

# Transportation Commission

---



April 8, 2025  
Town Hall  
2121 Cross Timbers Road  
Flower Mound, TX 75028

6:30 p.m.

## AGENDA

### A. CALL TO ORDER

### B. PLEDGE OF ALLEGIANCE TO THE AMERICAN FLAG

### C. PUBLIC COMMENT

The purpose of this item is to allow the public an opportunity to address the Board/Commission regarding any item on this agenda that is not a "Public Hearing." Issues regarding daily operational or administrative matters should first be dealt with by calling Town Hall at 972- 874-6000 during business hours. To speak to the Board/Commission during public comment, please fill out a comment form, which is located in the lobby of Town Hall.

In accordance with the Texas Open Meetings Act, the Board/Commission is restricted from discussing or acting on items not listed on the agenda.

- Speakers are limited to 3 minutes; a tone will sound at 30 seconds left and when time has expired, and times may be adjusted by the Chair depending on the number of speakers.
- Speakers must address their comments to the Board/Commission.
- Please state your name and address when speaking.

### D. ASSISTANT DIRECTOR REPORT

1. Update status report related to operational issues, capital improvement projects, and TxDOT projects
2. Future Transportation Commission meeting dates - May 13th
3. Future Agenda Items
4. Proposed Fairway Drive project - Summer closure
5. Annual Commission reporting by Chair/Vice Chair to Town Council - May 15
6. North Central Texas Council of Governments (NCTCOG) - Promote a regional bicycle safety survey of citizens

**E. CONSENT ITEM(S)**

This part of the agenda consists of non-controversial, or “housekeeping” items required by law. Items may be removed from Consent by any Commissioner by making such request prior to a motion and vote.

1. Consider approval of the minutes from 3/11. - Consider approval of the minutes from March 11, 2025.

**F. REGULAR ITEM(S)**

1. Consider a Recommendation to Staff on the Installa - Consider a Recommendation to Staff on the Installation of a Streetlight between 6637 and 6641 Palermo Trail in the Terracina Subdivision.
2. FY2025-2026 Streetlight Priority - Consider a Recommendation to Staff regarding the List of Proposed Streetlight Locations for Installation through the FY2025-2026 Streetlight Installation Program as part of the annual budget process.
3. MPA25-0002 Monarch/Dixon Thoroughfare Plan Amendment - Public Hearing to consider a request for a Master Plan Amendment (MPA25-0002) to amend Section 7.0 - Thoroughfare Plan. Locations are generally located within the Monarch Development area and between Dixon Lane and Justin Road (FM 407).

**G. WORK SESSION**

1. Review of FY 25-26 Signal Projects

**H. ADJOURN**

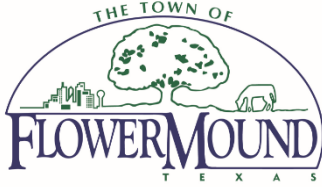
I do hereby certify that the Notice of Meeting was posted on the bulletin board at the Town Hall for the Town of Flower Mound, Texas, in a place convenient and readily accessible to the general public at all times and said Notice was also posted on the Town’s website in accordance with GC Section 551.056 on the following date and time: April 4, 2025, at 5:30 p.m., at least 72 hours prior to the scheduled time of said meeting.

**Tina Wells, Administrative Secretary**

The Flower Mound Town Hall and Jody Smith Hall are wheelchair-accessible. Requests for accommodation or interpretive services must be made 48 hours prior to this meeting by contacting Town Hall at 972.874.6000. Additional time limits will be provided for members of the public that need to address the Town Council through a translator.

# Transportation Commission

---



March 11, 2025  
Town Hall  
2121 Cross Timbers Road  
Flower Mound, TX 75028

6:30 p.m.

## DRAFT MINUTES

### **A. CALL TO ORDER**

Called to order at 6:32 p.m.

The Transportation Commission met in a regular meeting with the following members present:

Chris Reed, Place 6, Chair  
Ron Hogue, Place 3, Vice Chair  
Bjorn Vandug, Place 1  
Jason Huse, Place 4  
Charlie Landry, Place 7  
Ricky Clark, Place 8, Alternate  
Barbara Barrios, Place 9, Alternate

with the following member(s) absent:

Bob Morreira, Place 2  
Erica Mulder, Place 5

constituting a quorum with the following members of the Town Staff participating:

Matthew Hotelling, Assistant Director Public Works/Transportation  
Thomas Peppers, Project Engineer  
Tina Wells, Administrative Secretary

### **B. PLEDGE OF ALLEGIANCE TO THE AMERICAN FLAG**

Chair Chris Reed led the pledge.

### **C. PUBLIC COMMENT**

The purpose of this item is to allow the public an opportunity to address the Board/Commission regarding any item on this agenda that is not a "Public Hearing." Issues regarding daily operational or administrative matters should first be dealt with by calling Town Hall at 972- 874-6000 during business hours. To speak to the Board/Commission during public comment, please fill out a comment form, which is located in the lobby of Town Hall.

In accordance with the Texas Open Meetings Act, the Board/Commission is restricted from discussing or acting on items not listed on the agenda.

- Speakers are limited to 3 minutes; a tone will sound at 30 seconds left and when time has expired, and times may be adjusted by the Chair depending on the number of speakers.
- Speakers must address their comments to the Board/Commission.
- Please state your name and address when speaking.

None present

#### **D. ASSISTANT DIRECTOR REPORT**

1. Update status report related to operational issues, capital improvement projects and TxDOT projects.
2. Future Transportation Meeting dates - April 8th
3. Future Agenda Items
4. Annual Commission reporting by Chair/Vice Chair to Town Council - May 15

#### **E. CONSENT ITEM(S)**

This part of the agenda consists of non-controversial, or “housekeeping” items required by law. Items may be removed from Consent by any Commissioner by making such request prior to a motion and vote.

1. Consider approval of the minutes from 02/11, - Consider approval of the minutes from February 11, 2025.

**ACTION:** Ron Hogue moved to approve E.1. as presented in the agenda caption. Charles Landry seconded the motion.  
**AYES:** Ron Hogue, Bjorn Vandug, Jason Huse, Charles Landry, Ricky Clark, Barbara Barrios  
**NAYS:** None  
**ABSTAIN:** None  
**RESULT:** 6 : 0

**F. REGULAR ITEM(S)**

1. Furst Ranch Thoroughfare Plan Amendment - Public Hearing to consider a request and recommendation for a Master Plan Amendment (MPA25-0001) to amend Section 7.0, Thoroughfare Plan, Modification of Two Segments of MU-Arterial within Furst Ranch to an Urban Minor Arterial to Planning and Zoning Commission and Town Council

Presentation given by McAdams Representative:  
Bobby Dollack  
4400 State Highway 121  
Castle Hill, TX

Opened Public Comment at: 6:45:50 p.m  
None present  
Closed Public Comment at: 6:45:52 p.m.

<b>ACTION:</b>	Ron Hogue moved to approve F.1. as presented in the agenda caption. Charles Landry seconded the motion.
<b>AYES:</b>	Ron Hogue, Jason Huse, Charles Landry, Ricky Clark, Barbara Barrios
<b>NAYS:</b>	Bjorn Vandug
<b>ABSTAIN:</b>	None
<b>RESULT:</b>	5 : 1

**G. ADJOURN**

Motion to adjourn was made by Commissioner Vandug, All in favor.

Meeting adjourned at 6:54 p.m.



## TRANSPORTATION COMMISSION AGENDA F.1. REGULAR ITEM(S)

---

**DATE:** April 8, 2025  
**FROM:** Thomas Peppers, Project Engineer  
**ITEM:** **Consider a Recommendation to Staff on the Installation of a Streetlight between 6637 and 6641 Palermo Trail in the Terracina Subdivision.**

---

**BACKGROUND:** In November 2023, the Homeowners Association (HOA) for Terracina requested that the Town evaluate the subdivision's existing streetlight locations to determine if additional streetlights could be installed within the community. In response to this request, staff examined the subdivision's lighting plan and conducted a field evaluation to verify whether or not the existing streetlights within the community met Town design standards. The current Town design standards require that streetlights be installed at all intersections, cul-de-sacs, significant curves in the roadway, and at mid-block locations where the block length or streetlight spacing is greater than six hundred feet (600 feet).

The field evaluation identified four locations that did not meet the Town's design standards. A map showing the four locations is provided as attachment 1. Based on this finding, staff recommended the installation of three new streetlights within the subdivision at the following locations:

- Mid-block on Palermo Trail between 6624 and 6656 Palermo Trail
- Mid-block on Palermo Trail between 6624 Palermo Trail and 6601 Via Italia Drive
- At the intersection of Via Italia Drive and Sorrento Lane

A fourth location, between 6616 Via Italia Drive and 6656 Palermo Trail, was excluded from the recommendation due to the prioritization of other streetlight projects across the Town. The three recommended locations were added to the 2024-2025 streetlight priority list. In April 2024, staff presented this list to the Transportation Commission for a recommendation regarding the proposed streetlight locations to be installed through the annual streetlight installation program. The commission recommended the installation of all three streetlights in Terracina.

In August 2024, staff reached out to the HOA to request feedback from residents directly affected by the proposed streetlight installations. The HOA informed staff that they had already notified the community via a December 2023 newsletter and had received no objections or individual concerns regarding the new streetlights. Based on this feedback, staff moved forward with the installation process. In October 2024, staff met onsite with CoServ to determine the final placement of the proposed streetlights and obtain cost estimates. During the meeting, staff identified the best location for each streetlight, which minimized their cost and impact on individual homeowners. These locations were then clearly marked by CoServ, as illustrated in Attachment 2.

For the location between 6624 and 6656 Palermo Trail, the decision was made to install the streetlight at 6637 Palermo Trail based on the following reasons:

- This address was closest to being the midpoint between the two existing streetlights.

- An electrical pedestal was already available at this location to power the streetlight.
- The two adjacent homes, 6637 and 6641 Palermo Trail, both have garages facing the proposed location, minimizing the number of windows directly exposed to the streetlight.
- Both homes are set back approximately 30 feet from the proposed location, and 6637 Palermo Trail has existing landscaping that will help to block light from the streetlight.

The cost estimate for the new streetlights was received and paid for in December 2024. In February 2025, CoServ provided staff with a construction schedule indicating that installation would be complete by the end of March. This information was forwarded to the HOA. On February 28, 2025, the HOA requested an updated map showing the exact locations of new streetlights to share with the community. Staff provided the updated map to the HOA on March 3, 2025.

On March 20, 2025, while CoServ contractors were in the process of installing the new streetlights, a resident near the proposed mid-block streetlight on Palermo Trail contacted staff. The resident stated that he was unaware of the planned installation and voiced his opposition to the project. He asked if the Town could pause or cancel the installation, citing concerns over potential light intrusion and the aesthetic impact of the streetlight. Staff explained to the resident the background of the project, including the HOA's initial request, the assessment conducted by the Town, and the efforts of the HOA to notify the community. By this time, two of the three recommended streetlights had already been installed by CoServ contractors, with only the Palermo Trail location remaining. Given the resident's concerns and the progress of the project, staff determined that it would be appropriate to present the matter to the Transportation Commission for further discussion.

To reiterate to the commission, the section of Palermo Trail between 6624 and 6656 Palermo Trail does not meet the Town's streetlight spacing standards. The two existing streetlights located in this section, shown in Attachment 3, are approximately 680 feet apart and at different elevations. This results in this stretch of Palermo Trail being very dark at night, as depicted in Attachment 4. This lack of adequate lighting poses safety risks for both pedestrians and drivers traveling along Palermo Trail. Staff encourages commissioners to drive or walk along this section of Palermo Trail to experience firsthand how dark it becomes at night. Since modern cameras often compensate for low-light conditions, they make it seem brighter than it actually is. Installing a streetlight at the location identified by staff will significantly improve visibility and safety for all road users.

**BOARD REVIEW/CITIZEN FEEDBACK:** The resident at 6637 Palermo Trail, adjacent to the proposed streetlight location, expressed opposition to the installation, stating that he had not been informed of the project. He argues that the current exterior lighting from nearby homes adequately illuminates the area and that adding a streetlight could lead to unwanted light intrusion and negatively impact the area's aesthetic appeal. In contrast, the HOA states that many residents in the community support installing a streetlight at this location and want it to help improve visibility and safety along this notably dark section of Palermo Trail at night.

**ALTERNATIVES:** None

**FISCAL IMPACT:** N/A

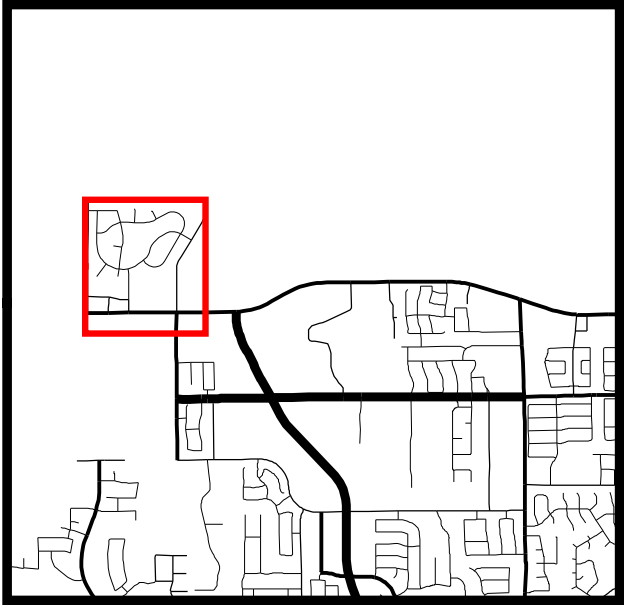
**LEGAL REVIEW:** N/A

**ATTACHMENTS:**

1. Terracina Streetlight Study 2023

2. Photographs of Proposed Streetlight Locations Marked by CoServ
3. Location of Existing Streetlights between 6624 and 6656 Palermo Trail
4. Photographs Illustrating Nighttime Lighting Conditions Near 6637 Palermo Trail

**DRAFT MOTION:** Move to approve as presented in the agenda caption.



Vicinity Map

**Lighting Study:  
Terracina  
Ph 1, 2, & 3**

- Legend**
- Street Lights**
  -  Proposed
  -  Existing
  -  Town Limits

Town of Flower Mound  
Traffic Department



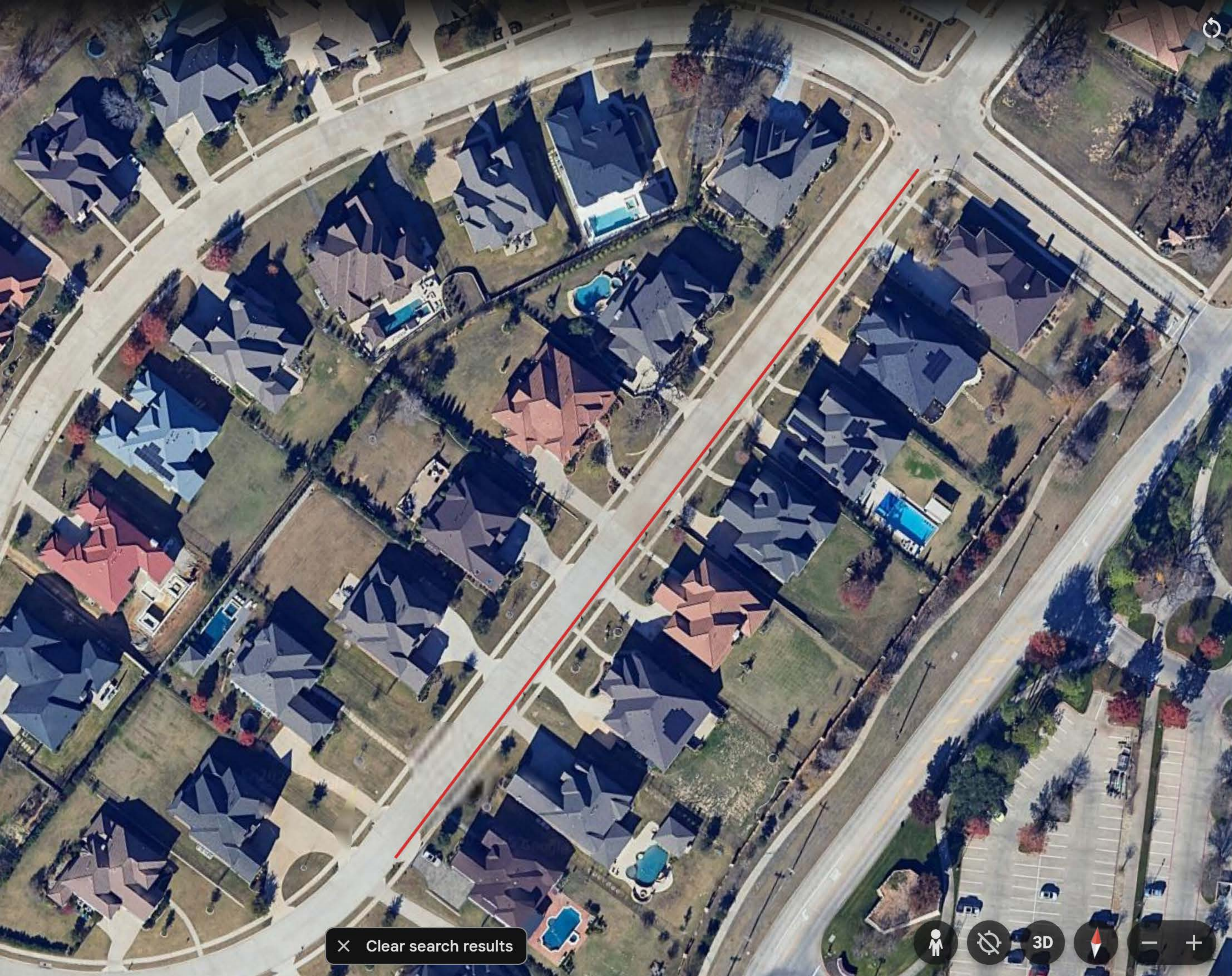
N  


Prepared December 2023









This is the distance between the existing streetlights located at 6624 Palermo Trail and 6656 Palermo Trail.

Length  
680 ft

Clear search results

Navigation controls including a person icon, a 3D view toggle, a compass, and zoom in (+) and zoom out (-) buttons.













## TRANSPORTATION COMMISSION AGENDA F.2. REGULAR ITEM(S)

**DATE:** April 8, 2025

**FROM:** Thomas Peppers, Project Engineer

**ITEM:** **Consider a Recommendation to Staff regarding the List of Proposed Streetlight Locations for Installation through the FY2025-2026 Streetlight Installation Program as part of the annual budget process.**

**BACKGROUND:** As part of the Road Safety Enhancement Program, the need for better visibility on roadways at night was identified as a priority. To address this, staff were tasked with presenting potential locations where streetlights could be installed to improve lighting and visibility at night. The Town's current design standards require that streetlights be installed at all intersections, cul-de-sacs, significant curves in the roadway, and at mid-block locations where the block length or streetlight spacing is greater than six hundred feet (600'). Additionally, although not required by the design standards, it is recommended that streetlights be installed at pedestrian crossings and median openings to enhance visibility and safety for both pedestrians and motorists.

To ensure that streetlights are installed where they are needed the most and that resources are allocated effectively, the recommended streetlight locations for the upcoming Fiscal Year (FY) 2025-2026 budget year have been categorized into four priority levels. The priority level for each location was assigned based on the following methodology:

- Level one priority – This is the highest priority level, assigned to locations identified as safety concerns or requested by residents.
- Level two priority – Assigned to intersections and cul-de-sacs that meet eligibility requirements but were not requested by a resident.
- Level three priority – Assigned to intersections and cul-de-sacs in residential subdivisions that meet eligibility requirements but were not requested by a resident and are less than two hundred feet (200') from an existing streetlight. This level also includes mid-block locations within a residential subdivision where the distance between existing streetlights is over eight hundred feet (800').
- Level four priority - This priority level is the lowest among all the other levels and is designated for all other mid-block locations in residential subdivisions that meet eligibility requirements but were not requested by a resident.

The current FY has \$115,000.00 budgeted for streetlight installation projects, which include locations that have been previously requested. Attached is the current status of this FY's streetlight list. Staff is seeking a recommendation from the Transportation Commission on the list of new streetlight locations to be installed in the FY2025-2026 budget year with a proposed expenditure of \$115,000.00. The list of proposed streetlight locations for FY2025-2026 is attached to this agenda item.

**BOARD REVIEW/CITIZEN FEEDBACK:** This item is to receive feedback and recommendation on the attached streetlight list of projects for next FY.

**ALTERNATIVES:** None

**FISCAL IMPACT:** \$115,000.00

**LEGAL REVIEW:** N/A

**ATTACHMENTS:**

1. FY2017-2023 Completed List of Streetlights
2. FY2024-2025 Current Status of Streetlight Projects
3. FY2025-2026 Proposed List of Streetlights

**DRAFT MOTION:** Move to approve as presented in the agenda caption.

**FY2017 Through FY2023  
List of Streetlight Locations**

<b>Location</b>	<b>Status</b>
Gerault at Big Canyon	Complete
Morriss Road at Forestwood Middle School	Complete
Forest Vista at Garden Ridge	Complete
Forest Vista at Forest Vista Elementary	Complete
Aberdeen Drive at Shadow Ridge Middle School	Complete
Spinks Road at Bluebonnet Elementary School	Complete
One Place at Timber Creek Drive	Complete
Morriss Road at Lexington	Complete
Morriss Road at Lake Bluff Drive	Complete
Morriss Road at Ponderosa Pine Drive	Complete
Morriss Road at Cortadera Street	Complete
Morriss Road at Homestead Street	Complete
Morriss Road at Kirkpatrick Lane	Complete
Morriss Road at Waterford Drive	Complete
Flower Mound Road at Native Oak	Complete
Flower Mound Road at Mark Twain	Canceled
US 377 at Dunham	Complete
Gerault at Carter Circle	Complete
Gerault at Sweet Water	Complete
FM 1171 at Scenic	Complete
Morris Road at Eaton	Complete
Dixon at Chinn Chapel	Complete
Dixon at Eastglen (MHS)	Complete
Sunset Trail at Shiloh Road	Complete
Wichita Trail at Skillern Road	Complete
Valley Ridge Parkway at Timber Creek Road	Complete
Old Orchard Lane at Aster Drive	Complete
Garden Ridge at Paisley	Complete
FM 2499 at Surrey Lane	Complete
Valley Ridge Parkway at Stone Hill Farms	Complete
Morriss Road at Broadway Avenue	Complete
Buckeye Drive at Azelea Court (Resident Request)	Complete
Chinn Chapel Road at Legends Path (HOA Request)	Complete
Stonecrest Road at Sunrise Circle (Resident Request)	Complete
High Meadow at Meadow Lark (Accident Driven)	Complete
West Windsor at Glenwick (Resident Request)	Complete
Rembert Drive (Resident Request)	Complete
Waketon at Marquis Apartment Complex (Resident Request)	Complete

**FY2024 -2025**  
**List of Streetlight Locations**

Location	Status
Katina Drive at Stone Bridge Drive (Resident Request)	Canceled
Via Italia Drive at Sorrento Lane (Resident Request)	Complete
Palermo Trail Mid-block - Two Locations (Resident Request)	One Location Complete
Willow Run Drive Mid-block - Two Locations (Resident Request)	Canceled
Lexington Avenue at Eleven11 Lexington Apartment Complex (Safety Driven)	Design
Bruton Orand Boulevard School Crossing Near Wellington Elementary (Safety Driven)	Design
Garden Ridge Boulevard School Crossing Near Vickery Elementary (Safety Driven)	On-Hold
Patriot Way at Old Gerault Road (Resident Request)	Not Started Yet
College Parkway Mid-block Crossing (Safety Driven)	Design
Morriss Road Mid-block School Crossing Near MHS (Safety Driven)	Not Started Yet
Garden Ridge Boulevard Pedestrian Crossing Near Hound Mound (Safety Driven)	Design
Flower Mound Road Pedestrian Crossing at Clearpoint Drive (Safety Driven)	Not Started Yet
Flower Mound Road Pedestrian Crossing Near Post Oak Park (Safety Driven)	Not Started Yet
Acropolis Drive at Olympia Drive (Recommended By Staff)	Not Started Yet
Churchill Drive at Yucca Drive (Recommended By Staff)	Not Started Yet
Navajo Bluffs Court (Recommended By Staff)	Not Started Yet

## FY2025-2026

### Proposed List of Streetlight Locations

Simmons Road at Sentinel Oak Drive (Resident Request)
Pack Saddle Way Mid-block (Resident Request)
Sandra Lynn Drive Mid-block (Resident Request)
MHS Driveway on Waketon Road (Resident Request)
Acropolis Drive at Olympia Drive (Recommended By Staff)
Churchill Drive at Yucca Drive (Recommended By Staff)
Navajo Bluffs Court (Recommended By Staff)
College Parkway at Danley Court (Recommended By Staff)
Crestwood Circle Cul-de-sac (Recommended By Staff)
Duncan Lane at Cherokee Path (Recommended By Staff)
Eads Street at Chestnut Court (Recommended By Staff)
Grady Court Cul-de-sac (Recommended By Staff)
Gregory Drive at Baker Court (Recommended By Staff)
Homestead Street at Gregory Drive (Recommended By Staff)
Homestead Street at Prairie Creek Drive (Recommended By Staff)
Mckamy Creek Road at Heron Court (Recommended By Staff)
River Oaks Drive Cul-de-sac (Recommended By Staff)
Spring Meadow Lane at Pin Oak Drive (Recommended By Staff)
Springwood Road at Almond Drive (Recommended By Staff)
Thrush Road at Lake Bluff Drive (Recommended By Staff)
Wager Road at St Gallen Lane (Recommended By Staff)
Wood Creek Circle Cul-de-sac (Recommended By Staff)



## TRANSPORTATION COMMISSION AGENDA F.3. REGULAR ITEM(S)

---

**DATE:** April 8, 2025  
**FROM:** Matthew Hotelling, Assistant Director of Public Works/Transportation  
**ITEM:** **Public Hearing to consider a request for a Master Plan Amendment (MPA25-0002) to amend Section 7.0 - Thoroughfare Plan. Locations are generally located within the Monarch Development area and between Dixon Lane and Justin Road (FM 407).**

---

**BACKGROUND:** In January 2025, Town Council unanimously approved the Master Plan Amendment and the Zoning Planning Development project for the Monarch Development. The Monarch Development is generally located north of Cross Timbers Road (FM 1171), west of US 377 and east of Interstate Highway (IH) 35W. Furthermore, it is located generally north and west of the Canyon Falls Development. Attached is a vicinity map showing the general location of this development and the proposed Master Thoroughfare Plan change. The overall Monarch Development is approximately 200 acres in size. The project consists of a mix of Campus Commercial and Residential uses. As part of that development application, a traffic impact analysis (TIA) was completed to determine if there was *adequate traffic capacity*. A large portion of the trips generated from this development will come from the IH 35W direction. This development will be built in phases. It is anticipated that beginning with Phase 2, there will be freeway access to this development. The TIA takes into consideration both background and site generated trips and the network of streets proposed by the development. This Master Plan Amendment for the Thoroughfare streets within the Monarch Development is consistent with the Master Plan and Zoning change in January. With these proposed changes to the Thoroughfare Plan, all streets are anticipated to operate at a Level of Service (LOS) of C or better,

The second area for a proposed Thoroughfare Plan change is located generally north of Dixon Lane, south of Justin Road (FM 407), east of Long Prairie Road (FM 2499) and west of Windridge Lane. A vicinity map showing this location is attached to this item. During the January 2009, Thoroughfare Plan Amendment, the Town had proposed another north/south Urban Collector between Dixon Lane and Justin Road (FM 407) to accommodate future traffic generated in this area. At that point in time, there were no plans in mind for this large area of land north of Dixon. It was verbally agreed upon that in the future there would likely be a need for this roadway connection. Originally, it was conceived that the urban collector would tie into Justin Road (FM 407) at Marketplace. Since that time, there have been talks with the property owner in question and some concepts of varying uses for this property have been presented. It has been determined that this north/south urban collector is beneficial to the various land uses of this area. The general path of the urban collector from north to south would start at the intersection of Tartan Trail/Justin Rd (FM 407) and meander through the property southward and connect to Dixon Ln at the Whyburn Dr intersection. The addition of this urban collector has been discussed with both the property owner and the engineering representatives for this property. The property owner has given a letter of support for this new urban collector crossing this property. This letter of support is attached to this agenda item. As new development site plans are submitted in this area, the Town will run a SMARTGrowth analysis to determine that the new urban collector operates at an acceptable LOS.

**BOARD REVIEW/CITIZEN FEEDBACK:** This item is to receive feedback and recommendation from the Transportation Commission. Letter of support received from the property owner for the proposed Urban Collector between Dixon Ln and Justin Rd (FM 407)

**ALTERNATIVES:** Leave Thoroughfare Plan as is

**FISCAL IMPACT:** N/A  
N/A

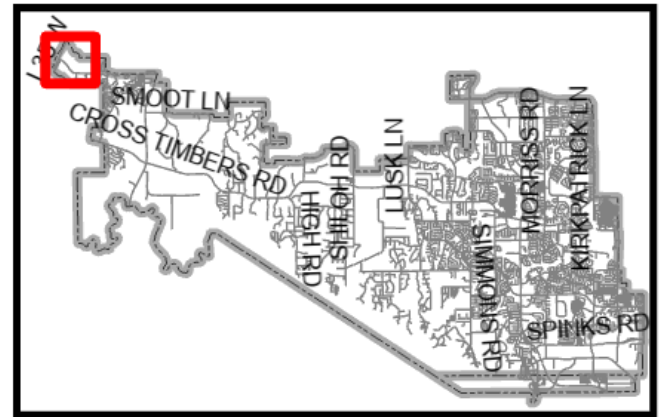
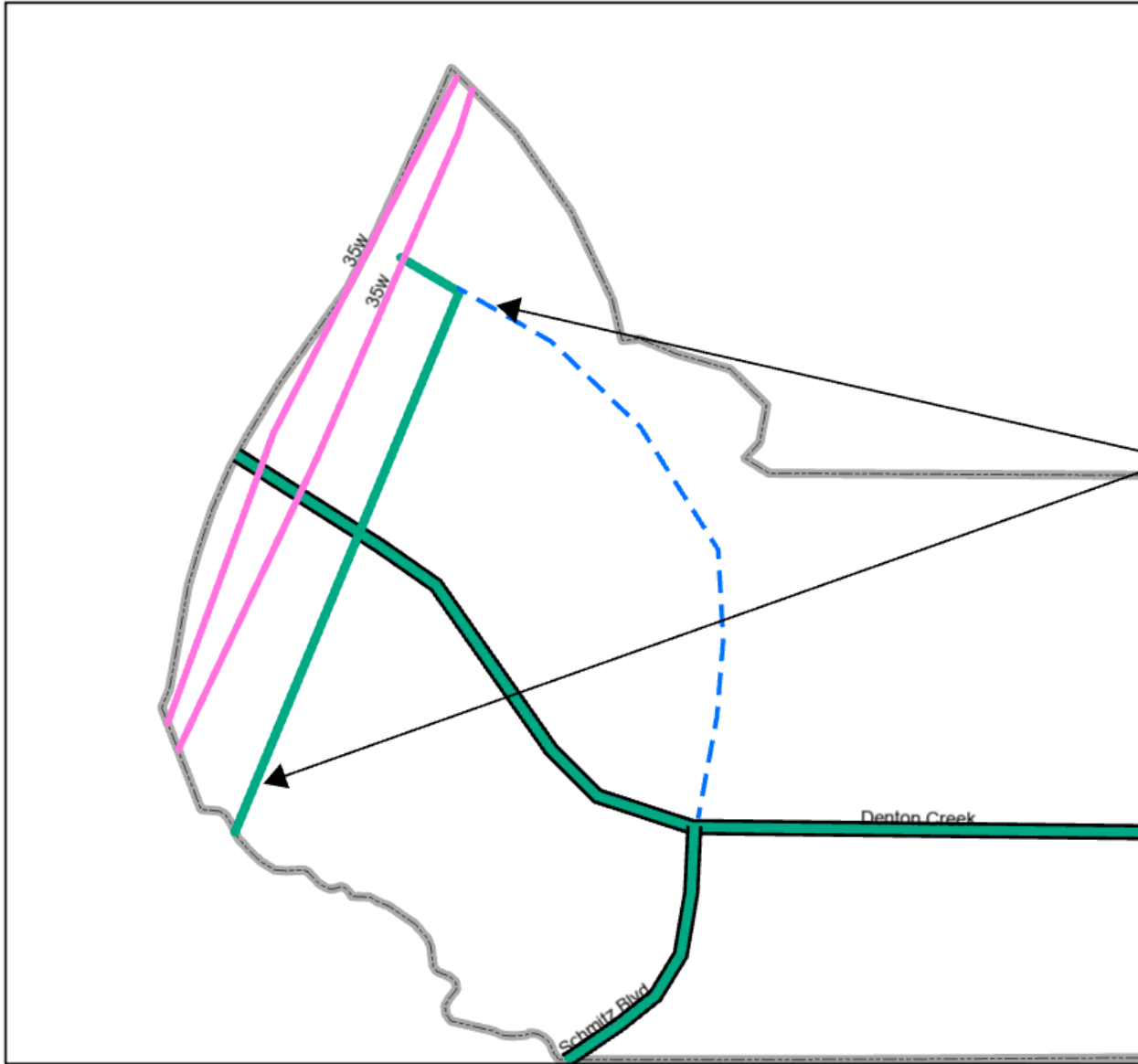
**LEGAL REVIEW:** Associated ordinance will be available for Town Council

**ATTACHMENTS:**

1. Vicinity Map - Monarch
2. Vicinity Map Urban Collector - DixonJustin
3. Cottonwood - McAdams - Letter of Support

**DRAFT MOTION:** Move to recommend approval as presented in the agenda caption.

# Vicinity Map - Location of Monarch Thoroughfare Streets



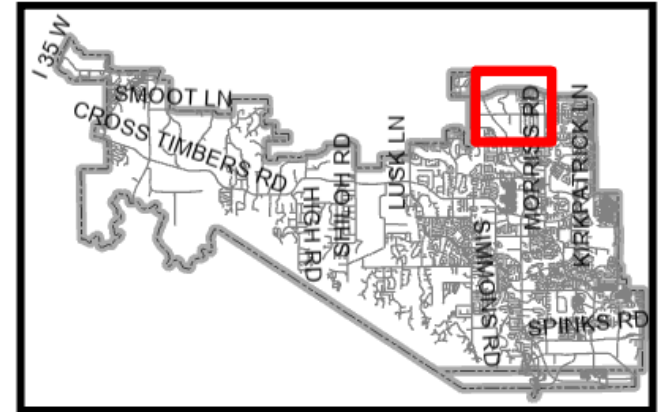
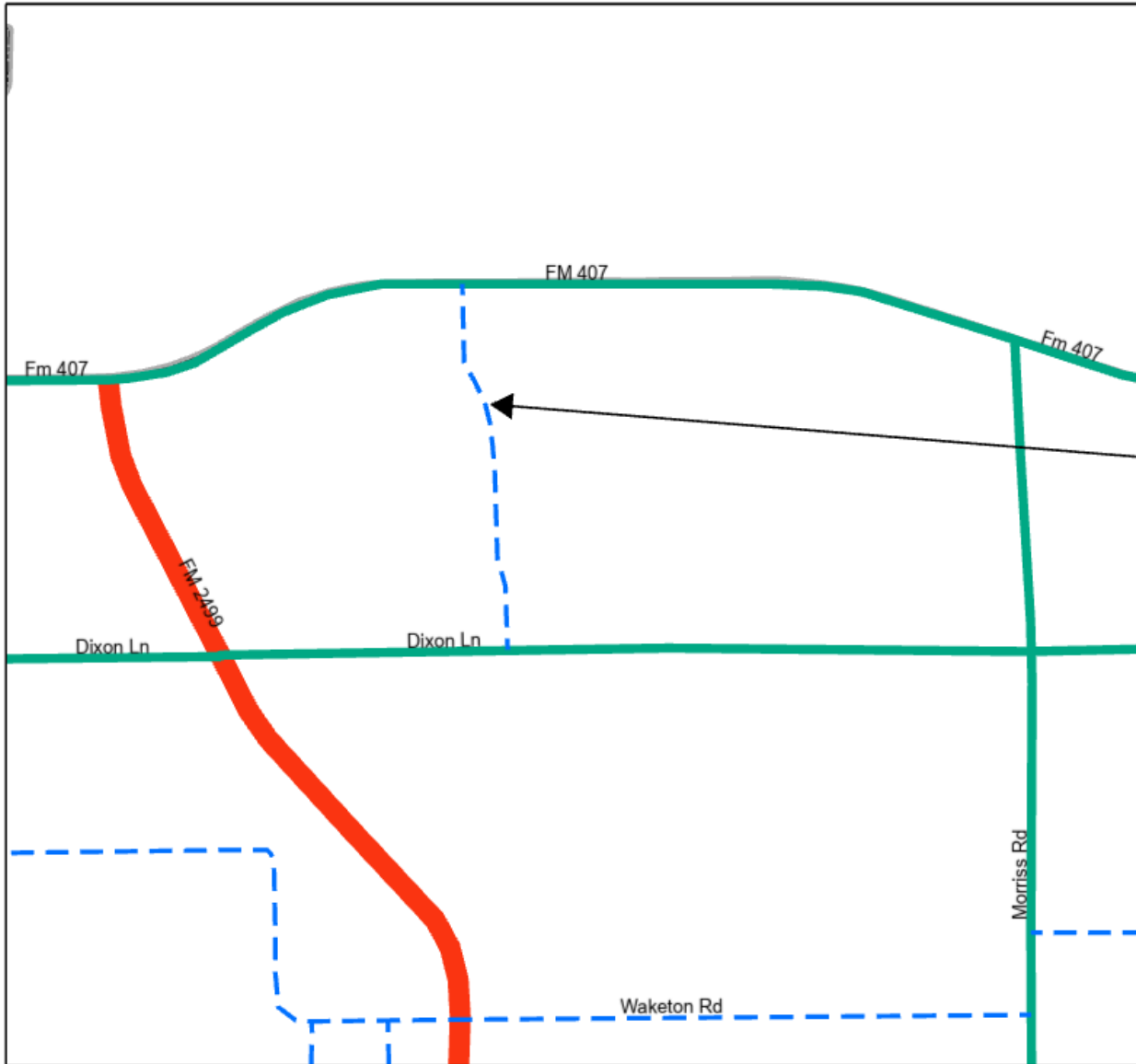
Project Locations

**Legend**

**Current Thoroughfare Plan Classification**

- Major Arterial
- Urban Minor Arterial w/Bike Lane
- Urban Minor Arterial
- Urban Collector
- Rural Collector
- Service Road

Vicinity Map - New Urban Collector between Dixon and Justin Rd (FM 407)



Project Location

**Legend**

**Current Thoroughfare Plan Classification**

- Major Arterial
- Urban Minor Arterial w/Bike Lane
- Urban Minor Arterial
- Urban Collector
- Rural Collector
- Service Road

March 28, 2025

Town of Flower Mound  
Attn: Planning Department  
2121 Cross Timbers Road  
Flower Mound, TX 75028

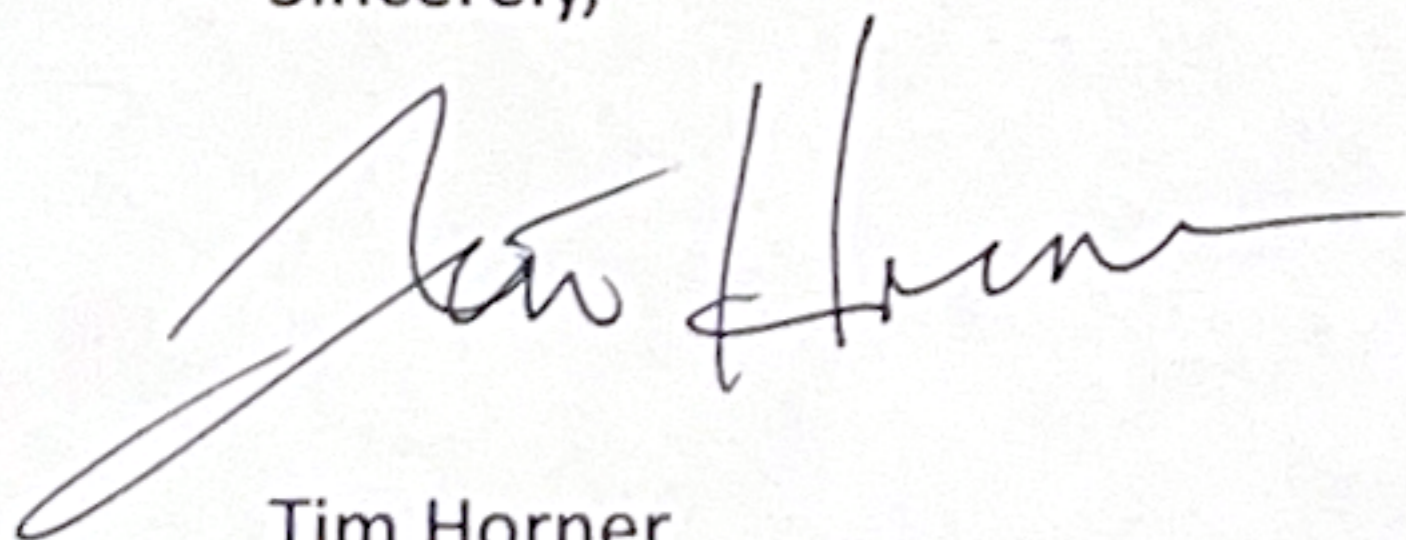
Dear Town of Flower Mound,

I am writing to express my support as the property owner for the inclusion of Whyburn Drive, between Dixon Lane and Justin Road, in the Town of Flower Mound's Thoroughfare Plan. I believe this addition will help support future development of my property and enhance connectivity to the surrounding area. Improved road access would not only benefit my property but also contribute to the overall growth and accessibility of the community.

I appreciate the Town's efforts to engage with stakeholders and plan for the future of Flower Mound. Please feel free to contact me if you need any additional information regarding my support for this proposal.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Tim Horner", written in a cursive style.

Tim Horner

Property Owner  
Justin/Dixon Properties, Ltd.



## TRANSPORTATION COMMISSION AGENDA G.1. WORK SESSION

---

**DATE:** April 8, 2025  
**FROM:** Matthew Hotelling, Assistant Director of Public Works/Transportation  
**ITEM:** **Review of FY 25-26 Signal Projects**

---

**BACKGROUND:** During the January 2025, Transportation Commission (TRC) meeting work topics item, the Commissioners expressed a desire to have input and review the Capital Improvement Project (CIP) program for Signals. The CIP group is beginning their compilation of the upcoming FY 25-26 budget year process. This item will provide a chance for TRC to provide feedback to staff on the projects for FY 25-26. The input from the TRC will be used to help select projects for the upcoming year or possibly push projects out into future years. Attached to this agenda item is the current (FY 24-25 Amendment 1) CIP for Signals.

The Signals Projects Five Year CIP identifies funding sources and schedules for the construction. The Five Year CIP is revisited and modified as needed as part of the Town's yearly budget process. Signal projects are projects that the Town builds either as new traffic signals or large capital expenditures to maintain traffic signals and other equipment under the purview of the Traffic Signals Division. This current FY, the new traffic signal projects were located at: FM 1171 at Canyon Falls Drive; Garden Ridge Blvd at Forest Vista Dr; and the partial reconstruction of FM 2499 at Firewheel Dr and are all substantially complete.

There are two new locations for next FY that have met traffic signal warrants. Staff requests that the TRC prioritize those two locations if there is a need to move one into a future fiscal year. The first location is Garden Ridge Blvd at Bellaire/Voyager Ln (formerly Kirkpatrick Ln). The second location is Flower Mound Rd at Quail Run Rd. The warrant studies of both of these locations have been added to this agenda item. It should also be noted that the intersection of Garden Ridge Blvd at Lopo Rd/Fox Ave just north of the proposed location at Garden Ridge and Bellaire/Voyager, has also met signal warrants and is being considered for construction by the City of Lewisville.

There is one location, FM 1171 at Parker Square/Luther, has been identified as one that needs to be reconstructed. This location is over 23 years old and is showing signs of needing to be reconstructed. Typically, at 20 years of age, traffic signals are reviewed to determine if reconstruction is needed. Various elements of traffic signals are replaced/maintained more often than 20 years, but large items such as traffic signal poles are scrutinized more closely at the 20-year mark.

Additional projects proposed to begin or take place in FY 25-26 include the following: Advanced Traffic Control (ATC) Signal Cabinets; Rectangular Rapid Flashing Beacons (RRFB) on Forest Vista Blvd at Forest Vista Elementary School; and ramp and minor signal work at McKamy Creek and Old Settles. The ATC Cabinets are the next generation of traffic signal cabinets. The signal cabinets currently in use are beginning to be phased out and in the relatively near future, will not have parts available for maintenance. Due to the large cost, starting earlier in the process and phasing in the replacement of cabinets will allow the Town to ease into the cost of replacement. The RRFB at Forest Vista Elementary School is due to the closing of Garden Ridge Elementary School and the

rerouting of students to Forest Vista Elementary. The McKamy Creek at Old Settlers intersection improvement will add accessible ramps to the west side of the intersection and the associated signal equipment needed for those ramps. It will reduce the number of times students have to cross the street to get to school and ease the burden on the crossing guards at this intersection.

There are a few other signal projects that are anticipated to take place next FY. These projects are associated with the Lakeside Capacity Improvement project, which includes: new traffic signals at Lakeside Parkway and Enterprise and at Lakeside Parkway and Silveron Boulevard and a Pedestrian Hybrid Beacon between Gerault and Garden Ridge. There is also the possibility that some of the infrastructure supporting Furst Ranch will be constructed next FY. With that infrastructure, if approved by the Texas Department of Transportation, two new signal projects are likely to be designed and possibly constructed next FY.

There are a few projects that are either ending next FY or are proposed to be removed from the CIP for next year. The Traffic Signal Preemption Upgrade project will be in its last year. By doing this project with Town staff, we were able to cut one year off of the 5-year project and make it a 4-year project. After next FY, the signal preemption replacements will be part of the normal operating budget. The Traffic Signal Detection Rehabilitation project is being proposed to be removed for a few years. With the additional detection systems installed by the previous traffic signal analytics, traffic signal performance measures and adaptive signal projects, these projects have eliminated the need for immediate replacement of detection cameras. The Town is proposing to move out the next phase of the traffic signal adaptive project, allowing the industry to further mature in this technology.

**BOARD REVIEW/CITIZEN FEEDBACK:** The purpose of this item is to solicit feedback from the Commission. Staff will be requesting the prioritization of the two newly warranted signal locations as part of this item.

**ALTERNATIVES:** N/A

**FISCAL IMPACT:** N/A  
N/A

**LEGAL REVIEW:** N/A

**ATTACHMENTS:**

1. CIP 24-25 Amendment I - Signals
2. Garden Ridge at Voyager Signal Warrant Analysis
3. Flower Mound Rd at Quail Run Signal Warrant Analysis

**DRAFT MOTION:** No formal action is required by the Transportation Commission on this item. This item is for discussion and to provide feedback to staff.

**Town of Flower Mound  
Summary of Five Year CIP Plan  
FY 2024-2025**

SIGNAL PROJECTS	Prior Fiscal Years	FY 2024-2025						TOTAL PROJECT COSTS	OTHER SOURCES	ISSUED DEBT GO's & CO's	NEW DEBT	FY 2024-2025						
		2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2034					2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2034	
Adaptive Traffic Signal Upgrade	1,000,000	-	1,300,000	-	-	-	2,600,000	4,900,000	1,000,000	4	-	3,900,000	-	1,300,000	-	-	-	2,600,000
Bruton Orand Blvd at Quail Run Road**	-	-	-	-	-	-	650,000	650,000	650,000	4	-	-	-	-	-	-	-	-
Cross Timbers Road at Canyon Falls Drive **	450,000	-	-	-	-	-	-	450,000	450,000	0,1,7	-	-	-	-	-	-	-	-
Cross Timbers Road at Cross Timbers/US 377 Connector 1	-	-	-	-	-	-	650,000	650,000	650,000	4,7	-	-	-	-	-	-	-	-
Cross Timbers Road at Denton Creek Blvd**	-	-	-	-	-	-	650,000	650,000	650,000	4,7	-	-	-	-	-	-	-	-
FM 1171 & Luther Signal Reconstruction	-	-	550,000	-	-	-	-	550,000	550,000	4	-	-	-	-	-	-	-	-
FM 2499 at Northshore Blvd **	-	-	-	640,000	-	-	-	640,000	640,000	4	-	-	-	-	-	-	-	-
Garden Ridge Blvd at Forest Vista Drive **	530,000	-	-	-	-	-	-	530,000	530,000	0,1,2	-	-	-	-	-	-	-	-
Gerault Road at Old Gerault Road **	-	-	-	-	-	-	650,000	650,000	650,000	4	-	-	-	-	-	-	-	-
Lakeside Enterprise Signal	-	574,000	-	-	-	-	-	574,000	574,000	1	-	-	-	-	-	-	-	-
Lakeside Pedestrian Hawk Signal	-	250,000	-	-	-	-	-	250,000	250,000	1,2	-	-	-	-	-	-	-	-
Lakeside Silveron Signal	-	574,000	-	-	-	-	-	574,000	574,000	1	-	-	-	-	-	-	-	-
Traffic Detection Rehabilitation **	1,405,000	200,000	200,000	200,000	200,000	200,000	-	2,405,000	1,780,000	4	625,000	-	-	-	-	-	-	-
Traffic Signal Performance Measures	-	450,000	-	-	-	-	-	450,000	-	-	-	450,000	450,000	-	-	-	-	-
Traffic Signal Preemption Upgrade	171,000	95,000	95,000	61,550	-	-	-	422,550	422,550	4	-	-	-	-	-	-	-	-
Traffic Signal Analytics Cameras	300,000	150,000	-	-	-	-	-	450,000	450,000	1,4	-	-	-	-	-	-	-	-
US 377 at Canyon Falls Drive **	730,000	-	-	100,000	-	-	-	830,000	830,000	0,1,2,4,7,9	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	<b>\$ 4,586,000</b>	<b>\$ 2,293,000</b>	<b>\$ 2,145,000</b>	<b>\$ 1,001,550</b>	<b>\$ 200,000</b>	<b>\$ 200,000</b>	<b>\$ 5,200,000</b>	<b>\$ 15,625,550</b>	<b>\$ 10,650,550</b>		<b>\$ 625,000</b>	<b>\$ 4,350,000</b>	<b>\$ 450,000</b>	<b>\$ 1,300,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 2,600,000</b>

\*General Obligation Bonds  
\*\* Project Includes ADA Improvements

- Other Sources**
0. Impact Fees
  1. Grant and Interlocal Funds
  2. Other Sources (Proj. Sav., Fund Bal., 380, Interest Inc.)
  3. Escrow
  4. Decision Package
  5. Developer Agreement(s)
  6. Park Development Fund
  7. Tax Increment Reinvestment Zone (TIRZ)
  8. Dedicated Sales Tax
  9. SH 121 Regional Toll Revenue (RTR)

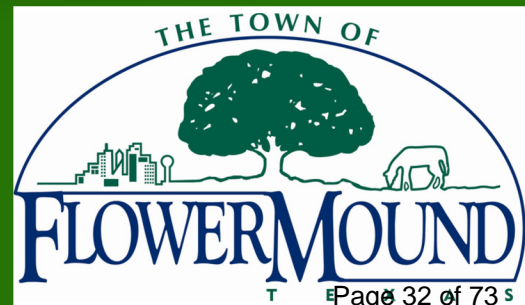
# TRAFFIC SIGNAL WARRANT STUDY

GARDEN RIDGE  
BLVD & BELLAIRE  
BLVD/VOYAGER LN

Prepared By  
Thomas  
Peppers P.E.  
March 2025



Town of Flower Mound  
Public Works  
Department  
Traffic Division



**EXECUTIVE SUMMARY**

In response to a resident’s request for a Traffic Signal at the intersection of Garden Ridge Boulevard and Bellaire Boulevard/Voyager Lane, a traffic signal warrant analysis was performed. This study evaluated the existing traffic conditions at the intersection against the requirements outlined in the Texas Manual on Uniform Traffic Control Devices (TMUTCD) to assess whether installing a traffic signal is justified.

The study included the collection of approach volume data, as well as a review of the crash history at the intersection. Traffic data was collected on Wednesday, February 26<sup>th</sup>, 2025, and is summarized in the report.

The intersection was analyzed based on the following nine traffic signal warrants outlined in the TMUTCD:

<b>Warrant</b>	<b>Description</b>	<b>Analysis Result</b>
<b>1</b>	<b>Eight-Hour Vehicular Volume</b>	Condition B is satisfied, Warrant is met
	Condition A – Minimum Vehicular Volume (70%)	Met for 5 hours (8 required)
	Condition B – Minimum Vehicular Volume (70%)	Met for 12 hours (8 required)
	Combination of Conditions A & B (56%)	Met for 7 hours (8 required)
<b>2</b>	<b>Four-Hour Vehicular Volume (70%)</b>	Met for 7 hours (4 required)
<b>3</b>	<b>Peak Hour</b>	Peak hour thresholds exceeded for 7 hours; Warrant is met
<b>4</b>	<b>Pedestrian Volume</b>	Not evaluated
<b>5</b>	<b>School Crossing</b>	No reported safety issues or concerns regarding school children crossing at this location. Warrant is not met
<b>6</b>	<b>Coordinated Signal System</b>	Not needed for progressive signal system. Warrant is not met
<b>7</b>	<b>Crash Experience</b>	Volume and crash experience requirements are not met
<b>8</b>	<b>Roadway Network</b>	Can be considered an intersection of two major routes. Warrant is met
<b>9</b>	<b>Intersection Near a Railroad Grade Crossing</b>	Not adjacent to a grade crossing. Warrant does not apply

Based on the findings of the warrant analysis, Warrants 1, 2, 3, & 8 are satisfied at this intersection. **Therefore, it is recommended that the intersection be converted from an all-way stop control to a signalized intersection to improve operational efficiency.**

The complete analysis and results of the study are presented in the report, with detailed findings in the accompanying tables and appendices

---

## **INTRODUCTION**

This traffic study was conducted in response to a citizen's request for a Traffic Signal at the intersection of Garden Ridge Boulevard and Bellaire Boulevard/Voyager Lane. The purpose of the study was to determine whether the existing traffic conditions at this intersection satisfy the criteria for installing a traffic signal as outlined in Chapter 4C of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). The TMUTCD serves as the state's standard for the design and installation of signs, markings, and signals on any street, highway, bikeway, or private road open to public travel.

## **DATA COLLECTION**

Approach volume data were collected at the study intersection on Wednesday, February 26<sup>th</sup>, 2025, over a 24-hour period using pneumatic tube counters. The raw volume data is presented in Appendix A. Crash records for the intersection were also obtained using TxDOT's Crash Records Information System (CRIS). A table detailing the crash history at this intersection is provided in Appendix B.

## **SITE DESCRIPTION**

Garden Ridge Boulevard is a four-lane divided north-south minor arterial with a posted speed limit of 40 mph. It serves as a key thoroughfare, connecting FM 1171 (Cross Timbers Road) to FM 3040 (Flower Mound Road). Voyager Lane, the eastbound approach to the intersection, is a four-lane divided urban collector with a statutory speed limit of 30 mph. It primarily serves local residential and school-related traffic. Bellaire Boulevard, the westbound approach, is a four-lane divided principal arterial with a posted speed limit of 40 mph. It is a major east-west thoroughfare for the City of Lewisville, linking Garden Ridge Boulevard to Interstate 35 (Stemmons Freeway).

The surrounding area is predominantly residential, with single-family homes and an elementary school (Vickery Elementary) just west of the intersection. Each approach includes a dedicated left-turn lane, two through lanes, and a marked crosswalk. The northbound approach also has a dedicated right-turn lane. Sidewalks and curb ramps are present at all corners of the intersection. There is a single streetlight installed in the median of the westbound approach. The intersection is currently controlled by an All-Way Stop.

Based on the traffic volumes at this intersection, Garden Ridge Boulevard is considered the Major Roadway for this analysis with multilane approaches. Bellaire Boulevard/ Voyager Lane will be considered the Minor Roadway with multilane approaches. The location and layout of the study intersection are illustrated in Figure 1.

**Figure 1: Study Intersection Location**



**EVALUATION**

The methodology for conducting a traffic signal warrant analysis is based on Section 4C of the TMUTCD, which outlines nine traffic signal warrants. These warrants address various intersection conditions, including vehicular volume, pedestrian volume, crashes, progression, and delay, and establish minimum criteria for evaluating the need for a traffic signal. According to the TMUTCD, an engineering study shall be performed to determine whether the installation of a traffic signal is justified at a particular location. This study must include an analysis of the relevant traffic signal warrants, as well as other factors related to existing operations and safety at the study location. The nine warrants are listed below:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 3 – Peak Hour
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network
- Warrant 9 – Intersection near a Grade Crossing

A traffic signal should be considered when one or more of these warrants are met, and engineering judgment determines that signalization would improve intersection safety and/or efficiency. A discussion of the requirements of each of the nine warrants and corresponding analysis results are presented below.

## Warrant 1 – Eight-Hour Vehicular Volume

The purpose of Warrant 1 is to assess whether the volume of intersecting traffic from the minor approaches is the main reason to consider installing a traffic signal. This warrant is comprised of two conditions:

Condition A – The Minimum Vehicular Volume: this condition is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal.

Condition B – The Interruption of Continuous Traffic: this condition is intended for application at locations where condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

The minimum eight-hour traffic volumes required for both conditions are presented in the tables below from Chapter 4C of the TMUTCD.

**Table 1: TMUTCD Table 4C-1: Warrant 1, Eight-Hour Vehicular Volume**

### Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (Total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%a	80%b	70%c	56%d	100%a	80%b	70%c	56%d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

### Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (Total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%a	80%b	70%c	56%d	100%a	80%b	70%c	56%d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

a - Basic minimum hourly volume.

b - Used for combination of Conditions A and B after adequate trial of other remedial measures;

c - May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

d - May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

According to the TMUTCD, Warrant 1 is satisfied if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

The warrant is also satisfied if both Conditions A and B are met at the 80% level for any 8 hours of an average day. If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Since the posted speed limit on Garden Ridge Boulevard is 40 mph, the traffic volumes during the eight-highest hours at the study intersection were compared with the volumes in the 70% and 56% columns in Table 4C-1 for both conditions. Based on this comparison, it is determined that Condition B of Warrant 1 is met. Per the TMUTCD, Warrant 1 is to be treated as a single warrant. If Condition A or B is satisfied, Warrant 1 is satisfied, and analyses of the combination of Conditions A and B are not needed. **Therefore, Warrant 1 is met for the study intersection.**

**Table 2: Warrant 1 Analysis**

Time	Major Street Combined Volume	Higher Volume Minor Street	Meet Condition A (70%)?	Meet Condition B (70%)?	Meet Condition A & B (56%)?
12:00 AM	58	8	No	No	No
1:00 AM	43	3	No	No	No
2:00 AM	20	1	No	No	No
3:00 AM	34	2	No	No	No
4:00 AM	88	8	No	No	No
5:00 AM	291	21	No	No	No
6:00 AM	555	69	No	No	No
7:00 AM	992	323	Yes	Yes	Yes
8:00 AM	1146	128	No	Yes	Yes
9:00 AM	708	99	No	Yes	No
10:00 AM	589	94	No	No	No
11:00 AM	699	85	No	Yes	No
12:00 PM	754	105	No	Yes	No
1:00 PM	750	109	No	Yes	No
2:00 PM	982	156	Yes	Yes	Yes
3:00 PM	953	236	Yes	Yes	Yes
4:00 PM	1414	215	Yes	Yes	Yes
5:00 PM	1534	170	Yes	Yes	Yes
6:00 PM	1367	129	No	Yes	Yes
7:00 PM	751	95	No	Yes	No
8:00 PM	582	65	No	No	No
9:00 PM	421	54	No	No	No
10:00 PM	208	16	No	No	No
11:00 PM	131	10	No	No	No
<b>No. of Hours Meeting Condition:</b>			5	12	7
<b>No. Hours Required:</b>			8	8	8
<b>Meet Warrant 1:</b>			No	Yes	No

## Warrant 2 – Four-Hour Vehicular Volume

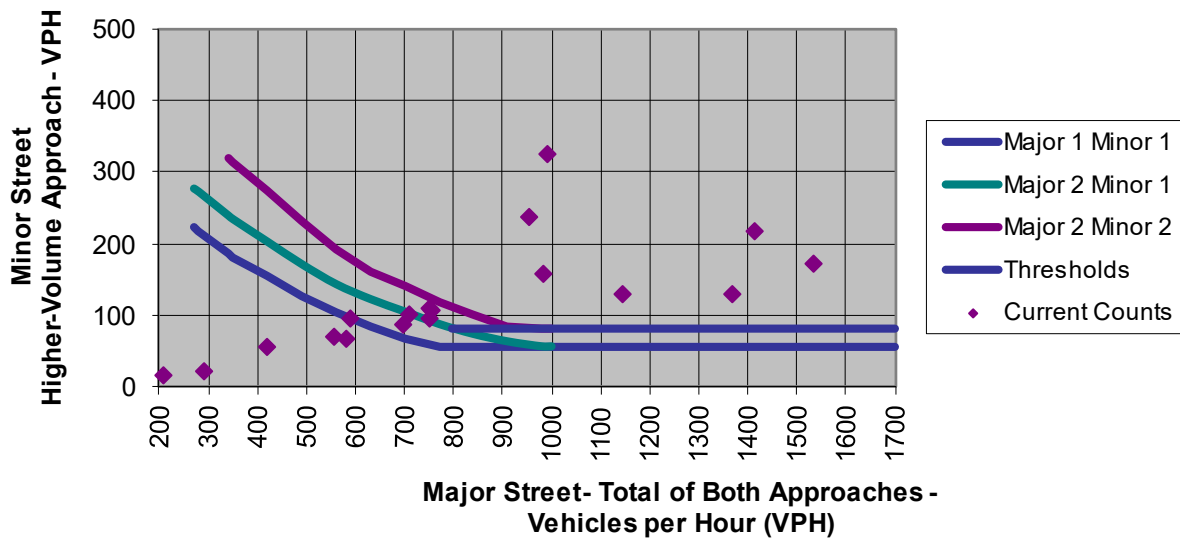
Similar to Warrant 1, Warrant 2 is also used to assess whether the volume of intersecting traffic from the minor approaches is the principal reason to consider installing a traffic signal.

According to the TMUTCD, Warrant 2 is satisfied if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

As the posted speed limit on Garden Ridge Boulevard is 40 mph, Figure 4C-2 from the TMUTCD was used in the analysis of the four-hour vehicular volume signal warrant.

**Figure 2: TMUTCD Figure 4C-2 Warrant 2, Four-Hour Vehicular Volume (70% Factor)**



\*Note: 80 vph applies as the lower threshold volume for a minor street approach w/ 2 or more lanes and 60 vph applies as the lower threshold volume for a minor street approach w/ 1 lane

Comparing the plotted traffic volumes for the study intersection with the volume thresholds in Figure 4C-2, it is determined that **Warrant 2 is met at the study intersection.**

---

### **Warrant 3 – Peak Hour**

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

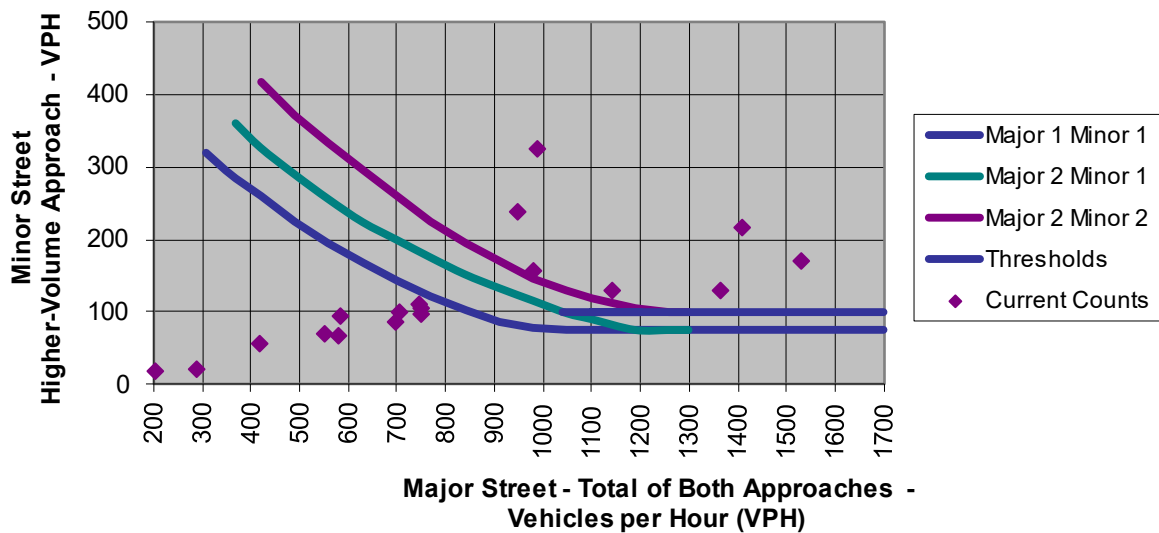
According to the TMUTCD, Warrant 3 is satisfied if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
  1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and
  2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and
  3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
  
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

Based on the posted speed limit of Garden Ridge Boulevard, figure 4C-4 from the TMUTCD was used in the analysis of the peak hour signal warrant.

**Figure 3: TMUTCD Figure 4C-4 Warrant 3, Peak Hour (70% Factor)**



\*Note: 100 vph applies as the lower threshold volume for a minor street approach w/ 2 or more lanes and 75 vph applies as the lower threshold volume for a minor street approach w/ 1 lane

Per the collected traffic volume data, this intersection's AM and PM peak hours are 7:15-8:15 in the morning and 5:15-6:15 in the evening. When the highest hourly volume of the study intersection is applied to Figure 4C-4, Category B is met for this Warrant.

Warrant 3 also has a requirement that the signal be near a facility that attracts or discharges large numbers of vehicles over a short time. The intersection is approximately 500 feet from Vickery Elementary School, which produces significant traffic during pick-up and drop-off times. Therefore, **Warrant 3 is met for the study intersection.**

#### **Warrant 4 – Pedestrian Volume**

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

According to the TMUTCD, Warrant 4 is satisfied if an engineering study finds that one of the following criteria is met:

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

---

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet unless the proposed traffic control signal will not restrict the progressive movement of traffic.

As it was anticipated that the vehicular volume warrants would be met for the intersection, pedestrian data was not collected for this analysis. **As a result, Warrant 4 was not evaluated as part of this study.**

#### ***Warrant 5 – School Crossing***

The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic signal. For the purposes of this warrant, the word “school children” includes elementary through high school students. The need for a traffic signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the school children are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 school children during the highest crossing hour.

Before a decision is made to install a traffic signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic signal along the major street is less than 300 feet, unless the proposed traffic signal will not restrict the progressive movement of traffic.

The study intersection serves as a designated school crossing for Vickery Elementary. During peak school hours, a crossing guard is present to manage pedestrian movements and ensure students cross safely. Based on observations and available data, there have been no reported safety issues or concerns regarding the ability of school children to cross at this location. **As a result, Warrant 5 is not met for the study intersection.**

---

### ***Warrant 6 – Coordinated Signal System***

Progressive movement in a coordinated signal system sometimes necessitates installing traffic signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

According to the TMUTCD, Warrant 6 is met when one of the following requirements are met:

- A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.
- B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic signals would be less than 1,000 feet. The nearest existing signalized intersections are approximately 3,500 feet to the north at FM 1171 and Garden Ridge Boulevard and 4,300 feet to the south at Garden Ridge Boulevard and Forest Vista Drive. Additionally, there is a proposed traffic signal at the intersection of Garden Ridge Boulevard and Lopo Road/Fox Avenue, which is approximately 1000 feet north of the study intersection.

Based on the TMUTCD's above guidance and existing traffic conditions on Garden Ridge Boulevard, it is unlikely that a traffic signal will be necessary at the study intersection to facilitate vehicle platooning. **Therefore, Warrant 6 is not met for the study intersection.**

### ***Warrant 7 – Crash Experience***

The Crash Experience signal warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic signal.

According to the TMUTCD, Warrant 7 is met when all of the following requirements are met:

- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
- B. Five or more reported crashes of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

---

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

A search of TxDOT's crash database reveals that one crash has been reported at this intersection in the past 12 months, which was related to driving while intoxicated (DWI). Therefore, the requirements for Item B are not satisfied. Additionally, the traffic volumes at the intersection do not meet the requirements for Item C when compared with the volumes in the 56% columns in Table 4C-1 for both conditions. **As a result, Warrant 7 is not met for the study intersection.**

### ***Warrant 8 – Roadway Network***

The systems warrant is intended to encourage concentration and organization of traffic flow in roadway networks. This warrant is satisfied when the common intersection of two major routes meets one or both of the following criteria:

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have at least one of the following characteristics:

- 1. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.
- 2. It includes rural or suburban highways outside, entering, or traversing a city.
- 3. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.
- 4. It connects areas of principal traffic generation.
- 5. It has surface street freeway or expressway ramp terminals.

Based on the collected approach volume data, the study intersection experiences an entering traffic volume exceeding 1,000 vehicles per hour for seven hours of the day, and meets Warrants 1B, 2, and 3. Therefore, the requirements for Item A are met. Additionally, Garden Ridge Boulevard and Bellaire Boulevard are designated as key roadways on a thoroughfare plan. The Town of Flower Mound classifies Garden Ridge Boulevard as a minor arterial, while the City of Lewisville designates Bellaire Boulevard as a principal arterial. Given these classifications, the study intersection can be considered a common intersection of two major routes. **Therefore, Warrant 8 is met for the study intersection.**

---

### ***Warrant 9 – Intersection Near a Grade Crossing***

The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal. This warrant is satisfied when both of the following criteria are met:

- A. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and
- B. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13 of the TMUTCD.

There is not a railroad grade crossing located within 140 feet of the study intersection. Therefore, **Warrant 9 does not apply to the study intersection.**

---

## CONCLUSION/RECOMMENDATIONS

Per the standards of the TMUTCD, a traffic signal shall not be installed unless an engineering study indicates that installing a traffic signal will improve the overall safety and/or operation of the intersection and will not seriously disrupt the progressive flow of traffic. Based on the results of this traffic signal warrant analysis, the existing traffic conditions at the study intersection meet four of the nine traffic signal warrants outlined in the TMUTCD. The results of the warrant analysis are summarized in Table 4.

**Table 3: Warrant Summary – Garden Ridge Blvd & Bellaire Blvd/Voyager Lane**

Warrant	Description	Analysis Result
1	<b>Eight-Hour Vehicular Volume</b>	Condition B is satisfied, Warrant is met
	Condition A – Minimum Vehicular Volume (70%)	Met for 5 hours (8 required)
	Condition B – Minimum Vehicular Volume (70%)	Met for 12 hours (8 required)
	Combination of Conditions A & B (56%)	Met for 7 hours (8 required)
2	<b>Four-Hour Vehicular Volume (70%)</b>	Met for 7 hours (4 required)
3	<b>Peak Hour</b>	Peak hour thresholds exceeded for 7 hours; Warrant is met
4	<b>Pedestrian Volume</b>	Not evaluated
5	<b>School Crossing</b>	No reported safety issues or concerns regarding school children crossing at this location. Warrant is not met
6	<b>Coordinated Signal System</b>	Not needed for progressive signal system. Warrant is not met
7	<b>Crash Experience</b>	Volume and crash experience requirements are not met
8	<b>Roadway Network</b>	Can be considered an intersection of two major routes. Warrant is met
9	<b>Intersection Near a Railroad Grade Crossing</b>	Not adjacent to a grade crossing. Warrant does not apply

Since Warrants 1, 2, 3, & 8 are satisfied, installing a traffic signal is likely to improve the operational efficiency of the intersection compared to the current all-way stop control. **Therefore, the installation of a traffic signal is recommended at the intersection of Garden Ridge Boulevard and Bellaire Boulevard/Voyager Lane.**

---

# ***APPENDIX A***

Time	Garden Ridge Boulevard			Voyager Lane/Bellaire Boulevard		
	SB	NB	Total	EB	WB	Total
	Volume	Volume	Volume	Volume	Volume	Volume
12:00 AM	2	18	20	1	2	3
12:15 AM	6	13	19	0	1	1
12:30 AM	5	9	14	0	0	0
12:45 AM	2	3	5	0	5	5
1:00 AM	4	9	13	1	0	1
1:15 AM	2	4	6	0	2	2
1:30 AM	7	8	15	0	1	1
1:45 AM	3	6	9	0	0	0
2:00 AM	2	2	4	0	0	0
2:15 AM	1	2	3	0	0	0
2:30 AM	4	1	5	0	1	1
2:45 AM	5	3	8	1	0	1
3:00 AM	2	3	5	0	0	0
3:15 AM	5	0	5	0	0	0
3:30 AM	6	5	11	0	1	1
3:45 AM	11	2	13	0	1	1
4:00 AM	9	3	12	0	1	1
4:15 AM	14	2	16	0	1	1
4:30 AM	22	4	26	1	2	3
4:45 AM	29	5	34	3	4	7
5:00 AM	18	12	30	0	4	4
5:15 AM	44	14	58	2	6	8
5:30 AM	91	18	109	4	5	9
5:45 AM	77	17	94	7	6	13
6:00 AM	54	26	80	0	6	6
6:15 AM	104	31	135	3	17	20
6:30 AM	132	29	161	4	20	24
6:45 AM	140	39	179	5	26	31
7:00 AM	183	49	232	32	57	89
7:15 AM	186	78	264	144	98	242
7:30 AM	120	99	219	122	107	229
7:45 AM	172	105	277	25	59	84
8:00 AM	206	88	294	10	33	43
8:15 AM	234	81	315	7	33	40
8:30 AM	197	84	281	10	31	41
8:45 AM	171	85	256	8	31	39
9:00 AM	117	70	187	6	24	30

9:15 AM	111	66	177	9	19	28
9:30 AM	105	70	175	6	29	35
9:45 AM	105	64	169	6	27	33
10:00 AM	71	40	111	1	25	26
10:15 AM	102	56	158	2	28	30
10:30 AM	107	58	165	7	16	23
10:45 AM	87	68	155	8	25	33
11:00 AM	73	75	148	10	21	31
11:15 AM	120	73	193	4	23	27
11:30 AM	103	65	168	10	16	26
11:45 AM	107	83	190	4	25	29
12:00 PM	120	77	197	6	25	31
12:15 PM	113	86	199	5	19	24
12:30 PM	89	73	162	5	30	35
12:45 PM	113	83	196	8	31	39
1:00 PM	107	74	181	5	22	27
1:15 PM	91	95	186	4	30	34
1:30 PM	132	77	209	12	30	42
1:45 PM	104	70	174	5	27	32
2:00 PM	123	93	216	14	34	48
2:15 PM	126	108	234	11	33	44
2:30 PM	143	121	264	5	32	37
2:45 PM	140	128	268	9	57	66
3:00 PM	111	116	227	131	49	180
3:15 PM	97	133	230	71	37	108
3:30 PM	102	119	221	10	57	67
3:45 PM	117	158	275	24	48	72
4:00 PM	145	170	315	22	61	83
4:15 PM	157	205	362	9	64	73
4:30 PM	161	169	330	10	44	54
4:45 PM	179	228	407	25	46	71
5:00 PM	168	185	353	14	59	73
5:15 PM	185	233	418	12	43	55
5:30 PM	182	220	402	23	34	57
5:45 PM	184	177	361	18	34	52
6:00 PM	196	211	407	4	36	40
6:15 PM	156	183	339	18	33	51
6:30 PM	157	189	346	21	25	46
6:45 PM	123	152	275	6	35	41
7:00 PM	101	138	239	3	21	24

7:15 PM	76	114	190	5	28	33
7:30 PM	95	91	186	0	26	26
7:45 PM	78	58	136	4	20	24
8:00 PM	73	69	142	4	13	17
8:15 PM	70	84	154	2	18	20
8:30 PM	58	68	126	3	17	20
8:45 PM	80	80	160	1	17	18
9:00 PM	67	68	135	1	18	19
9:15 PM	66	50	116	2	17	19
9:30 PM	53	53	106	3	11	14
9:45 PM	27	37	64	1	8	9
10:00 PM	24	37	61	1	7	8
10:15 PM	23	23	46	0	3	3
10:30 PM	7	35	42	0	3	3
10:45 PM	24	35	59	1	3	4
11:00 PM	16	19	35	2	4	6
11:15 PM	13	16	29	0	2	2
11:30 PM	11	38	49	0	2	2
11:45 PM	4	14	18	0	2	2
Total	8265	6805	15070	1003	2154	3157

---

## ***APPENDIX B***

All crash data available using this tool represents reportable data collected from Texas Peace Officer's Crash Reports (CR-3) received and processed by the Texas Department of Transportation (Department) as of 03/13/2025. The Department makes no warranty, representation or guaranty as to the content, accuracy, timeliness or completeness of any of the information provided as a result of your query. Any opinions and conclusions resulting from analysis performed on the crash data must be represented as your own and not those of the State of Texas or the Department.

Query Result Counts:

Your query returned a total of 5 Crashes containing 8 Units and 12 Persons

Filters Applied to current Query:

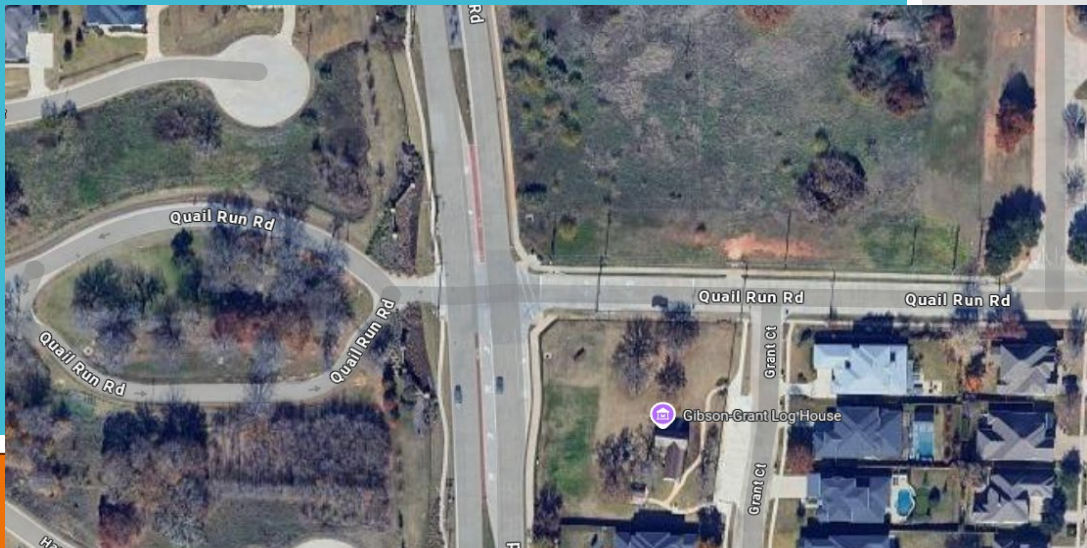
Crash Year Is In 2015 or 2016 or 2017 or 2018 or 2019 or 2020 or 2021 or 2022 or 2023 or 2024 or 2025

Crash ID	City	Street Name	Crash Date	Manner of Collision	Crash Severity	Weather Condition
14835385	LEWISVILLE	BELLAIRE BLVD	12/30/2015	FAILED TO CONTROL SPEED	N - NOT INJURED	1 - CLEAR
18026891	FLOWER MOUND	BELLAIRE BLVD	12/22/2020	OTHER (EXPLAIN IN NARRATIVE)	C - POSSIBLE INJURY	1 - CLEAR
18483496	FLOWER MOUND	S GARDEN RIDGE BLVD	9/14/2021	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	N - NOT INJURED	2 - CLOUDY
19677434	FLOWER MOUND	BELLAIRE BLVD	7/28/2023	FAILED TO CONTROL SPEED	N - NOT INJURED	1 - CLEAR
20081544	FLOWER MOUND	S GARDEN RIDGE BLVD	3/17/2024	FAILED TO DRIVE IN SINGLE LANE; UNDER INFLUENCE - ALCOHOL	C - POSSIBLE INJURY	2 - CLOUDY

# TRAFFIC SIGNAL WARRANT ANALYSIS

INTERSECTION OF FLOWER  
MOUND ROAD AND QUAIL RUN

TRANSPORTATION DEPARTMENT  
FEBRUARY 3, 2025



---

## ***INTRODUCTION***

This traffic study was conducted in response to a request for a resident through the Town's Strategic Services Department for a Traffic Signal at the intersection of Flower Mound Road at Quail Run Road. The purpose of this study was to determine whether the traffic volumes or crash history at this intersection meet the criteria for the installation of a traffic signal. The results of the traffic signal warrant analysis are summarized in this report.

## ***DATA COLLECTION***

Traffic volume data was collected at the study intersection on Thursday January 23, 2025, over a 24-hour period using pneumatic tube counters. The traffic volume dataset is included in Appendix A. Crash records for the intersection were also obtained using TxDOT's Crash Records Information System (CRIS). A table detailing the crash history at this intersection is provided in Appendix B.

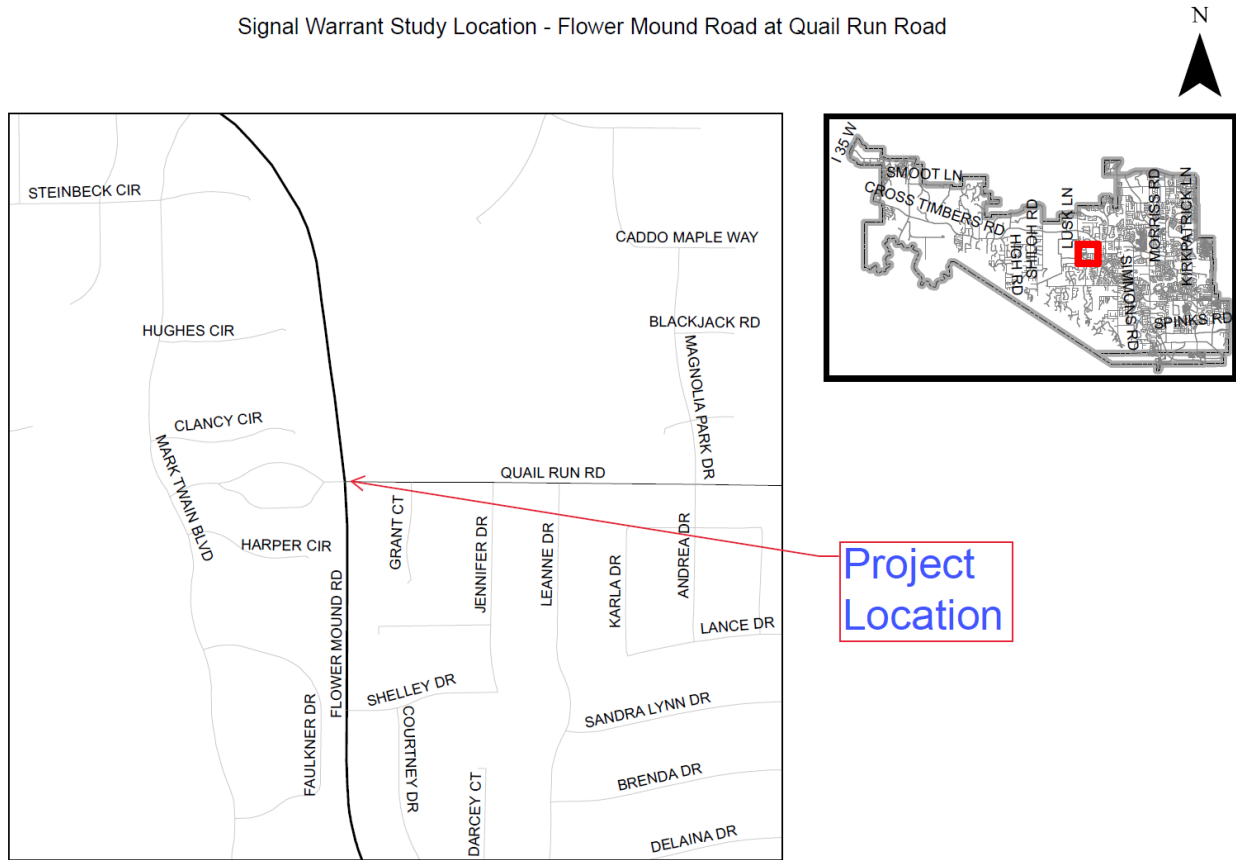
## ***SITE DESCRIPTION***

Flower Mound Road is a four-lane divided north-south Urban Minor Arterial with a posted speed limit of 40 mph. This road serves as a key thoroughfare in town, facilitating significant daily traffic volumes. At the study intersection, Flower Mound Road has dedicated left-turn lanes for both the northbound and southbound directions. Flower Mound Road has a dedicated northbound right turn lane. Quail Run Road is the eastbound and westbound approach to the intersection and is an Urban Collector to the east and a Local Residential Estate Road to the west. The posted speed limit to the east is 30 mph and unposted speed limit to the west. Texas state law prima facie speed limit for unposted residential roadways is 30 mph. If they neighborhood would like to request a lower speed limit of 25 mph, that can be accommodated. The westbound approach of Quail Run Road has two lanes. The eastbound approach is a single lane approach. The westbound traffic is service by both Liberty Elementary School traffic and local residential traffic. The eastbound approach serves local residential traffic.

The intersection of these two streets is currently a two way stop-controlled intersection with stop signs on the approaches of Quail Run Road. Flower Mound Road is the major roadway at this intersection for analysis purposes. Quail Run Road is considered the minor roadway with a multi-lane approach for analysis purposes. The location and layout of the study intersection are illustrated in Figure 1 on the next page

**Figure 1: Study Intersection Location**

Signal Warrant Study Location - Flower Mound Road at Quail Run Road



## **EVALUATION**

The traffic signal warrant analysis presented in this report was performed based on Chapter 4C of the 2011 Texas Manual on Uniform Traffic Control Devices (TMUTCD) revision 2. This chapter of the TMUTCD defines the criteria used for warranting the installation of a traffic signal. The nine signal warrants are listed below:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 3 – Peak Hour
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing

- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network
- Warrant 9 – Intersection near a Grade Crossing

A discussion of the requirements of each of the nine warrants and corresponding analysis results are presented below.

### **Warrant 1 – Eight-Hour Vehicular Volume**

The purpose of Warrant 1 is to assess whether the volume of intersecting traffic from the minor approaches is the main reason to consider installing a traffic signal. This warrant is comprised of two conditions:

Condition A –The Minimum Vehicular Volume: this condition is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal.

Condition B –The Interruption of Continuous Traffic: this condition is intended for application at locations where condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

The minimum eight-hour traffic volumes required for both conditions are presented in the tables below from Chapter 4C of the TMUTCD.

**Table 1: TMUTCD Table 4C-1: Warrant 1, Eight-Hour Vehicular Volume**

**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (Total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%a	80%b	70%c	56%d	100%a	80%b	70%c	56%d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (Total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%a	80%b	70%c	56%d	100%a	80%b	70%c	56%d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

- a - Basic minimum hourly volume;
- b - Used for combination of Conditions A and B after adequate trial of other remedial measures;
- c - May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.
- d - May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

According to the TMUTCD, Warrant 1 is satisfied if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

The warrant is also satisfied if both Conditions A and B are met at the 80% level for any 8 hours of an average day.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 and 56 percent columns in Table 4C-1 may be used in place of the 100 percent columns. The Warrant B is met but not Warrant A for the combination of conditions under the 56% column

Since the posted speed limit on Flower Mound Road is 40 mph, the traffic volumes during the eight-highest hours at the study intersection were compared with the volumes in the 70% and 56% columns in Table 4C-1 for both conditions. Based on this comparison, **Warrant 1 is not met for the study intersection.**

**Table 2: Warrant 1 Analysis**

**Warrant 1A**

Time	Volumes		Warrant 1A Meets Criteria?			
	Major	Minor	100%	80%	70%	56%
0:00 - 1:00	26	3	Neither	Neither	Neither	Neither
1:00 - 2:00	9	0	Neither	Neither	Neither	Neither
2:00 - 3:00	13	0	Neither	Neither	Neither	Neither
3:00 - 4:00	13	1	Neither	Neither	Neither	Neither
4:00 - 5:00	49	1	Neither	Neither	Neither	Neither
5:00 - 6:00	105	12	Neither	Neither	Neither	Neither
6:00 - 7:00	332	14	Neither	Neither	Neither	Neither
7:00 - 8:00	1143	206	Both	Both	Both	Both

8:00 - 9:00	860	82	Major Only	Major Only	Major Only	Major Only
9:00 - 10:00	513	59	Neither	Major Only	Major Only	Major Only
10:00 - 11:00	469	58	Neither	Neither	Major Only	Major Only
11:00 - 12:00	427	63	Neither	Neither	Major Only	Major Only
12:00 - 13:00	432	63	Neither	Neither	Major Only	Major Only
13:00 - 14:00	461	62	Neither	Neither	Major Only	Major Only
14:00 - 15:00	644	83	Major Only	Major Only	Major Only	Major Only
15:00 - 16:00	795	177	Major Only	Both	Both	Both
16:00 - 17:00	1027	104	Major Only	Major Only	Major Only	Major Only
17:00 - 18:00	1271	84	Major Only	Major Only	Major Only	Major Only
18:00 - 19:00	854	95	Major Only	Major Only	Major Only	Major Only
19:00 - 20:00	428	50	Neither	Neither	Major Only	Major Only
20:00 - 21:00	313	52	Neither	Neither	Neither	Neither
21:00 - 22:00	198	14	Neither	Neither	Neither	Neither
22:00 - 23:00	94	15	Neither	Neither	Neither	Neither
23:00 - 24:00	50	3	Neither	Neither	Neither	Neither

Number of Hours that Meet Criteria for Both Streets

10526	1301	1	2	2	2
-------	------	---	---	---	---

**Warrant 1B**

Time	Volumes		Warrant 1B Meets Criteria?			
	Major	Minor	100%	80%	70%	56%
0:00 - 1:00	26	3	Neither	Neither	Neither	Neither
1:00 - 2:00	9	0	Neither	Neither	Neither	Neither
2:00 - 3:00	13	0	Neither	Neither	Neither	Neither
3:00 - 4:00	13	1	Neither	Neither	Neither	Neither
4:00 - 5:00	49	1	Neither	Neither	Neither	Neither
5:00 - 6:00	105	12	Neither	Neither	Neither	Neither
6:00 - 7:00	332	14	Neither	Neither	Neither	Neither
7:00 - 8:00	1143	206	Both	Both	Both	Both
8:00 - 9:00	860	82	Neither	Both	Both	Both
9:00 - 10:00	513	59	Neither	Neither	Neither	Both
10:00 - 11:00	469	58	Neither	Neither	Neither	Minor Only
11:00 - 12:00	427	63	Neither	Neither	Neither	Minor Only
12:00 - 13:00	432	63	Neither	Neither	Neither	Minor Only
13:00 - 14:00	461	62	Neither	Neither	Neither	Minor Only
14:00 - 15:00	644	83	Neither	Minor Only	Both	Both
15:00 - 16:00	795	177	Minor Only	Both	Both	Both
16:00 - 17:00	1027	104	Both	Both	Both	Both
17:00 - 18:00	1271	84	Major Only	Both	Both	Both
18:00 - 19:00	854	95	Neither	Both	Both	Both
19:00 - 20:00	428	50	Neither	Neither	Neither	Neither

20:00 - 21:00	313	52	Neither	Neither	Neither	Neither
21:00 - 22:00	198	14	Neither	Neither	Neither	Neither
22:00 - 23:00	94	15	Neither	Neither	Neither	Neither
23:00 - 24:00	50	3	Neither	Neither	Neither	Neither

Number of Hours that Meet Criteria for Both Streets

10526	1301	2	6	7	8
-------	------	---	---	---	---

### Warrant 2 – Four-Hour Vehicular Volume

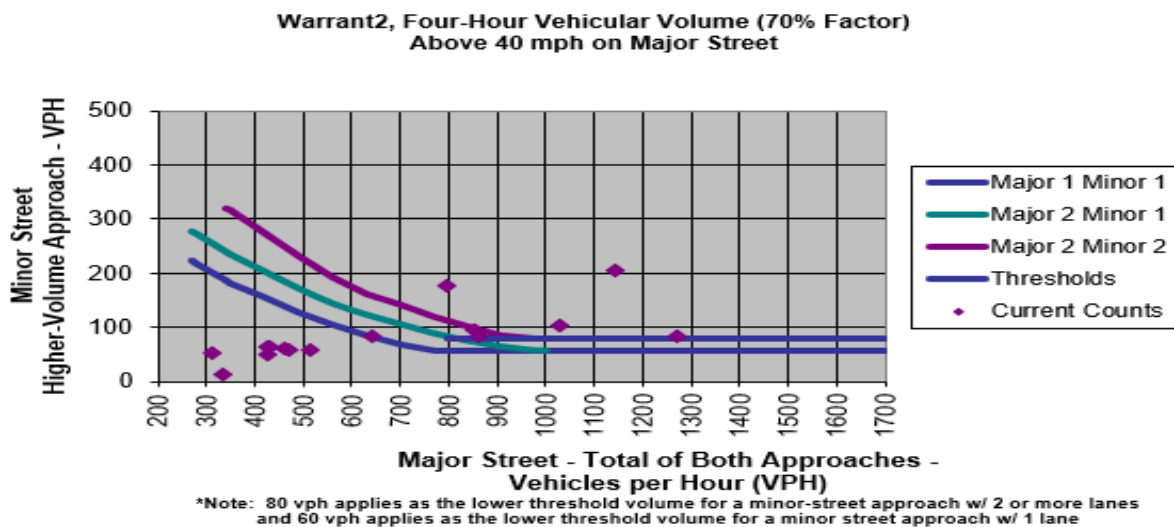
Similar to Warrant 1, Warrant 2 is also used to assess whether the volume of intersecting traffic from the minor approaches is the principal reason to consider installing a traffic signal.

According to the TMUTCD, Warrant 2 is satisfied if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

As the posted speed limit on Flower Mound Road is 40 mph, Figure 4C-2 from the TMUTCD was used in the analysis of the four-hour vehicular volume signal warrant.

**Figure 2: TMUTCD Figure 4C-2 Warrant 2, Four-Hour Vehicular Volume (70% Factor)**



---

In comparing the traffic volumes of the four highest hours with those in Figure 4C-2, **Warrant 2 is met for the study intersection.**

### ***Warrant 3 – Peak Hour***

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

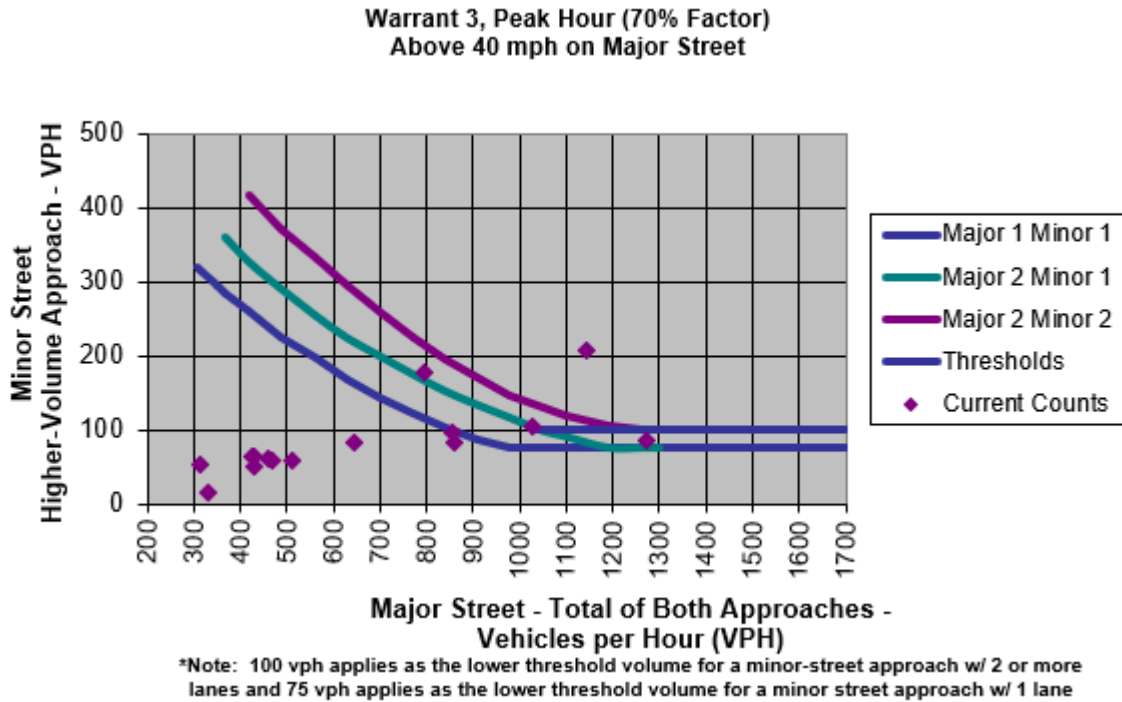
According to the TMUTCD, Warrant 3 is satisfied if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
  1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and
  2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and
  3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

Based on the posted speed limit of Flower Mound Road, figure 4C-4 from the TMUTCD was used in the analysis of the peak hour signal warrant.

**Figure 3: TMUTCD Figure 4C-4 Warrant 3, Peak Hour (70% Factor)**



Per the collected traffic volume data, this intersection's AM and PM peak hours are 7:00-8:00 in the morning and 5:00-6:00 in the afternoon. When the highest hourly volume of the study intersection is applied to Figure 4C-4, Category B is satisfied for this warrant. Category A may meet. Delay study was not performed. As a result, **Warrant 3 is met for the study intersection.**

### **Warrant 4 – Pedestrian Volume**

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

According to the TMUTCD, Warrant 4 is satisfied if an engineering study finds that one of the following criteria is met:

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or

- 
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Since there is no pedestrian crossing facilities across Flower Mound Road this warrant was not determined. Based on historical field observations, pedestrian crossings take place at the Liberty Elementary school and not at this intersection. Therefore, **Warrant 4 is unlikely to meet warrant criteria and was not observed.**

#### ***Warrant 5 – School Crossing***

The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “school children” includes elementary through high school students. The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the school children are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 school children during the highest crossing hour.

The study intersection is not an established school crossing. Therefore, **Warrant 5 does not apply.**

---

### ***Warrant 6 – Coordinated Signal System***

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

According to the TMUTCD, Warrant 6 is met when one of the following requirements are met:

- A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.
- B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet. The nearest signalized intersections to the study location are located over 4,000 feet to the north at FM 1171 (Cross Timbers Rd) and approximately 1.25 miles to the southeast at Bruton Orand/Simmons.

Based on the current traffic conditions, it is unlikely that a traffic signal will be necessary at the study intersection to facilitate vehicle platooning. As a result, **Warrant 6 is not met for the study intersection.**

### ***Warrant 7 – Crash Experience***

The Crash Experience signal warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic signal.

According to the TMUTCD, Warrant 7 is met when all of the following requirements are met:

- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
- B. Five or more reported crashes of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the

---

intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

According to the available crash data, there have been three reported crashes susceptible to correction by a traffic signal at this intersection in the past 12 months. Therefore, the requirements for Item B are not satisfied. Additionally, the traffic volumes at the intersection do not meet the requirements for Item C. When the volumes are compared with the volumes in the 56% columns in Table 4C-1 for both conditions. **As a result, Warrant 7 is not met for the study intersection.**

### ***Warrant 8 – Roadway Network***

The systems warrant is intended to encourage concentration and organization of traffic flow in roadway networks. This warrant is satisfied when the common intersection of two major routes meets one or both of the following criteria:

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have at least one of the following characteristics:

It is part of the street or highway system that serves as the principal roadway network for through traffic flow.

- 1. It includes rural or suburban highways outside, entering, or traversing a city.
- 2. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.
- 3. It connects areas of principal traffic generation.

- 
4. It has surface street freeway or expressway ramp terminals.

The study intersection does not serve as a common intersection of two major routes; therefore, **Warrant 8 does not apply to the study intersection.**

### ***Warrant 9 – Intersection Near a Grade Crossing***

The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal. This warrant is satisfied when both of the following criteria are met:

- A. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and
- B. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13 of the TMUTCD.

There is not a railroad grade crossing located within 140 feet of the study intersection. Therefore, **Warrant 9 does not apply to the study intersection.**

### ***Sight Distance Evaluation***

As part of this study, the sight distance on the minor approaches was evaluated to determine if vehicles stopped on Quail Run Road have adequate visibility to observe conflicting traffic along Flower Mound Road. For this evaluation, Intersection sight triangles were developed using the methodology outlined in the American Association of State Highway and Transportation Officials (AASHTO) guidebook, *A Policy on Geometric Design of Highways and Streets, 7th Edition*. Based on the AASHTO sight distance criteria, aerial images, and field observations, the available and required intersection/stopping sight distances for Quail Run Road were determined. Table 3 presents the findings of the sight distance evaluation.

**Table 3: Sight Distance Evaluation Summary – Flower Mound Rd and Quail Run Rd**

Major Roadway Flower Mound Rd		Sight Distance Analysis: Flower Mound Rd at Quail Run Rd		
Minor Roadway Quail Run Rd				
Posted Speed Limit 40 mph		Left Turn		Right Turn
Setback	Category	Looking Left from Decision Point	Looking Right from Decision Point	Looking Left from Decision Point
Required Intersection Sight Distance		385 ft	560 ft	385 ft
Required Stopping Sight Distance		360 ft		
Eastbound Approach ~8 ft from Travel Way	Available	>600 ft	>600 ft	>600 ft
	Acceptable?	Yes	Yes	Yes
	Obstruction	None	None	None
Westbound Approach ~8 ft from Travel Way	Available	>600 ft	>600 ft	>600 ft
	Acceptable?	Yes	Yes	Yes
	Obstruction	None	Partial from median landscaping	None

Based on a comparison of the available sight distance to the required sight distance presented in Table 3, the westbound left-turn movement has adequate sight distance, however, median landscaping could be trimmed or thinned to increase better visibility within the sight triangle.

It is important to note that not all objects in the sight triangles completely block the driver's view, as some are narrow enough to be seen through allowing the driver to see oncoming traffic.

**CONCLUSION/RECOMMENDATIONS**

Per the standards of the TMUTCD, a traffic signal should not be installed unless an engineering study indicates that installing a traffic signal will improve the overall safety and/or operation of the intersection and will not seriously disrupt the progressive flow of traffic. Based on the results of this traffic signal warrant analysis, the existing traffic conditions at the study intersection does meet traffic signal warrants outlined in the TMUTCD. The results of the warrant analysis are summarized in Table 4.

**Table 4: Warrant Summary – Flower Mound Rd and Quail Run Rd**

Warrant	Description	Analysis Result
1	Condition A - Eight Hour Volume - Minimum Vehicular Volume (70% & 56 % respectively)	2 hours met (8 required) 2 hours met (8 required)
	Condition B - Eight Hour Volume - Minimum Vehicular Volume (70% & 56 % respectively)	7 hours met (8 required) 8 hours met (8 required)
	Combination of A & B	A not met; B met
2	Four Hour Vehicular Volume	Plot above line, met
3	Peak Hour Volume	Plot above line, met
4	Pedestrian Volume	No FMRD crossing; Not met
5	School Crossing	Not a school crossing; Not met
6	Coordinated Signal System	Not needed; Not met
7	Crash Experience	No enough crashes; Not met
8	Roadway Network	Not major intersection; Not met
9	Intersection Near a Rail Crossing	No adjacent rail; Not met

Two of the nine signal warrants were met for the study intersection, installing a traffic signal may improve the overall safety and/or operation of the intersection. However, it could disrupt the progressive flow of traffic on Flower Mound Road. **Therefore, installing a traffic signal is could be considered at this intersection by the Transportation Commission.** However, to help improve visibility for drivers making a westbound left turn at the intersection, **it is recommended to trim the trees and landscaping on the north of Quail Run Road in the median.** This trimming should focus on removing or reducing the density of vegetation that partially obstructs the sight triangle.

---

# ***APPENDIX A***

Town of Flower Mound  
Transportation Department  
Traffic Counts

Site Code: Westbound Quail Run Rd at Flower Mound  
Rd

Location 1:  
Location 2:

Latitude: 0.000000  
Longitude: 0.000000

---

1/23/2025	WB
Time	
12:00 AM	3
1:00	0
2:00	0
3:00	1
4:00	1
5:00	12
6:00	14
7:00	206
8:00	82
9:00	59
10:00	58
11:00	63
12:00 PM	63
1:00	62
2:00	83
3:00	177
4:00	104
5:00	84
6:00	95
7:00	50
8:00	52
9:00	14
10:00	15
11:00	3
Total	1301
AM Peak	7:00
Volume	206
PM Peak	3:00
Volume	177

---

Town of Flower Mound  
 Transportation Department  
 Traffic Counts

Site Code: Northbound Flower Mound Rd at Quail Run  
 Rd  
 Location 1:  
 Location 2:

Latitude: 0.000000  
 Longitude: 0.000000

1/23/2025	A to B, None
Time	Specified
12:00 AM	16
1:00	4
2:00	8
3:00	3
4:00	12
5:00	21
6:00	92
7:00	452
8:00	295
9:00	192
10:00	215
11:00	213
12:00 PM	215
1:00	243
2:00	345
3:00	478
4:00	614
5:00	804
6:00	519
7:00	257
8:00	165
9:00	128
10:00	60
11:00	28
Total	5379
AM Peak	7:00
Volume	452
PM Peak	5:00
Volume	804

Town of Flower Mound  
Transportation Department  
Traffic Counts

Site Code: Eastbound Quail Run Rd at Flower Mound

Rd

Location 1:

Location 2:

Latitude: 0.000000

Longitude: 0.000000

---

1/23/2025	Channel 1
Time	
12:00 AM	0
1:00	0
2:00	0
3:00	1
4:00	0
5:00	4
6:00	9
7:00	34
8:00	19
9:00	14
10:00	10
11:00	10
12:00 PM	9
1:00	6
2:00	18
3:00	17
4:00	14
5:00	30
6:00	36
7:00	9
8:00	9
9:00	1
10:00	0
11:00	0
Total	250
AM Peak	7:00
Volume	34
PM Peak	6:00
Volume	36

---

Town of Flower Mound  
Transportation Department  
Traffic Counts

Site Code: Southbound Flower Mound Rd at Quail Run

Rd

Location 1:

Location 2:

Latitude: 0.000000

Longitude: 0.000000

---

1/23/2025	A to B, SB
Time	
12:00 AM	10
1:00	5
2:00	5
3:00	10
4:00	37
5:00	84
6:00	240
7:00	691
8:00	565
9:00	321
10:00	254
11:00	214
12:00 PM	217
1:00	218
2:00	299
3:00	317
4:00	413
5:00	467
6:00	335
7:00	171
8:00	148
9:00	70
10:00	34
11:00	22
Total	5147
AM Peak	7:00
Volume	691
PM Peak	5:00
Volume	467

---

---

## ***APPENDIX B***

---

Crash ID	Agency	Case ID	Contributing Factors	Crash Date	Intersecting Street Name	Street Name
20161184	FLOWER MOUND POLICE DEPARTMENT	24014711	FAILED TO YIELD RIGHT OF WAY - TURNING LEFT	4/27/2024	QUAIL RUN RD	N FLOWER MOUND RD
20460710	FLOWER MOUND POLICE DEPARTMENT	24042840	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	10/17/2024	QUAIL RUN RD	N FLOWER MOUND RD
20618069	FLOWER MOUND POLICE DEPARTMENT	25002944	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	1/21/2025	QUAIL RUN RD	N FLOWER MOUND RD