



SH 29 Feasibility Study Summary Report

From Southwestern Boulevard near the City of
Georgetown to State Highway 95
Williamson County, Texas

June 2017

Texas Department of Transportation, Austin District

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

Executive Summary

The Texas Department of Transportation initiated a corridor feasibility study in March 2015 for State Highway 29 extending from Southwestern Boulevard in Georgetown to SH 95 near the community of Circleville. The purpose of the study was to evaluate the SH 29 corridor including deficiencies and identify recommended improvements and/or options that would be further evaluated for study and implementation, should funding become available.

The area for the SH 29 study extended from Southwestern Boulevard (western boundary) near the city of Georgetown to SH 95 (eastern boundary). The project study area generally followed the San Gabriel River to the south and County Road 124 to the north and covered approximately 15,000 acres. SH 130, a toll facility, crosses SH 29 1.7 miles east of Southwestern Boulevard.

The study evaluated several potential improvements, including improving the existing SH 29 roadway between these limits as well as new location alternatives. In order to develop alternatives for the study, a purpose and need statement and study goals and objectives were developed. Traffic data including existing and future traffic projections, level of service, accident data, engineering information, current land use, environmental constraints, right-of-way requirements, and public input were examined during the study.

For the SH 29 study, TxDOT identified the following Purpose and Need Statement:

- **Purpose:** To upgrade the existing roadway to meet current design standards and potentially provide a new location alignment between SH 130 and SH 95.
- **Need:** To accommodate existing and projected traffic volumes, improve safety, and address roadway flooding.

Study goals and objectives include the following:

- Avoid and/or minimize impacts to parcels and residential properties
- Utilize existing county or state right-of-way where possible
- Avoid and/or minimize flooding issues
- Minimize bridge structures
- Avoid and/or minimize impacts based on constraints identified
- Avoid impacts to cemeteries
- Bring SH 29 up to meet current design standards
- Develop the route above/out of the 100-year floodplain

Three open house public meetings were held for the SH 29 corridor feasibility study. The majority of comments received after each meeting concerned potential impacts to homeowners, preference or dislikes for particular alternative alignments presented, safety issues along SH 29, and roadway flooding issues. Based on public input received from these public meetings and environmental and engineering constraints, four alternatives were developed. These alternatives included Alternative A, located in the northern portion of the study area, Alternative D, located in the southern portion of the study area, a hybrid alternative that combined portions of Alternatives A and D (Alternative A-A1-D), and Alternative E, which generally follows the existing SH 29 roadway. Throughout the study, the No-Build Alternative was also evaluated as a comparison to the four build alternatives.

Based on the study findings, it is recommended that the northernmost alignment, Alternative A, be advanced for further refinement and study. Alternative A would meet the purpose and need of the study, while resulting in the least amount of floodplain impacts, property parcel impacts, prime farmland soils impacts, and impacts to woodlands. In addition, Alternative A best fulfills the goals and objectives of the study.

This is a planning level study and no construction funds have been identified. Should the study be advanced into the National Environmental Policy Act (NEPA) phase of project development, additional environmental study, alternatives evaluation, schematic development, and public involvement would be undertaken. Should it be determined during the NEPA process that the best alternative is one that provides for a new location alternative, the existing SH 29 facility would be left in place and maintained to provide access to adjacent property owners.

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Glossary

100-year Floodplain: The 100-year floodplain is the land that is predicted to flood during a 100-year storm, which has a 1 percent chance of occurring in any given year. The 100-year floodplain is used by FEMA to administer the federal flood insurance program and local governments to regulate development.

Average Daily Traffic (ADT): Average daily traffic volume represents the total two-way traffic on a roadway for some period less than a year, divided by the total number of days it represents, and includes both weekday and weekend traffic. Usually, ADT is adjusted for day of the week, seasonal variations, and/or vehicle classification.

Crash Rate: The number of crashes per 100,000,000 vehicle miles travelled.

Environmental Constraint: An environmental factor or consideration (such as natural or human resources) that would impose limitations on project planning or design.

Extraterritorial Jurisdiction (ETJ): The legal ability of a government to exercise authority beyond its normal boundaries.

Horizontal Curve: The piece connecting straight (tangent) sections that changes (turns) the directions the road will follow. Curves can vary by degrees between gentle and sharp in measurement. The choice of curve sharpness impacts other design elements such as the amount of banking (superelevation) required in the curve to provide vehicles the ability to safely and comfortably negotiate. The design of a safe roadway curvature is associated with highway design speed.

Level of Service (LOS): Level of Service is a measure of traffic flow and congestion. As defined in the Highway Capacity Manual - A qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Typical Roadway Configuration Diagrams: Also referred to as typical section(s), these diagrams show usual roadway (or bridge) cross-sectional features including lane and shoulder widths, limits of surfacing, typical right-of-way limits, median width and slopes, and curb location and geometry.

1.0 Introduction

The following report provides the formal recommendation for the State Highway 29 corridor feasibility study extending from Southwestern Boulevard to SH 95 in Williamson County, Texas conducted by the Austin District of the Texas Department of Transportation.

According to TxDOT’s *Transportation Planning Manual*, “TxDOT performs feasibility studies to determine critical elements of engineering and the economic feasibility of a proposed facility/corridor. Typically, these studies focus on improvements to particular transportation facilities or corridors, including construction of a new highway route instead of adding capacity to an existing facility or adding a high-occupancy vehicle facility or express lanes to an existing roadway rather than adding main lanes. Such studies establish design concepts, general right-of-way requirements, and [general] project impacts.”

In addition, the following report summarizes Phase 1 of TxDOT’s Project Development Process as illustrated in the TxDOT Project Development Process Chart below (**Figure 1**). During Phase 1 TxDOT first identified and considered local planning features and then sought public input to develop potential alternative alignments to address proposed improvements to SH 29 and connecting facilities. This report provides a recommendation for the advancement of a route to be studied for future SH 29 improvements. This planning level study does not include the development of a final schematic or construction plans.

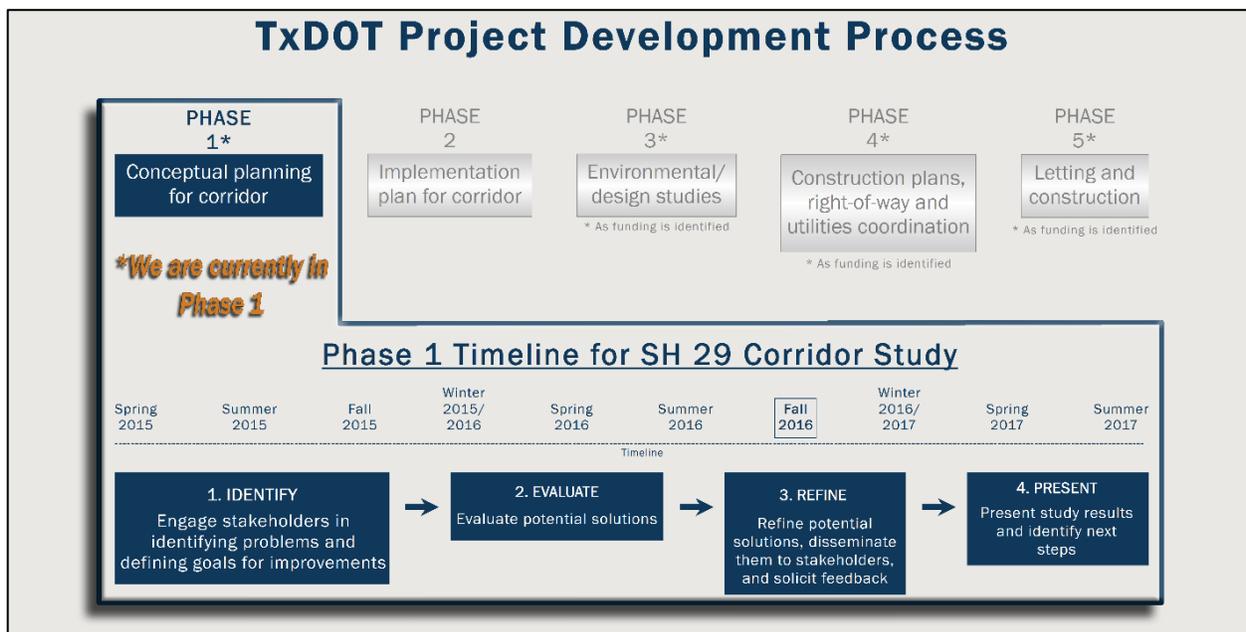


Figure 1. TxDOT Project Development Process

SH 29 is an east-west highway located in the central portion of Williamson County, a rapidly developing area. The existing SH 29 roadway typically consists of two 12-foot travel lanes (one in each direction) with variable width paved shoulders, and turn lanes at various locations. There are three major water crossings within the study area, which are the San Gabriel River, Smith Branch, and Mileham Branch. A map of the study area covering 15,419 acres is provided in **Figure 2**.

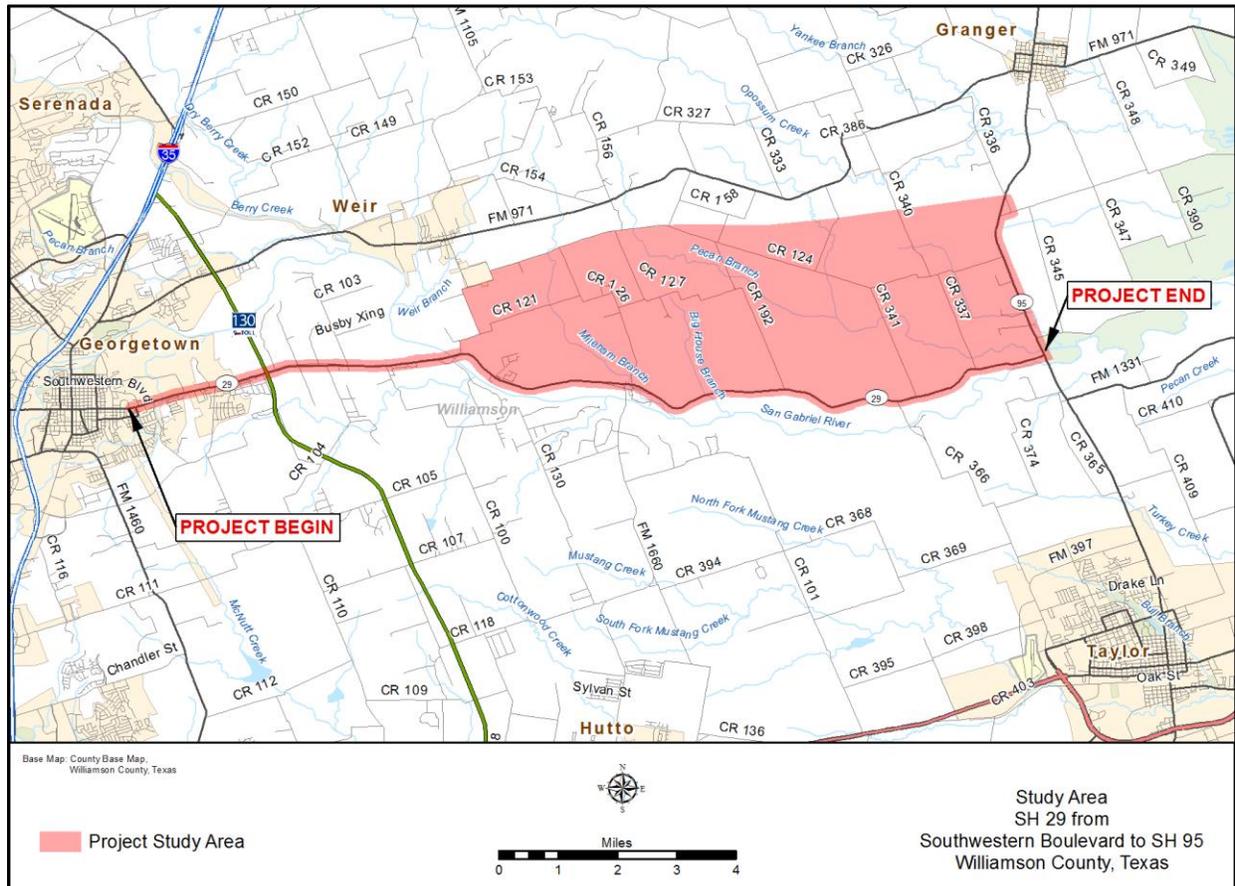


Figure 2. SH 29 Feasibility Study Area

The extreme western end of the study area is partially located within the extraterritorial jurisdiction (ETJ) of the city of Georgetown and exhibits urban development with residential subdivisions and commercial establishments. SH 130 crosses SH 29 1.7 miles east of Southwestern Boulevard. East of SH 130, adjacent land use is generally rural and used for agricultural and farming purposes.

The study area was further subdivided into an urban section and a rural section because of the different needs of the urban section (from Southwestern Boulevard to the San Gabriel River) versus the rural section (from the San Gabriel River to SH 95). The alignment for the urban section (**Figure 3**) has followed the existing facility throughout the study due to previously developed properties surrounding SH 29.

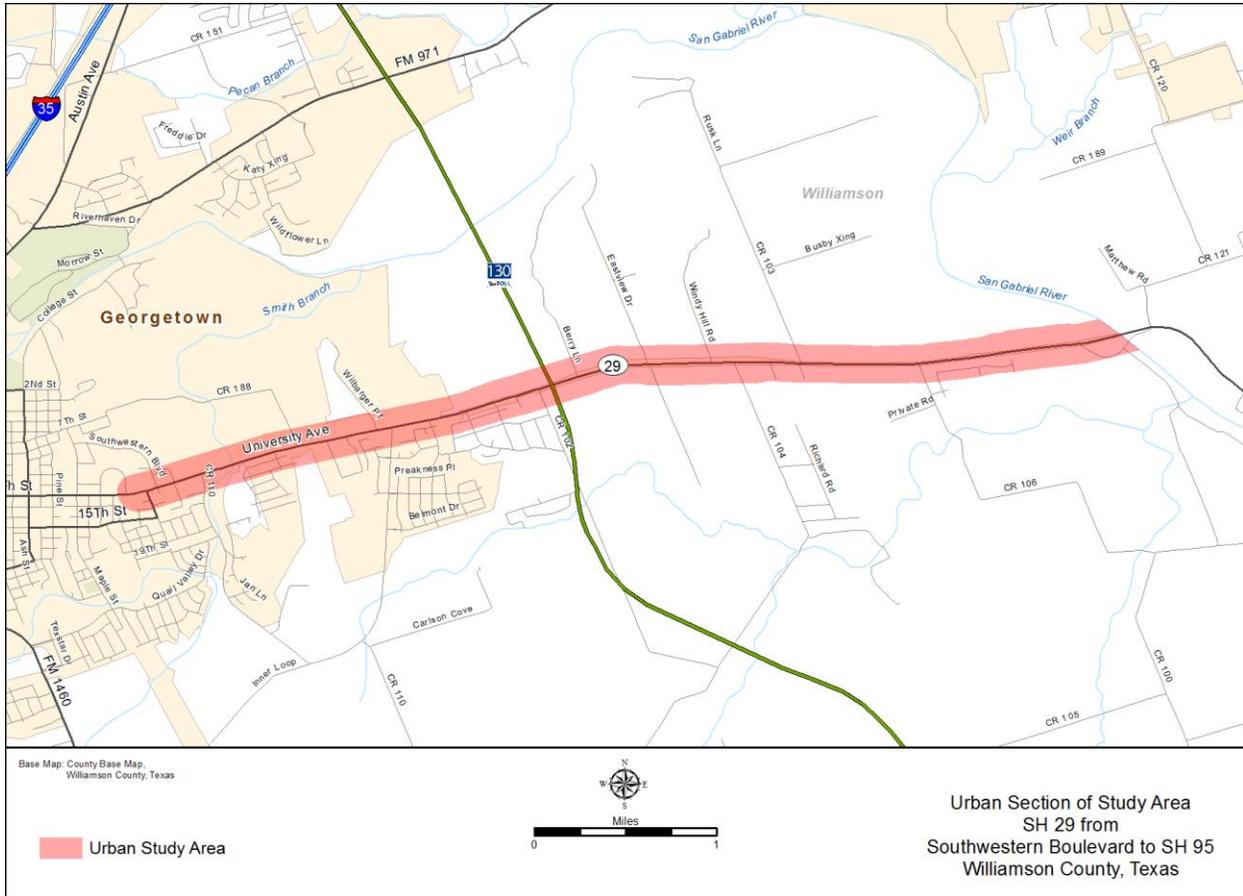


Figure 3. Urban Section of the Feasibility Study Area

East of the San Gabriel River, the rural section (**Figure 4**), land use trends are typically agricultural in nature with scattered residential developments. The existing SH 29 alignment east of the river crosses or is located within the floodplain for most of its length within the study area. The alternative alignments for the rural section were developed to avoid the existing floodplain to the maximum extent possible.

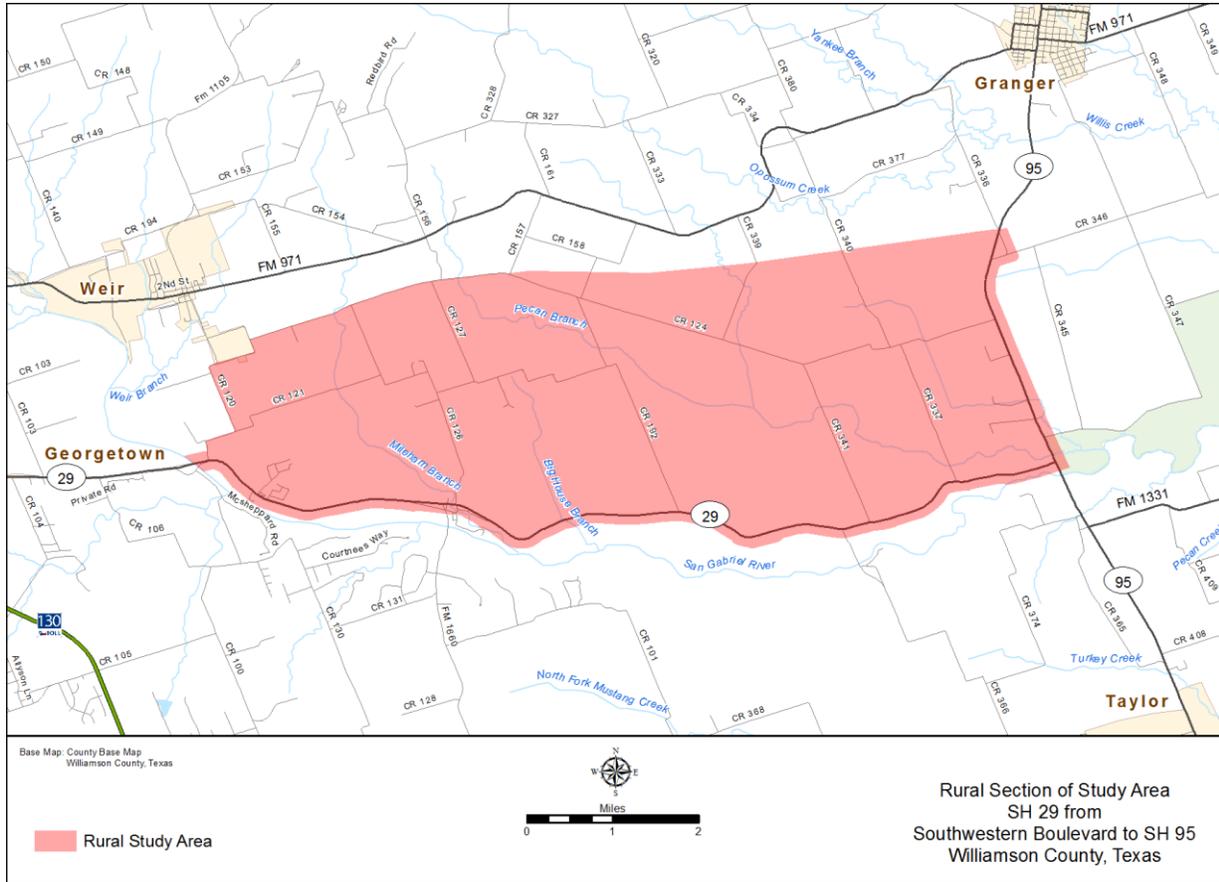


Figure 4. Rural Section of the Feasibility Study Area

Williamson County has developed the *Williamson County Long Range Transportation Plan*, which identifies road and transit improvements that should be built or improved over the next 25 years. The Plan identifies a new location for a controlled access roadway requiring a typical right-of-way width of 350 feet located east of the San Gabriel River and connecting to SH 95. The SH 29 corridor study was developed in consideration of this information. Throughout the study process, TxDOT has coordinated with Williamson County.

2.0 Purpose and Need

A purpose and need statement was developed to guide the study, identify deficiencies, and evaluate potential alternatives. This statement identifies what needs or problems exist for the transportation facility and what potential improvements could possibly be implemented to solve the problem or address the needs. The statement was used for identifying and comparing reasonable alternatives and in identifying a recommended solution.

The purpose of this study was to evaluate potential upgrades to the existing SH 29 roadway to meet current design standards and potentially provide a new location alignment between SH 130 and SH 95. Originally, SH 29 was constructed between 1932 and 1934. Since that

time, only routine maintenance or operational improvements have been made to the road. The existing roadway does not meet current design standards for the volume of traffic the facility currently carries.

The study is needed to address population growth and the resultant traffic growth, safety, flooding, and maintenance issues associated with the existing SH 29 roadway.

2.1 Population and Traffic Growth Projections

According to the U.S. Census Bureau, Williamson County is one of the fastest growing counties in the U.S. In 2000, the population of the Georgetown was estimated at 28,339, and by 2010, the population had reached 47,400, a growth rate of 67 percent. The population of Williamson County was approximately 250,000 in the year 2000. In 2010, the population was estimated at 422,679, a growth rate of 69 percent. According to the Texas Water Development Board, the population of Williamson County is expected to reach a population of approximately 987,500 by the year 2040 (Figure 5), and the city of Georgetown is expected to reach more than 114,000 people by 2040. With increased population comes increased traffic.

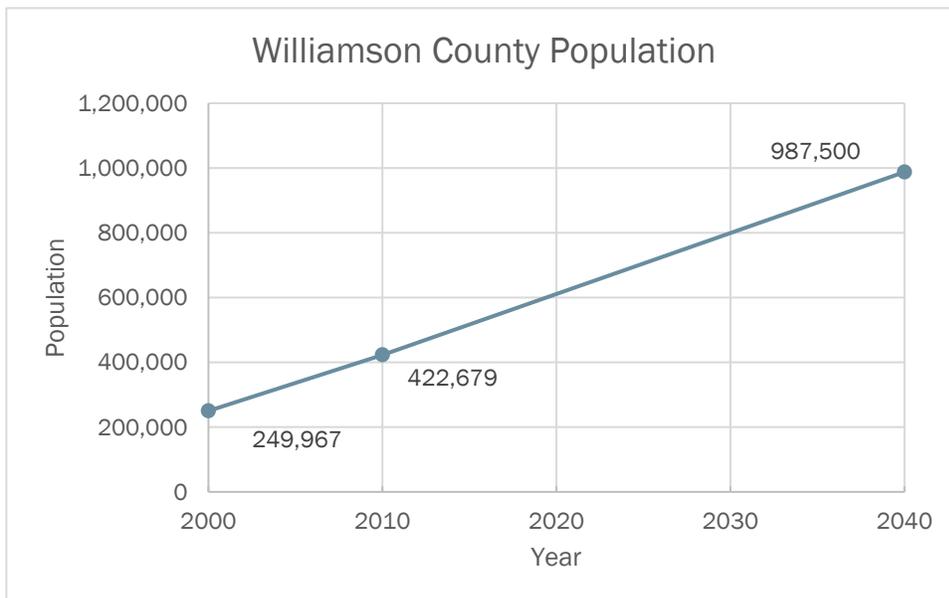


Figure 5. Population Growth in Williamson County

Source: U.S. Census Bureau, 2010; Texas Water Development Board, 2012.

To understand existing and future traffic demands, TxDOT's Transportation Planning and Programming Division conducted a study on existing traffic conditions and on future traffic projections for the SH 29 Corridor.

Between Southwestern Boulevard and CR 120, average daily traffic is projected to range from 25,700 to 27,100 vehicles per day (vpd) in the year 2045, with the higher vehicle numbers being closer to Georgetown. There would be a 95 percent increase between Southwestern Boulevard and SH 130, and a 221 percent increase between SH 130 and CR 120. The largest increase in traffic is anticipated to occur in the eastern portion of the study area, between CR 120 and SH 95. The 2015 average daily traffic for this section was 3,800 vpd and is projected to increase to 19,600 vpd by the year 2045, a 416 percent increase (Figure 6).

Location	2015 ADT*	2045 ADT**	Annual Growth
Southwestern Blvd. to SH 130	13,900	27,100	2.3%
SH 130 to CR 120	8,000	25,700	4.0%
CR 120 to SH 95	3,800	19,600	5.7%

Figure 6. SH 29 Average Daily Traffic.

Source: *TxDOT, **2040 CAMPO Model with Growth Rate

Forecasted truck percentages along the corridor are also expected to increase. Between Southwestern Boulevard and CR 104, truck traffic is anticipated to increase from 2.1 percent in 2015 to 10.7 percent in 2045, which is five times more compared to 2015 truck percentages. The remainder of the study area is projected to increase to approximately 15 percent trucks for the year 2045 (Figure 7).

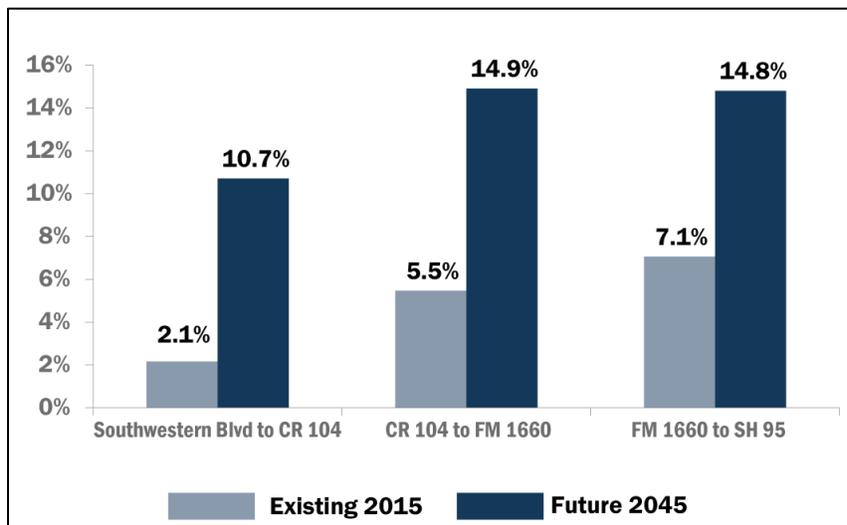


Figure 7. Existing and Forecasted Truck Traffic Percentages along SH 29

Source: Existing – 2015 peak hour turning movement counts;
 Future – TxDOT Statewide Planning Map

Improvements to the roadway are needed to accommodate increased traffic volumes resulting from the past and future projected population growth in the city of Georgetown and Williamson County. The existing road does not meet current design standards for the volume of traffic the road currently carries and the projected traffic volume it would carry in the future.

2.2 Existing Roadway Safety

The increase in traffic volumes has led to an above average crash rate on the roadway. TxDOT also evaluated crash data and found that in the study area the crash rate on SH 29 exceeds the statewide average rates for rural state highways. Data from the TxDOT maintained Crash Records Information System (CRIS) between 2011 and 2013 shows the crash rate per 100 million vehicle miles travelled in the study area for SH 29 is higher than the statewide average crash rate, as seen in **Figure 8**. (At the beginning of the study, data for the year 2014-2017 were not available.)

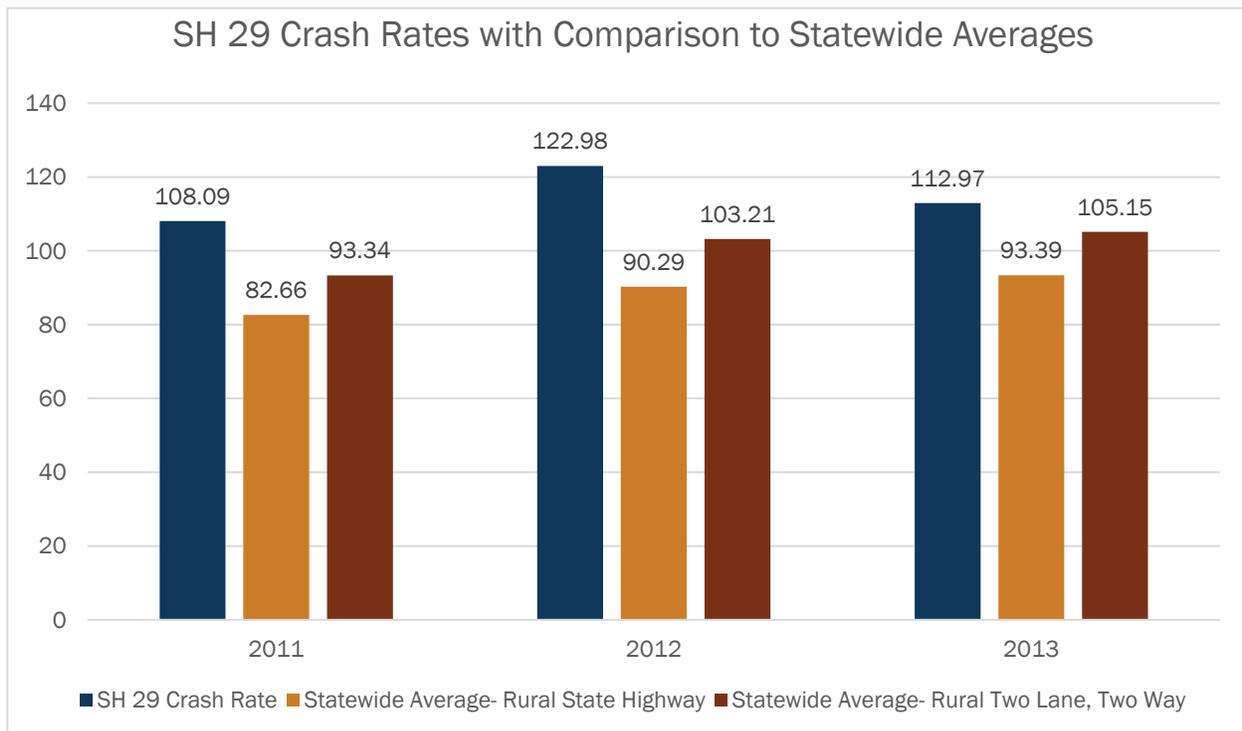


Figure 8. Crash Rates

Source: TxDOT Maintained Crash Records Information System, 2014

In addition to an above average crash rate, the absolute total number of crashes has increased along SH 29 in the study area as well. In 2011 there were 24 crashes, in 2012 there were 28 crashes, in 2013 there were 27 crashes, and in 2014 there were 33 crashes (**Figure 9**).

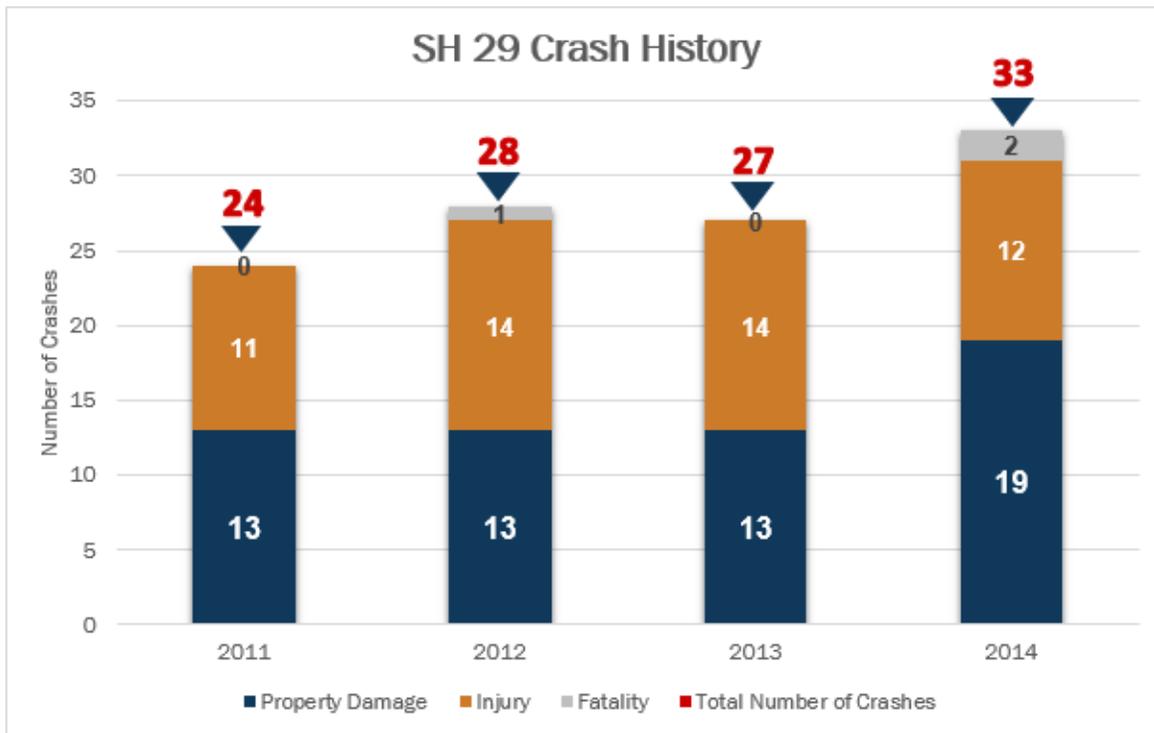


Figure 9. SH 29 Crash History

Source: TxDOT Maintained Crash Records Information System, 2014

The existing SH 29 roadway does not currently meet design standards. Some examples of how the existing SH 29 roadway does not meet design standards are as follows:

- Sharp horizontal curves that require vehicles to slow down to safely negotiate them
- Lack of full width shoulders that allow vehicles to recover from errant driving and provide areas for turning vehicles to slow down out of the main travel lane prior to turning
- Structure crossings that contain obsolete design and layouts of metal beam guard fence (MBGF) and safety end treatments
- Large trees and other objects located inside the clear zone that do not allow for areas of recovery for errant vehicles

2.3 Flooding and Maintenance

Portions of the existing SH 29 roadway are located within the 100-year floodplains of the San Gabriel River, Mileham Branch, and Smith Branch. As a result, floodwaters occasionally overtop the roadway. This contributes to the flooding and maintenance issues that SH 29 currently experiences. The blue shading on the floodplain map (**Figure 10**) shows the

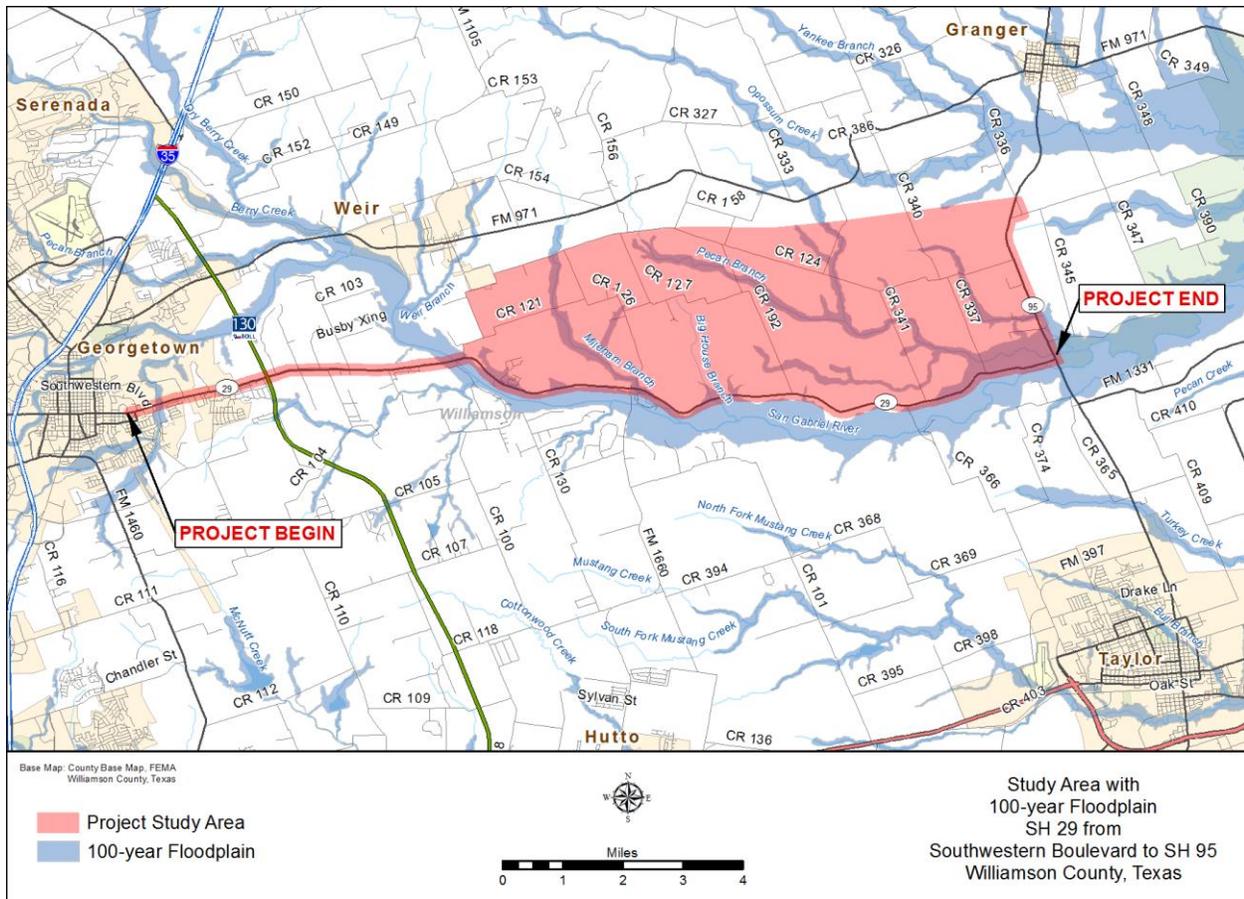


Figure 10. SH 29 Study Area Floodplains Map

100-year floodplain in relation to SH 29, and illustrates what areas of the existing road are located within the floodplain. One of the goals and objectives of this study is to avoid and/or minimize flooding issues.

Between March 2015 and June 2016, there were a total of 27 flood maintenance reports over this 16-month period. Twenty-three cases resulted in water over the roadway, and four cases resulted in the roadway being closed due to high water. Water over the roadway has caused various issues such as travel delays, reduction in usable lanes, and the need to use alternative routes. In addition, dirt and debris over the roadway were reported numerous times during rain events, and during one flooding event an advisory warning discouraged the use of the route.

During the study, TxDOT evaluated correcting flooding issues for the existing SH 29 roadway. After analyzing several options for adding fill into the floodplain, it was determined that would not be practical, for the following reasons: cost, permitting requirements with Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers, and potential increases in flooding issues resulting from construction.

3.0 Goals and Objectives

After the study's purpose and need were identified, study goals and objectives were established to help aid in the development of alternative alignments and to ensure that all of the study's priorities were met. A working set of goals and objectives were developed by staff in preparation for the first open house public meeting and were adjusted based on public input. Public concerns and input were similar to those previously developed by the project team.

The main objective of the SH 29 corridor feasibility study was to identify a recommended alternative that would best meet the purpose and need for the project and fulfill the goals and objectives of the study. Objectives include upgrading SH 29 to meet current design standards and moving the route out of the 100-year floodplain. Further goals and objectives are:

- Avoid and/or minimize impacts to parcels and residential properties
- Utilize existing county or state right-of-way where possible
- Avoid and/or minimize flooding issues
- Minimize bridge structures
- Avoid and/or minimize impacts based on constraints identified
- Avoid impacts to cemeteries

4.0 Facility Type

SH 29 is classified as a principal arterial/rural arterial road based on its traffic volume and function. The design speed for this project was determined to be 60 miles per hour (mph) from Southwestern Boulevard to the San Gabriel River (urban section) and 70 mph from the San Gabriel River to SH 95 (rural section). These two elements determined the desirable design criteria such as horizontal and vertical curves, grade, and clear zone requirements.

The typical roadway configuration was determined from several resources. The number of lanes needed to accommodate the future traffic was based on a traffic analysis. TxDOT consulted with Williamson County and determined that any improvements should match the typical roadway configurations in the *Williamson County Long Range Transportation Plan*. This resulted in a 350-foot right-of-way needed for the study corridor. There would be three lanes in each direction in the rural section. The urban section would have curb and gutter and a narrow raised median. The raised median was selected due to the number and type of crashes, and the anticipated increase in future traffic volumes that would require the need to provide safe turning movements at controlled locations. The rural section would have 10-foot shoulders and a wide median. To accommodate pedestrian and bicycle users, a 10-foot shared use path is proposed for both sides of the roadway.

Various engineering constraints were used to evaluate each alternative alignment. Alternatives would utilize the existing right-of-way as much as possible and therefore minimize the amount of new right-of-way required. Wherever new right-of-way was needed, the alignment was designed to minimize impacts to residential and commercial structures. The alignments were also designed to avoid and/or minimize impacts to the environmental constraints identified during project development. Several stream crossings with large floodplains are located within the study area. The designs would minimize the amount of earthwork in the floodplain, as well as limit the number and length of bridges needed at each crossing. Major utility crossings, such as electrical transmission lines, are also an engineering constraint and thereby influenced the alignments of the roadway to avoid impacts and the need for relocations.

5.0 Public Outreach

From the beginning of the study, TxDOT has sought to include public input as a crucial component into the corridor study process. Three public meetings were conducted over a year-and-a-half time span, with time in between the meetings for refinement of the alternative alignments, in an effort to include as much public input as possible. Public comments were taken into consideration and guided the goals and objectives of the study.

5.1 Open House Public Meeting #1

The first open house public meeting was held on September 1, 2015 and introduced the SH 29 feasibility corridor study to the public. Public meeting notices were sent to property owners within the study area and elected officials. Notices announcing the meeting were published on TxDOT's website and in local newspapers. Notices of the first open house public meeting were published in the *Taylor Press* on August 19, 2015, and the *Williamson County Sun* on August 21, 2015.



SH 29 first open house public meeting.

Displays at this meeting included study area maps, environmental constraint maps, the purpose and need statement, existing and proposed typical sections, existing and projected traffic volumes, level of service

information, crash history, and forecasted truck percentage information. No alternative alignments were presented at this meeting.



Consultants and TxDOT staff were available to answer questions. One of the goals of the first meeting was to receive public input on previously unidentified environmental constraints within the study area.

Members of the public examining exhibits presented at the first open house public meeting.

Approximately 107 people attended the meeting. A total of 45 written comments were received, including 19 comments that were hand written on meeting exhibits.



Consultants and members of the public discussing the exhibits presented at the first open house public meeting.

A summary of comments received are presented in **Figure 11**. Most comments discussed safety, flooding, and impacts to homeowners. After the first public meeting, comments were evaluated and alternative alignments were developed for the study.

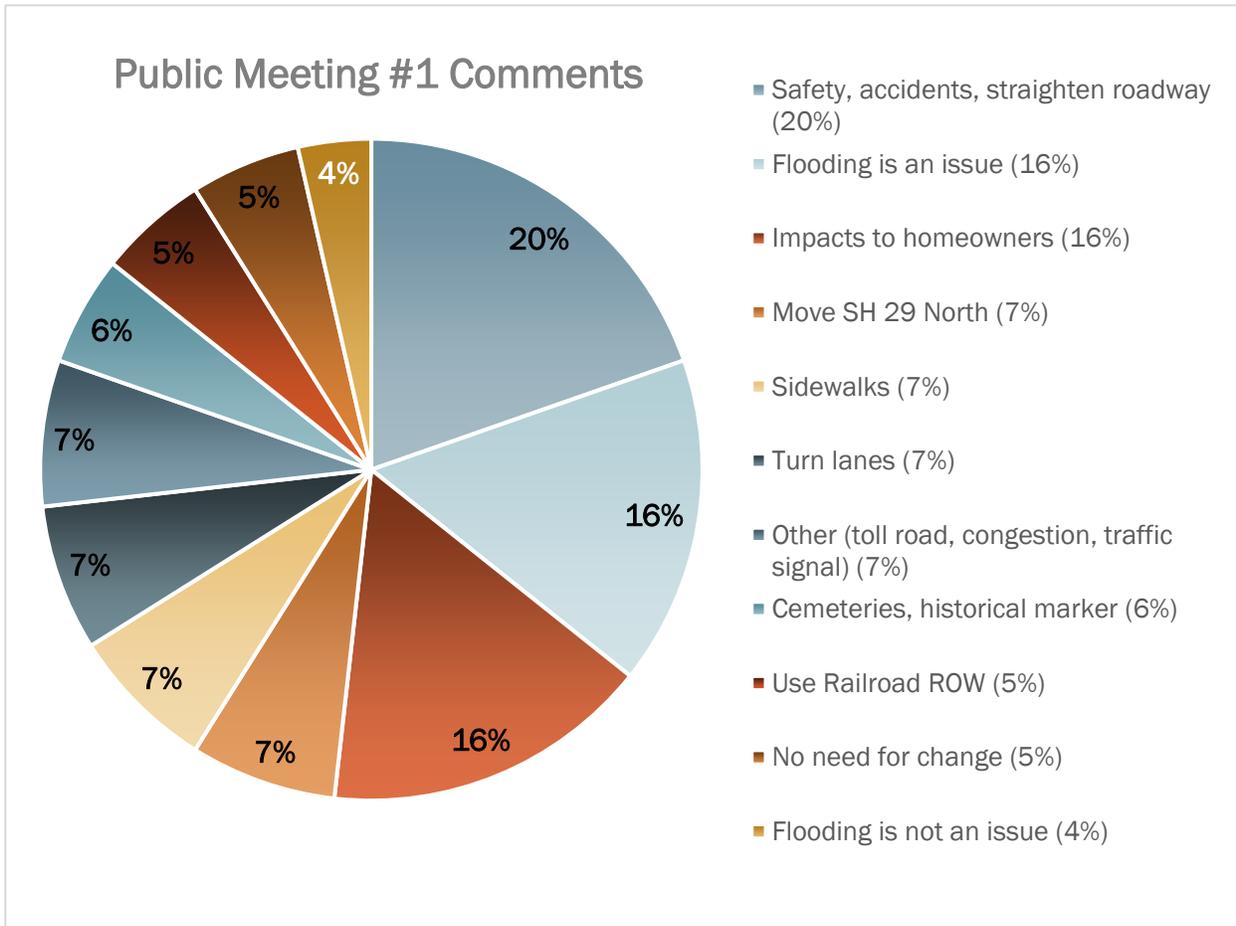


Figure 11. Summary of Public Meeting #1 Comments Received

5.2 Public Meeting #2

Before the second open house public meeting, the project team developed alternative alignments taking into consideration public input gathered as a result of the first public meeting. Efforts were made to utilize existing right-of-way where feasible, minimize impacts to parcels and structures where possible, and move the road out of the floodplain where possible. Every attempt was made to develop alternative alignments that followed existing property boundaries to avoid dividing parcels. For the second public meeting, public meeting notices were sent to property owners within the study area and elected officials. Notices announcing the meeting were published on TxDOT’s website and in local newspapers. The notices were published in the *Williamson County Sun* on April 20, 2016, and the *Taylor Press* on April 24, 2016.

The second open house public meeting was then held on May 10, 2016, to present the three feasible alternative alignments that were developed. These were named A (also known as A-A1-C), A-A1-D, and D. Any alternative alignments placed between Alternatives A and D would have resulted in increased impacts to residential properties. Expanding the existing SH 29 east of the San Gabriel River crossing was considered; however, it was determined to have more impacts to floodplains and residential and commercial properties, compared to the other three alternative alignments. Expanding the existing roadway east of the river could not be accomplished while minimizing additional bridge structures that would need to be constructed.



SH 29 second open house public meeting.

Approximately 175 people attended the meeting. After the meeting, TxDOT summarized all comments received within the comment period. A total of 103 written comments were received during the meeting and following comment period, including six comments written on the exhibit presented at the meeting, which was displayed on tables.

A summary of comments received are presented in **Figure 12**. Most comments discussed impacts to homeowners and/or farms, pro Alternative D/against Alternative A, and flooding. After the second public meeting, comments were summarized and evaluated.



Consultants and members of the public discussing exhibits presented at the second open house public meeting.

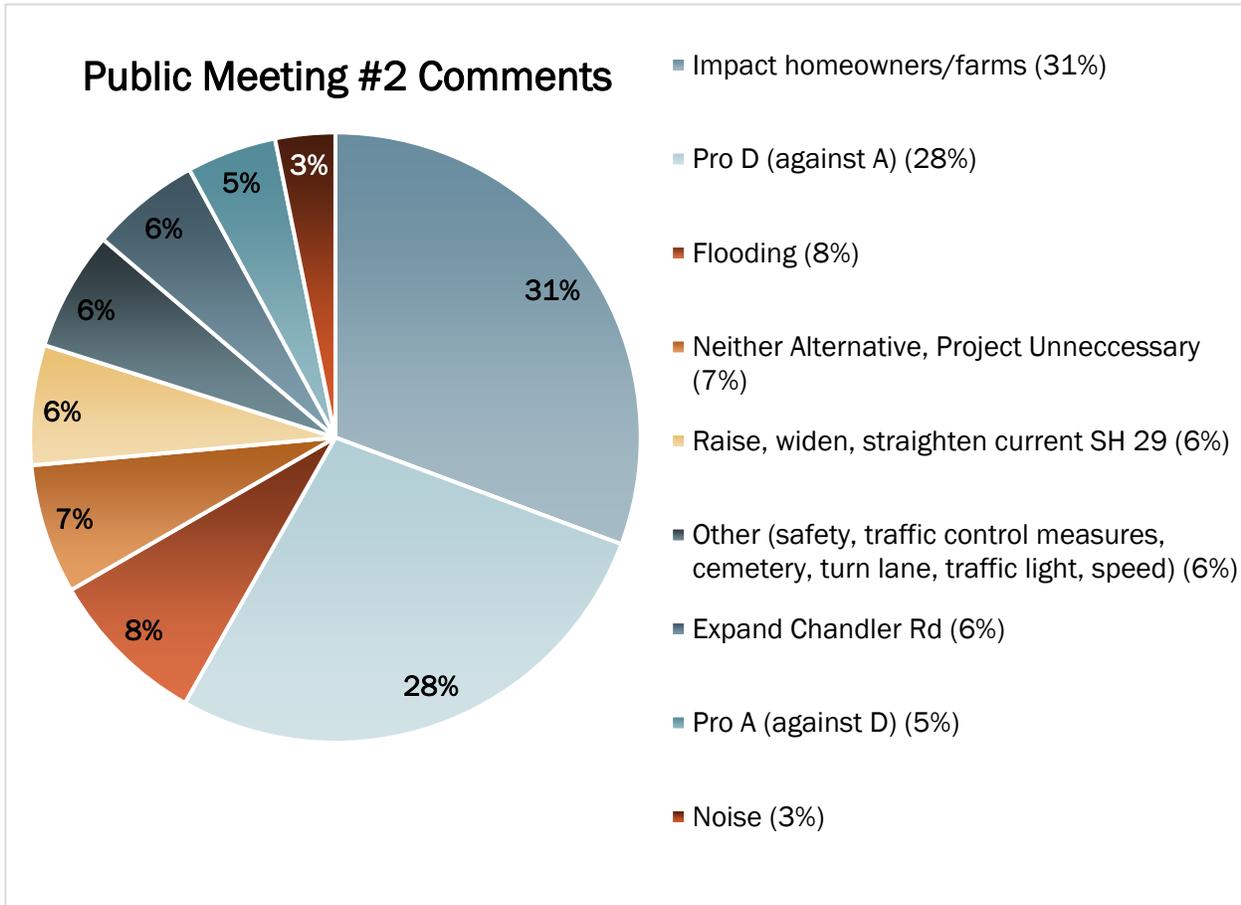


Figure 12. Summary of Public Meeting #2 Comments Received

5.3 Public Meeting #3

Based on comments received after the second meeting, it was determined that a third public meeting was needed to inform the public of the study process and provide another opportunity for public comments.

The third open house public meeting was held on November 10, 2016. This meeting included a presentation and open house. TxDOT provided a PowerPoint presentation with an overview of the SH 29 feasibility study, a summary of the purpose and need statement with supporting information, a summary of public comments received after meetings one and two, and a matrix providing a comparison of alternatives and anticipated impacts. In addition to the three alternative alignments, the matrix and environmental displays included Alternative E. This alternative is located along the existing SH 29 alignment, and was included based on public input from the second meeting.

For the third public meeting, public meeting notices were sent to property owners within the study area and elected officials. Notices announcing the meeting were published on TxDOT's

website and in local newspapers. The notices were published in the *Williamson County Sun* on October 29, 2016, and in the *Taylor Press* on October 30, 2016.

Approximately 221 people attended the public meeting. A total of 96 written comments were received during the meeting and the following comment period, including 36 comments written on the roll plots by the public.



Presentation given at the SH 29 third public meeting.

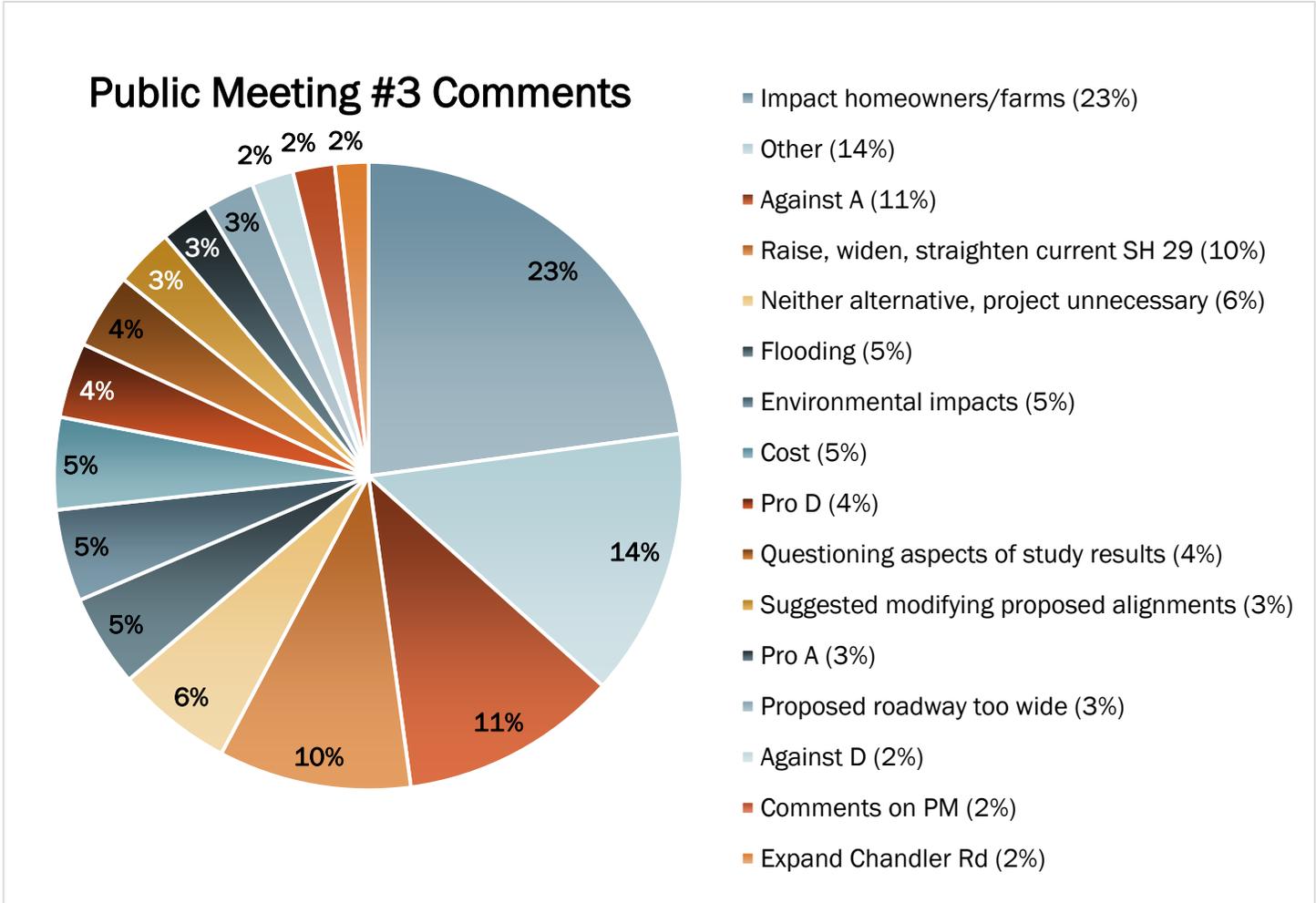


Figure 13. Summary of Public Meeting #3 Comments Received

A summary of comments received are presented in **Figure 13**. Most comments discussed impacts to homeowners and/or farms, against Alternative A, and improving the existing SH 29 corridor. After the third public meeting, comments were summarized and evaluated.

6.0 Alternative Alignments Evaluation

Following the first SH 29 open house public meeting, five possible alternative alignments were developed. On September 3, 2015, the project team presented the preliminary alternative alignments and an evaluation matrix to TxDOT for consideration. The alternative alignment corridors were 300-feet in width. Based on input TxDOT received from Williamson County, the corridors were then expanded from 300-feet to 350-feet wide to match *Williamson County's Long Range Transportation Plan*.

Development of alternative alignments was based on the purpose and need, design goals and objectives, and public input. Some concepts were dismissed early in the study due to fatal

flaws. The concepts to use FM 971 (to the north of the study area) and Chandler Road (to the south of the study area) were eliminated due to their location outside the study area, and the fact that these roadways serve different travel sheds. Using the railroad right-of-way north and parallel to FM 971 as the alignment was suggested at public meetings; however, the Georgetown Railroad is located outside the study area and serves a different travel shed, and was therefore eliminated from consideration.

The public did provide alignment concepts that were within the northern, central, and southern portions of the study area. The team designed alternative alignments that were similar to those drawn by the public. The public also had comments concerning upgrading the existing SH 29 roadway. The team developed one alternative alignment for this option.

All of the first five alignments in the rural section avoided impacting the David Sackville Cooke Historic Texas State Cemetery, located east of the river. After the presentation of the first preliminary alternative alignments and evaluation matrix to TxDOT, more combinations of these primary alternative alignments were developed, resulting in 10 possible alternative alignments (Figure 14).

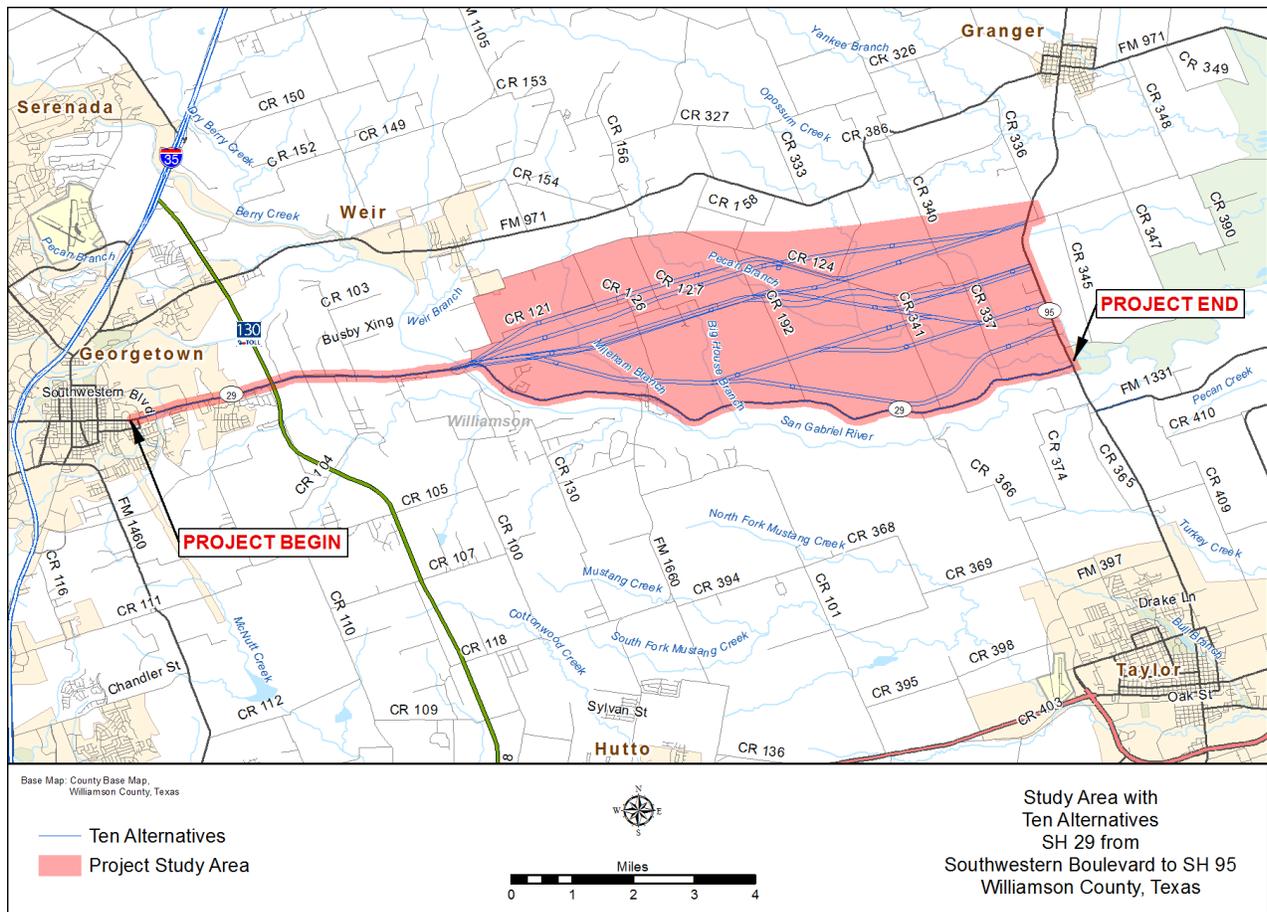


Figure 14. Preliminary Alternative Alignments

For evaluation purposes, the alternative alignments were split into two areas: from Southwestern Boulevard to the San Gabriel River (or the urban section), and from the San Gabriel River to SH 95 (or the rural Section).

The alignment for the urban section has followed the existing roadway throughout the study due to previously developed properties surrounding SH 29 (Figure 15). The proposed typical roadway configuration for the urban section would consist of four 12-foot-wide travel lanes, with two lanes in each direction separated by a variable width center turn lane. The roadway would include 10-foot-wide outside shoulders flanked by a 10-foot-wide shared use path on both sides.

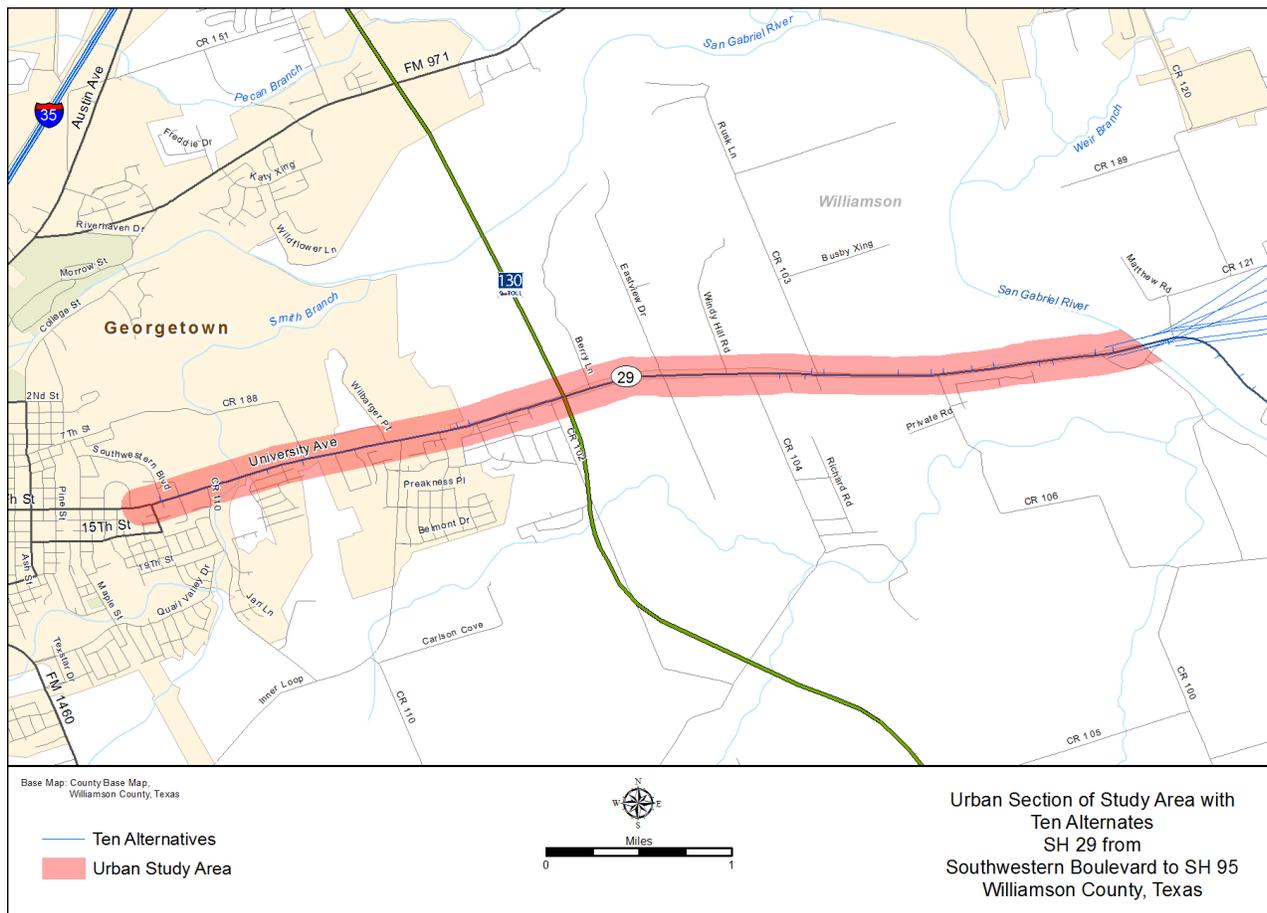


Figure 15. Urban Section

Typical roadway configuration diagrams are illustrated in Figure 16. The design incorporates the future needs of connecting streets such as Inner Loop and SH 130. The design for each connection considers turning movements and the number of lanes needed.

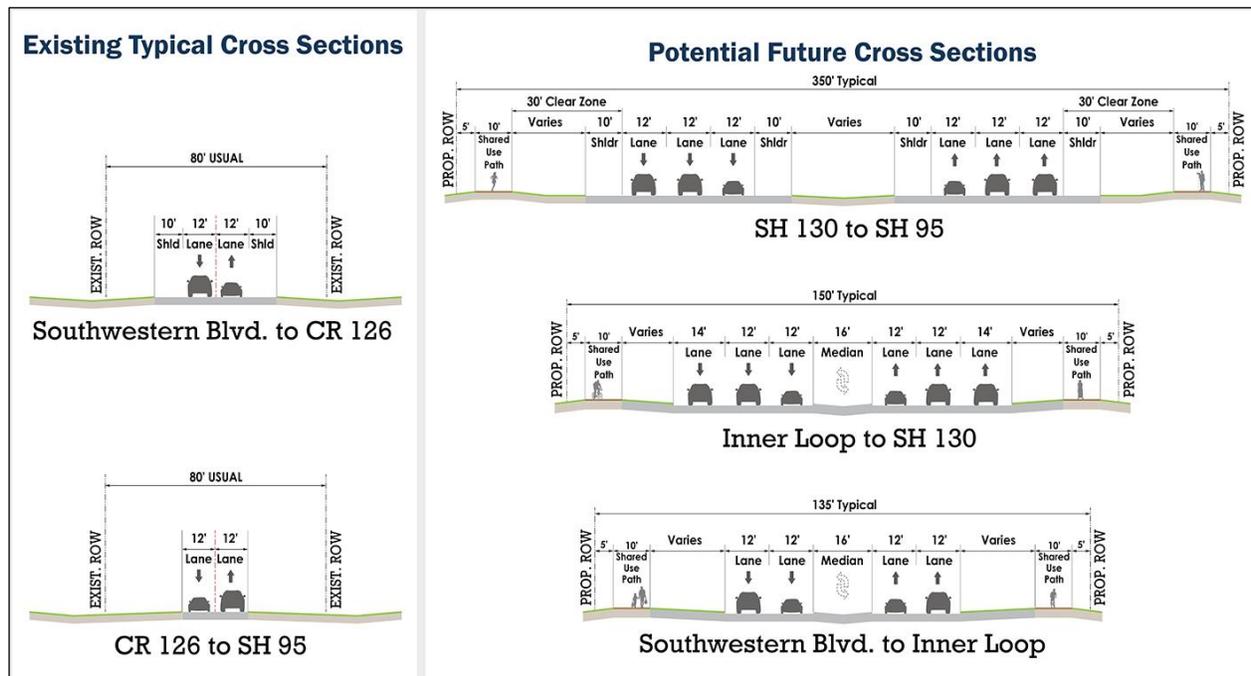


Figure 16. Typical Roadway Configuration

The proposed typical roadway configuration for the rural section would consist of six 12-foot-wide travel lanes, with three lanes in each direction separated by a variable width grassy median. The roadway would include 10-foot-wide inside and outside shoulders, flanked by 10-foot-wide shared-use paths on each side.

6.1 Preliminary Alternatives Summary

The project team developed a total of 10 preliminary alternative alignments for the rural section of the study area (**Figure 17**). From the San Gabriel River to SH 95, the goal of all the alternative alignments was to minimize impacts to area homes, landowners, and the environment, while also providing a cost-effective design that meets current design standards. Constructing additional bridges would result in additional costs for any new location alternative. The additional needed bridges on some alternative alignments resulted in those alignments being eliminated.

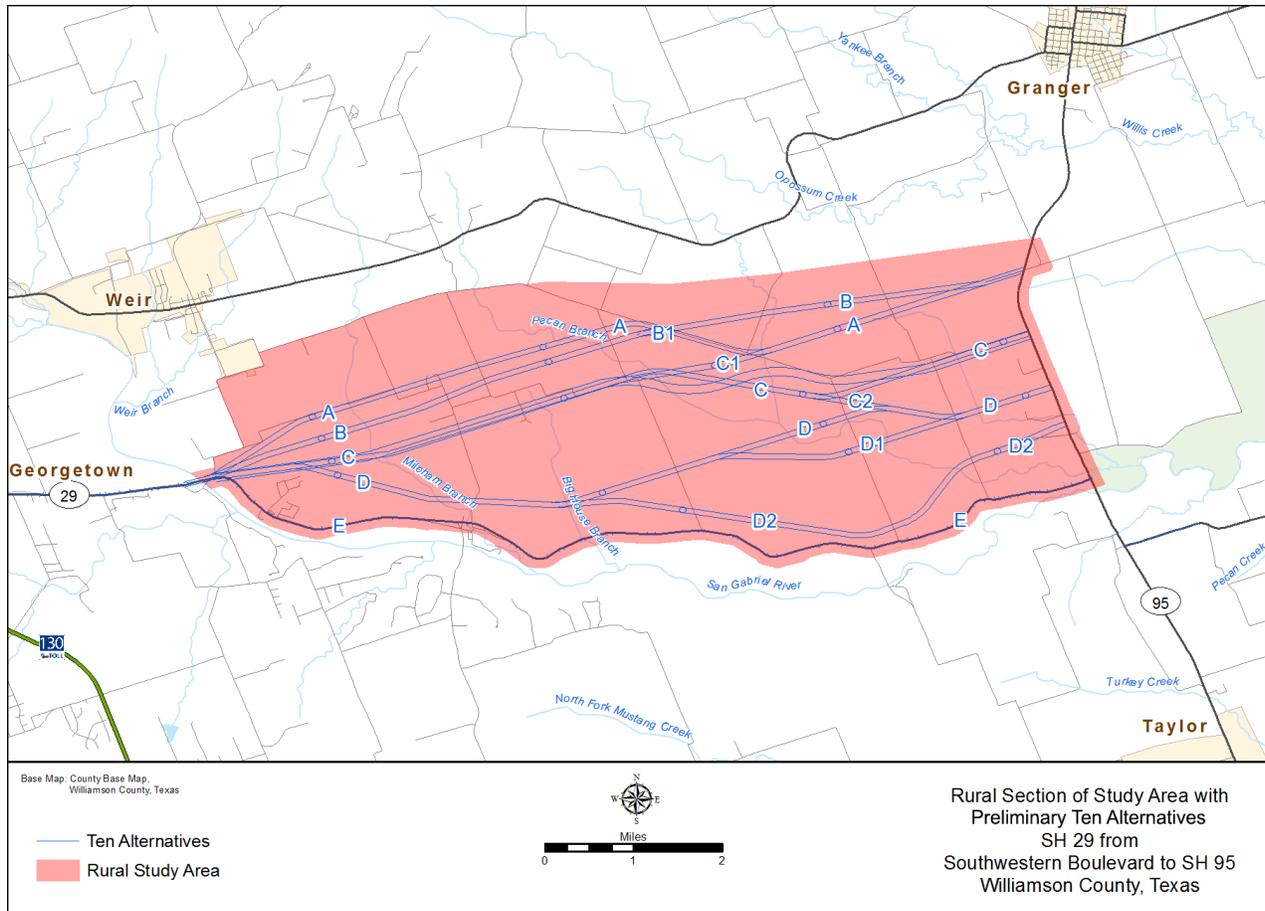


Figure 17. Rural Section

Alternative A would utilize existing county right-of-way on CR 121 and CR 124; however, this alignment would require a longer bridge over Pecan Branch which was not desirable and would result in displacing a residential property. Alternative B was similar to Alternative A and required a lengthy bridge over Pecan Branch; therefore, it was not considered desirable. Like Alternative A, Alternative B would displace a residential property.

The eastern limits of Alternatives A and B were not preferable because they would connect with SH 95 in a less than desirable horizontal curve, resulting in limited sight distance at intersections. Alternatives A and B allow for a future connection with CR 346 to the east, but it was determined that there was not a future need to extend SH 29 to the east, and Granger Lake would be a constraint to all potential roadways extending east in this area.

The western portion of Alternative C was eliminated as it would result in more impacts to outbuildings such as barns and feed troughs, than the other alternative alignments. The eastern limit for Alternative C was acceptable; however, Alternative C1 would terminate at CR 346 and connect to SH 95 in a less than desirable horizontal curve.

Alternatives D/D1 were determined feasible. Alternative D1 was desirable, as only one bridge would be needed to cross Pecan Branch and it had acceptable geometry at the eastern limit. Furthermore, no residential displacements were anticipated with Alternatives D or D-D1-D.

Alternative D2 was not preferred, because the endpoint at SH 95 would be located in the floodplain.

Alternative E, which follows the existing SH 29 alignment, did not meet a goal of the project, which is to move the roadway out of the floodplain. It would also not meet the goal of upgrading the SH 29 roadway to design standards. Furthermore, it would result in more residential impacts than the other alternatives because the area adjacent to the existing facility is more developed than the other alternatives.

6.2 Preliminary Alternatives Eliminated/Refined, and Renamed

The 10 rural section alternative alignments were screened by the project team and narrowed down to four final alternatives plus the No-Build option. These alternatives were relabeled and renamed and are described below. Refinement of the alternative alignments were based on the purpose and need, design goals and objectives (such as moving the roadway out of the floodplain), and avoiding and/or minimizing impacts to previously identified constraints.

The final four build alternative alignments plus the No-Build alternative were presented at the third public meeting (**Figure 18**).

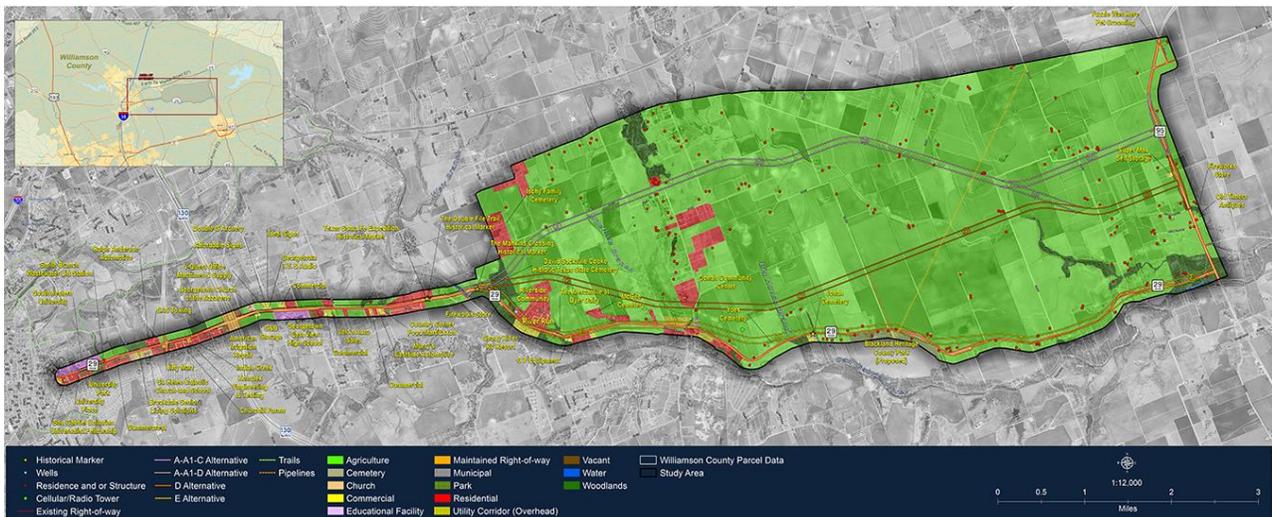


Figure 18. Final Alternative Alignments

Alternative A (also known as A-A1-C): This alternative is the northernmost alignment under consideration for the SH 29 study. It has a length of 13.2 miles and would require 386 acres of new right-of-way. Along Alternative A, the following displacements are anticipated: four

houses, one eight-plex (apartment complex), one storage unit facility, one barn, and one abandoned barn (**Figure 19**).

Alternative A-A1-D: This alternative is similar to Alternative A, except this alternative connects to SH 95 south of Alternative A-A1-C. This alternative has a length of 13.3 miles and would require 399 acres of new right-of-way. Along Alternative A-A1-D, the following displacements are anticipated in the rural section: four houses, one eight-plex (apartment complex), two storage unit facilities, one barn, and one abandoned barn

Alternative D: This alternative is located just north of SH 29. It has a length of 13.1 miles and would require 407 acres of new right-of-way. Along Alternative D, the following displacements are anticipated in the rural section: one house, one eight-plex (apartment complex), two storage unit facilities, and one abandoned house.

Alternative E: This alternative is located along the existing SH 29 alignment. It has a length of 13.7 miles and would require 348 acres of new right-of-way. Along Alternative E, the following displacements are anticipated in the rural section: four houses, one eight-plex (apartment complex), one storage unit facility, 14 mobile homes, one maintenance building, one cell tower, two barns, one transmission tower, one old log cabin, one commercial building, and one office.

Matrix/ Comparison of Alternatives						
	Unit of Measure	A	A-A1-D	D	E	No-Build
Meets Purpose and Need	Yes/ No	Yes	Yes	Yes	Yes	No
Length	Mile	13.2	13.3	13.1	13.7	0
Proposed ROW	Acre	386	399	407	348	0
Residential Displacements	Number	5	5	3	20	0
Commercial Displacements	Number	1	2	2	3	0
Other Structure Displacements	Number	2	0	2	6	0
Parcels Impacted	Number	129	145	142	220	0
Bisected Properties	Number	10	14	24	6	0
Floodplain Impacts	Acre	30	34	38	199	0
Prime Farmland Soils Impacts	Acre	326	338	359	358	0
Impacts to Woodlands	Acre	12	15	16	37	0
Potential Impacts to Parks	Acre	0.2 (Trail Use)	0.2 (Trail Use)	0.2 (Trail Use)	7.3 (Blackland Heritage Park-Proposed)	0

Figure 19. Comparison of Alternatives Matrix

7.0 Recommended Alternative

As seen in the Comparison of Alternatives Matrix above, the four alternative alignments and the no-build scenario were evaluated.

The engineering constraints, such as corridor length, earthwork in the floodplain, and number and length of bridges, are similar between Alternatives A, A-A1-D, and D. The only engineering constraint that has a slight difference is public ROW. Since Alternative A follows along county

roads for a significant length, and Williamson County is open to transferring the needed right-of-way to TxDOT at no cost, this would provide a cost savings to TxDOT.

Alternative D would have the least amount of residential displacements and would be the shortest alternative alignment, however, it requires the most amount of proposed ROW, has the most amount of bisected properties, and has the most impacts to prime farmland soils.

Alternative A-A1-D was similar to Alternative A in alignment and impacts, however, Alternative A-A1-D would result in slightly more impacts to commercial properties, parcels, floodplains, prime farmland soils, and woodlands when compared to Alternative A. Alternative A-A1-D also required more additional right-of-way than Alternative A.

Alternative E would have the least amount of additional right-of-way required and bisected properties, however, it would have the most residential, commercial, and other structure displacements; most impact to parcels; floodplain impact; impact to woodlands; and impact to parks. Alternative E would also be the longest alternative alignment. Since the east end of the existing SH 29 has over a mile of roadway located inside the floodplain, the vertical grade would need to be raised by approximately six feet. An equal amount of fill needed within the floodplain to raise the roadway would have to be removed in other areas of the floodplain to meet permit requirements. With a right-of-way width of 350 feet and a new fill of six feet, this would be a significant amount of fill and would require an extensive permitting process. It would most likely require additional right-of-way along the existing roadway to remove equal amounts of fill. The team considered retaining walls and bridging options to minimize the amount of earthwork in the floodplain. These options come at a higher cost for construction than traditional roadway, and present access issues with the adjacent property owners. The retaining walls and bridges would need to connect with local streets and all driveways. The design could accommodate the current situation, but as development moves into the area, it would require special design to provide gaps in the retaining walls or bridges to supply new access points. This would be cost prohibitive and require qualified TxDOT inspectors to monitor construction for driveway access. The retaining walls would need to be specially designed and constructed with select materials suitable for floodplains which would result in a higher cost than traditional retaining wall construction.

The No-Build option does not meet the purpose and need for the feasibility study to upgrade the roadway to current design standards, accommodate existing and projected traffic volumes, improve safety, and address roadway flooding.

Based on the anticipated impacts, purpose and need statement, and goals and objectives, it was determined that Alternative A would be more favorable when compared to all other build alternatives considered. Alternative A would meet the purpose and need of the study, while resulting in the least amount of impact to land parcels, floodplain, prime farmland soils and

woodlands. Alternative A would also address safety, by constructing a new highway that would meet current design standards, while removing the roadway from the floodplain, thus addressing flooding issues. Therefore, it is recommended that Alternative A advance into Phase 2 for environmental study and detailed engineering.

8.0 Next Steps

This is a planning level study and no construction funds have been identified as of May 2017. Should the study be advanced into the NEPA phase of project development, additional environmental study, alternatives evaluation, schematic development, and public involvement would be undertaken. Should it be determined during the NEPA process that the best alternative is one that provides for a new location alternative, the existing SH 29 facility would be left in place and maintained to provide access to adjacent property owners.

9.0 References

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