate lane assignments for vehicles approaching Anderson Mill Road along Olson Drive, and provide dedicated right, left, and through lanes.

6. Install Traffic Signal at 9707 Anderson Mill Road. The traffic study recommended a signalized intersection at the commercial driveway entrances for a gas station and shopping center, respectively. A warrant study was not completed as part of the traffic report. An alternate option is to install traffic signal conduit at this location to facilitate a potential future signal if a warrant study verifies the need and funding become available.

Preliminary Construction Cost Estimates were developed for the various recommended improvements, and separated in an attempt to evaluate the range of costs associated with the prioritized improvements. This is a challenging, iterative process, as costs for each improvement option must account for ancillary project costs such as temporary traffic control, environmental controls, and any necessary water quality, detention, etc. As options are combined, the additive cost needs to be reassessed holistically, and may be more or less than the cost of each individual improvement combined.

For cost estimating purposes, Recommendations 1 and 2 were combined as noted in the prioritization summary, since these two recommendations are so closely intertwined. Lane widths also had a significant impact on cost estimates, so a baseline assumption was made for the compact cross-section. As the project proceeds to design phase, lane width may be adjusted to ensure that the project cost falls within the project budget.

Construction Cost Estimate – Prioritized Improvements

1. Two-way Center Turn Lane	$1,000,000
2. Sidewalks (8' Shared-Use Path)	$1,000,000
Ancillary Costs (All Options)*	$1,000,000
3. Extend Eastbound turn bay at US 183	$500,000
4. Provide Eastbound turn bay at Spicewood Parkway	$50,000
5. Modify Olson Drive northbound approach	$50,000
Sub-Total	$3,600,000
Project Delivery Costs	$1,200,000
Contingency and Risk	$1,800,000
Grand Total Project Cost	**$6,600,000**

Note: Ancillary costs includes Temporary Traffic Control, Drainage Improvements, Erosion and Sedimentation Controls, Mobilization, etc.

Given the project improvement costs are greater than the available budget, the project scope must be refined to fit within the available funding (refer to **Appendix F** for detailed Cost Estimates). Options include removal of individual scope elements and/or further reduction of the typical cross-section elements. Since the recommended traffic signal at 9707 Anderson Mill Rd. requires further warrant study, it should be deferred from this project and studied further once the remainder of improvements are in place.

The recommendation of this report is to proceed with design phase for the remainder of the prioritized improvements. As the project design phase progresses, the cost estimate can be refined at each milestone as potential risks are identified, addressed, and retired. Scope may be removed or reduced after the 60% milestone submittal to ensure that the final permitted plans are constructible within the allotted funds.

6.2 Permitting Requirements

A new Site Development Permit Application must be submitted for review and approval through the City of Austin Development Services Department. It is anticipated that the following permits will be required:

City of Austin Permit:	Streets and Drainage Site Plan Permit
Potential Variances:	Critical Environmental Feature (CEF) Setback
State Requirements:	Stormwater Pollution Prevention Plan (SWPPP) Water Pollution Abatement Plan (WPAP)
Texas Department of Licensing and Regulation (TDLR):	Registered Accessibility Specialist (RAS) assessment and ADA Sidewalk Compliance
Federal Requirements:	N/A (No federal funding associated)

This roadway is entitled to 50 percent reduction on review fees due to being located within the Desired Development Zone. The site is partially located within Edwards Aquifer 1,500 feet Verification Zone of the Edwards Aquifer Recharge Zone.

6.3 Project Schedule

A best estimate of project duration is included for planning purposes. The project schedule should be revisited and updated as design and permitting progresses to typical project delivery milestones. Design submittals are required at 30%, 60% and 90% design. Permitting begins at between 90% and 100% design phase.

Phase	Minimum (months)	Maximum (months)
Design	18	24
Permitting	6	9
Contract Procurement	4	6
Construction		
Pre-construction	3	5
Construction duration	18	24
Total	**49**	**68**

LIST OF ACRONYMS

ADT	Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	American Disabilities Act
AMATP	Austin Metropolitan Area Transportation Plan
AULCC	Austin Utility and Location Coordination Committee
CAMPO	Capital Area Metropolitan Planning Organization
CARTS	Capital Area Rural Transportation System
CEF	Critical Environmental Feature
CNU	Congress for the New Urbanism
CMTA	Capital Metropolitan Transportation Authority
CTRMA	Central Texas Regional Mobility Authority
DCM	Drainage Criteria Manual
ECM	Environmental Criteria Manual
ESA	Environmental Site Assessment
ERI	Environmental Resource Inventory
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HCM	Highway Capacity Manual
HEC-HMS	Hydrologic Engineering Center-Hydrologic Modeling System
LOS	Level of Service
MAD	Major Arterial Divided
MOE	Measure of Effectiveness
NACTO	National Association of City Transportation Officials
NBFR	North Bound Frontage Road
NOAA	National Oceanic and Atmospheric Administration
PDO	Property Damage Only
RAS	Registered Accessibility Specialists
REC	Recognized Environmental Conditions
ROCIP	Rolling Owner Controlled Insurance Program
ROW	Right-of-Way
SBFR	South Bound Frontage Road
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TDLR	Texas Department of Licensing and Regulation
TxDOT	Texas Department of Transportation
UCM	Utility Criteria Manual
WPAP	Water Pollution Abatement Plan

PROJECT TEAM

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Typical Section/Bike Lane Review (ATD)	Nathan Wilkes, P.E.
Water Quality/Environmental Review (WPD)	Tom Franke, EIT Sylvia R. Pope, P.G.
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Survey Reviewer	Istvan Voiculescu (CAD Manager)
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Environmental Consultant	URS Corporation
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