# Amarillo District Highway - Rail Grade Crossing Study

Summary Report

April 2025

Texas Department of Transportation

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# 1. Overview

The Amarillo District Highway-Rail Grade Crossing Study evaluates safety and operational challenges at highway-rail grade crossings within the Texas Department of Transportation (TxDOT) Amarillo District. This initiative focuses on identifying high-priority crossings and developing cost-effective improvement strategies to enhance safety, mobility, and efficiency for both motorists and rail operations.

The study area (**Figure 1**) includes crossings along freight rail lines operated by BNSF Railway (BNSF), Union Pacific Railroad (UP), Panhandle Northern Railroad Company (PNR), and Texas North Western Railway Company (TXNW). Through a structured screening process, 10 priority crossings were selected from an initial pool of 279 at-grade crossings, using a combination of quantitative data analysis and qualitative assessments. To address the identified challenges, six grade-separation and four at-grade improvement concepts were developed for the priority crossings. A benefit-cost analysis was conducted, along with the development of a strategic implementation plan for recommended upgrades. These findings will guide next steps for individual project development in future phases. Two rounds of stakeholder engagement meetings were held throughout the study process to gather input, along with several individual stakeholder meetings to discuss specific crossings of interest to participating jurisdictions as shown in **Figure 2**.

Key components of the study include:

- Safety and operational analysis of existing at-grade crossings
- Screening and prioritization of existing at-grade crossings
- Conceptual development of potential improvements
- Benefit-cost evaluation
- Strategic implementation planning for recommended upgrades

## 1.1 Report Outline

This report includes the following sections:

- **Screening Methodology and Results:** This section outlines the quantitative and qualitative information used to evaluate the highway-rail at-grade crossing locations for potential grade separation and at-grade improvement considerations.
- **Improvement Type Overview:** This section provides a summary of the improvement types considered in this study.
- **Summary or Improvement Concepts:** This section summarizes the improvement concepts considered at identified priority highway-rail at-grade crossings.
- **Benefit-Cost Analysis and Results:** This section summarizes the economic feasibility of replacing the rail grade-crossings for each of the six rail projects with grade-separated crossings.
- **Implementation Plan:** This section outlines the steps necessary to execute the proposed improvements for priority highway-rail grade crossings.

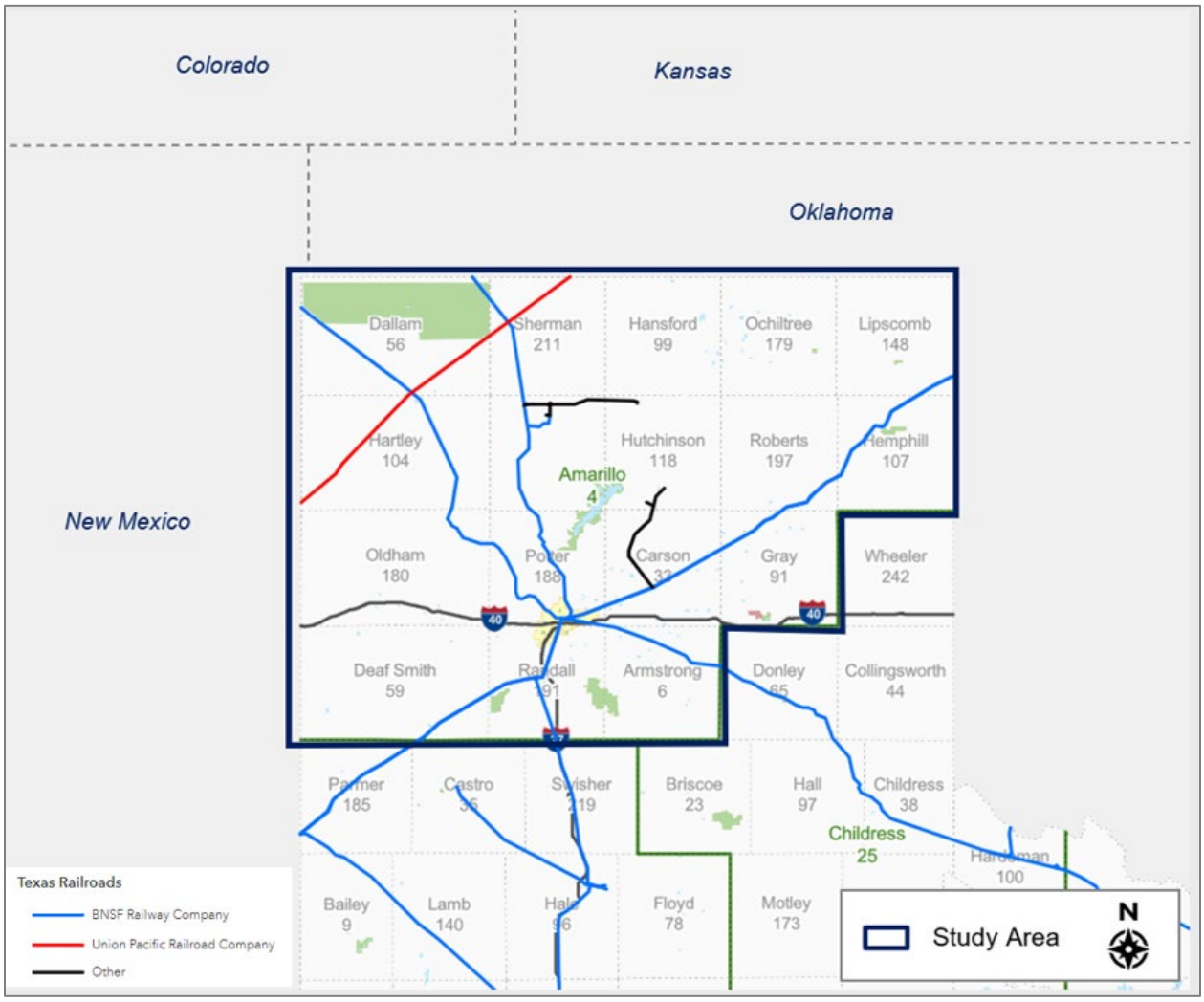



*Figure 1: Study Area*

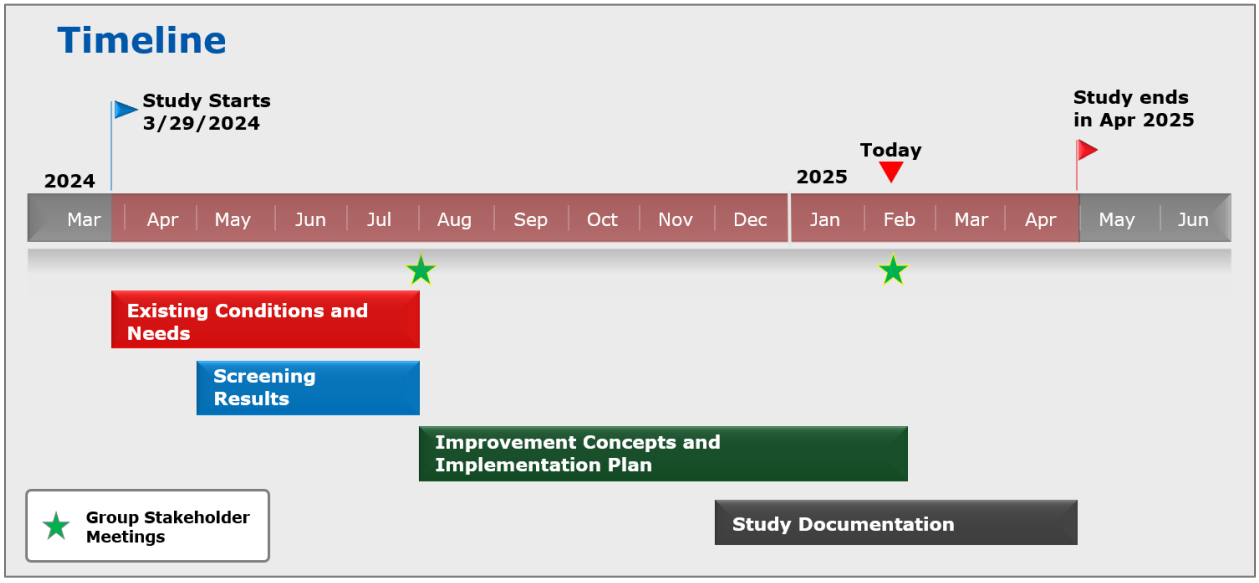



*Figure 2: Study Schedule*

# 2. Screening Methodology and Results

This screening methodology evaluated various crossing parameters and characteristics of highway-rail at-grade crossings to prioritize grade separation feasibility and project advancement. With 345 open public rail crossings in the Amarillo District (**Figure 3**), the screening methodology was broken into phases.

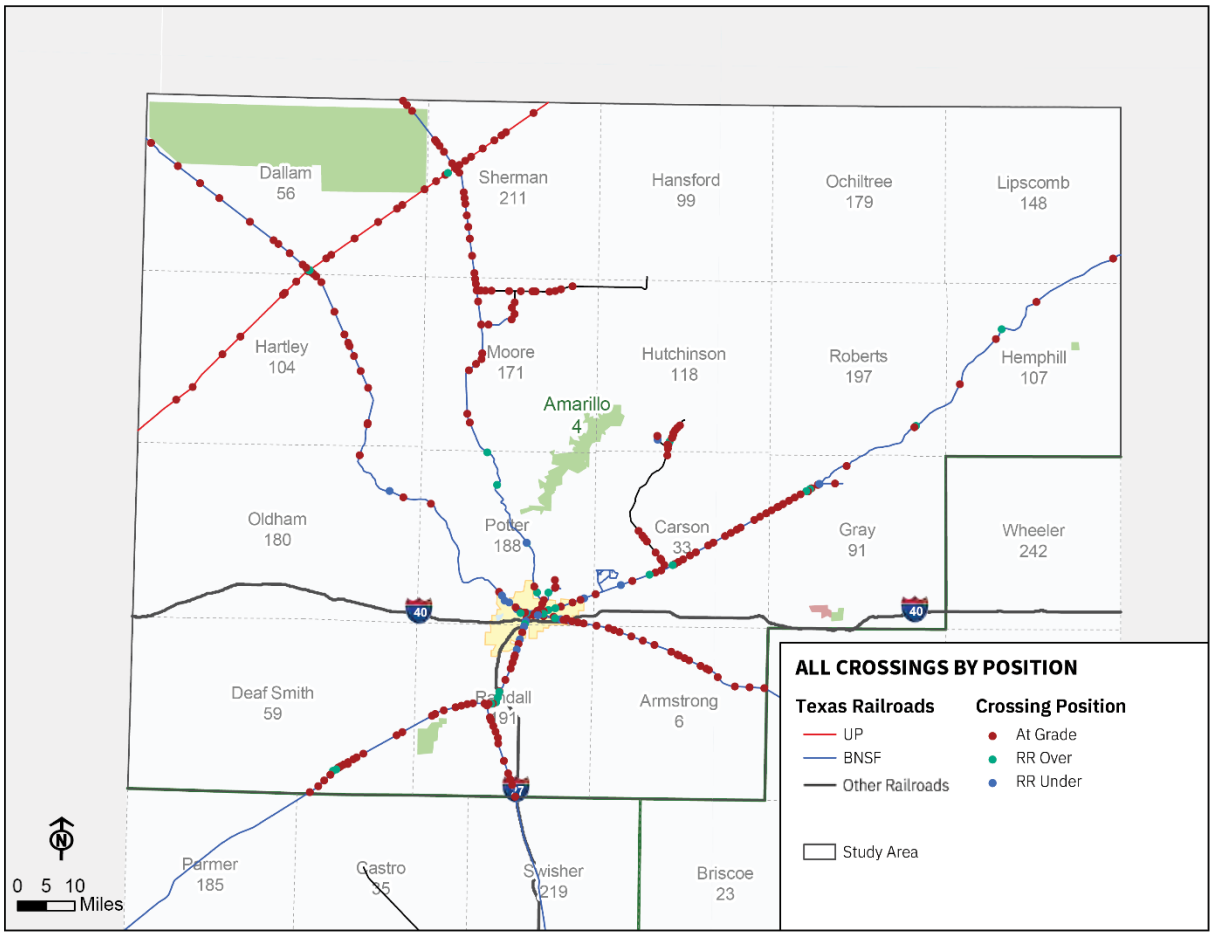



*Figure 3: Public Rail Crossings by Position in the Amarillo District*

## 2.1 Existing Conditions

Key data sources used for the existing conditions analysis included grade crossing incident reports and blocked crossing data from the Federal Railroad Administration (FRA), as well as crossing profiles from TxDOT. A detailed analysis of the existing conditions can be found in **Appendix A**.

### *2.1.1 Public Crossing Inventory*

The existing conditions analysis, based on data collected in April 2024, concluded there are currently 345 public rail crossings in the Amarillo District, including 279 at-grade crossings, 35 railroad overpasses, and 31 railroad underpasses. The key focus of this study is at-grade crossings.

### *2.1.2 At-Grade Crossing Analysis*

Among these 279 at-grade rail crossings, 245 crossings (88%) have an average annual daily traffic count (AADT) of less than 2,500. Only 10 crossings experience an AADT greater than 5,000. Three crossings have an AADT exceeding 10,000 which include Grand Street and US 287 (Taylor Street) crossings, both of which already have grade separations but still maintain surface streets with grade crossings, and the Hereford Feed Yard Road crossing, which connects to a Livestock Nutrition Center Feed Mill adjacent to US 60. Railroad ownership, warning device types, and daily train counts were also included in the at-grade crossing analysis.

### *2.1.3 Safety Analysis*

The safety analysis was conducted using the last five-year crash history data (2019-2023) obtained from FRA (**Table 1**). The analysis highlights that while most of the crossings (253) have not experienced any crashes in the past five years, there are specific crossings with higher frequencies and severities of crashes, necessitating focused safety improvements.

*Table 1: Five-year Crash and Severity Counts*

| DOT Num | Street/Road | Crash Count | Fatality Count | Injury Count |
|---|---|---|---|---|
| 014733K | FM 2943 | 4 | 1 | 1 |
| 014556H | COUNTY ROAD 3 | 3 | - | - |
| 596201M | COUNTY ROAD 13 | 2 | - | - |
| 014693P | EAST 46TH STREET | 2 | - | - |
| 596188B | FM 807 | 2 | - | |
| 596189H | LITTLE ROAD | 2 | - | 1 |
| 014602G | NORTH EASTERN STREET | 2 | - | 1 |
| 014734S | PROGRESSIVE ROAD | 2 | - | - |
| 016969J | SIXTH STREET | 2 | - | - |
| 014707V | BROWN ROAD | 1 | - | - |
| 596181D | CHAMBERLAIN ROAD | 1 | - | - |
| 596199N | COUNTY ROAD 11 | 1 | 1 | - |
| 275281W | COUNTY ROAD 30 | 1 | - | - |
| 017098G | COUNTY ROAD 7 | 1 | - | - |
| 017105P | COUNTY ROAD J | 1 | - | 1 |
| 014580J | COUNTY ROAD L | 1 | - | - |

| DOT Num | Street/Road | Crash Count | Fatality Count | Injury Count |
|---|---|---|---|---|
| 014549X | FM 282 | 1 | - | - |
| 017052T | FM 722 / WEST FOURTEENTH STREET | 1 | - | - |
| 014508T | FM 1453 | 1 | - | - |
| 014714F | JOHNSON RANCH ROAD | 1 | - | 2 |
| 014700X | MCCORMICK ROAD | 1 | - | - |
| 017075A | MONTFORD ROAD | 1 | - | - |
| 017010G | NORTHEAST TWENTY FORTH AVENUE | 1 | - | 1 |
| 014597M | PARSLEY ROAD | 1 | - | - |
| 440783L | SS 24 | 1 | - | - |
| 014518Y | WEST PURCELL AVENUE | 1 | - | - |

### *2.1.4 Previous Studies and Plans*

The following studies and plans were reviewed to establish a comprehensive understanding of the Amarillo District's transportation context, relevant issues, and planned projects:

- Statewide Transportation Improvement Program (STIP)
- Amarillo MPO Transportation Improvement Program (TIP)
- Connecting Texas 2050
- Amarillo Area Regional Multimodal Mobility Plan 2021
- 2024 Unified Transportation Program
- Amarillo Metropolitan Transportation Plan 2020-2045
- Texas Rail Plan 2019
- Amarillo City Plan: Vision 2045
- Texas Transportation Plan 2050
- Texas Freight Mobility Plan 2018
- Canyon Downtown Plan 2022
- Our Canyon: A Comprehensive Plan 2018

The reviewed plans highlighted key concerns, including congestion at intermodal facilities for rail-truck transfers and safety and delays at at-grade highway-rail crossings. Notably, the Texas Rail Plan (2019) proposes a grade separation project at Farmers Avenue to improve safety, mobility, and reliability for both passenger and freight movement.

## 2.2 Initial Screening

The study employed a multifaceted approach, incorporating the Texas Priority Index (TPI), ten-year crash history, district and stakeholder priorities, and previous plans to evaluate the 279 at-grade crossings in the study area.

### *2.2.1 TPI/Revised TPI*

The TPI formula and the revised TPI formula were used in weighing at-grade rail crossings for project improvements. The TPI formula was used by TxDOT until a 2013 research report[1] suggested a revision to the TPI formula that included a wider range of variables and better controlled for AADT.

- **TPI Formula:** $TPI = 0.001 \times AADT \times T \times S \times P_f \times A^{1.15}$
- **Revised TPI Formula:** $TPI_{revised} = 1000 \times \hat{u} \times (A_5 + 0.1)$

### *2.2.2 Stakeholder and District Priority*

TxDOT Amarillo District provided a list of the priority crossings from previous work in the district. Feedback from the two stakeholder meetings in July and August through interactive survey and an GIS WebMap including railroads, Amarillo District, cities and counties, were also incorporated into the screening of priority crossings.

## 2.3 Priority Crossings

After the initial screening, the top-priority at-grade crossings were identified based on weighted scores using TPI/Revised TPI, crash data, district and stakeholder priorities, and previous plans. Ten priority at-grade crossings were advanced for conceptual improvements and design (**Table 2**).

*Table 2: Priority At-Grade Crossings*

| DOT Num | Street/Road | County | RR Operator Name |
|---|---|---|---|
| 014693P | EAST 46TH STREET | Randall | BNSF Railway Company |
| 014695D | FARMERS AVENUE | Randall | BNSF Railway Company |
| 014700X | MCCORMICK ROAD | Randall | BNSF Railway Company |
| 014701E | ROCKWELL ROAD | Randall | BNSF Railway Company |
| 014602G | NORTH EASTERN STREET | Potter | BNSF Railway Company |
| 014698Y | GEORGIA STREET | Randall | BNSF Railway Company |
| 014704A | 15TH STREET | Randall | BNSF Railway Company |
| 275237J | SH 207/HURLEY AVENUE | Armstrong | BNSF Railway Company |
| 014549X | FM 282/SOUTH PRICE ROAD | Pampa | BNSF Railway Company |
| 596188B | FM 807 | Dallam | Union Pacific Railroad Company |

[1] Weissmann, A. J., et al. (2013). Integrated prioritization method for active and passive highway-rail crossings (Report No. FHWA/TX-12/0-6642-1). Texas A&M Transportation Institute. https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6642-1.pdf

# 3. Improvement Type Review

The improvement concepts aim to address immediate needs while accommodating future transportation demands. The project team reviewed various improvement types, and their relevant applications considered for highway-railroad at-grade crossings which is found in **Appendix B**. At this stage, the improvement concepts are preliminary, and there is currently no established construction timeframe or funding commitment.

Recommended Improvements:

- **Grade Separation**: Eliminate highway-rail intersections by elevating or lowering either the highway or the railroad tracks. This design allows vehicular traffic to flow uninterrupted at crossings occupied by trains. By physically separating road and rail traffic, grade separations eliminate the potential for vehicle-train collisions, significantly enhancing safety at these locations. Additionally, grade-separated crossings improve safety for pedestrians and bicyclists by providing a safer alternative that minimizes interactions with moving trains—an especially critical consideration in areas with high pedestrian and bicyclist activity. Grade separation is typically implemented as a long-term solution due to its high cost and significant impacts.
- **Safety Upgrades**: Targeted safety improvements in the short- or medium-term at at-grade crossings to improve roadway safety and maintain smooth traffic flow, including gate installation, hump mitigation, pedestrian and bicycle accommodations, raised median, signs, pavement markings, and crossing panels.
    - Gate Installation: Installing or upgrading automatic gates with flashing lights helps prevent vehicles and pedestrians from crossing tracks when trains are approaching.
    - Hump Mitigation: Addressing vertical alignment issues at crossings reduces the risk of vehicles bottoming out and becoming stuck on the tracks, especially for large or low-clearance vehicles.
    - Pedestrian and Bicycle Accommodations: Adding sidewalks, bike lanes, or shared-use paths enhances safety for non-motorized users, ensuring clear and accessible pathways across rail tracks.
    - Raised Medians: Constructing raised medians between opposing traffic lanes prevents drivers from circumventing gates, improving compliance with crossing signals.
    - Signs and Pavement Markings:
        - Stop Bars and Pavement Markings: Installing highly visible stop bars and highway-rail grade crossing markings provides clear lane guidance and helps alert drivers to crossing locations.
        - Sign Relocation: Moving signs such as the Grade Crossing Advance Warning Sign (W10-1) and the Do Not Stop on Tracks Sign (R8-8) to optimal positions ensures better visibility, effectively warning and guiding roadway users to reduce potential risks.
    - Crossing Panels: Installing durable crossing panels creates a smoother surface for vehicles, minimizing bumps and disruptions at crossings. These panels are particularly effective in high-traffic industrial areas as they withstand the wear and tear of heavy truck traffic and frequent rail shipments.

- **Other Planned Improvements**: planned or funded improvements such as the Federal Highway Administration (FHWA) Section 130 Program.

# 4. Summary of Improvement Concepts

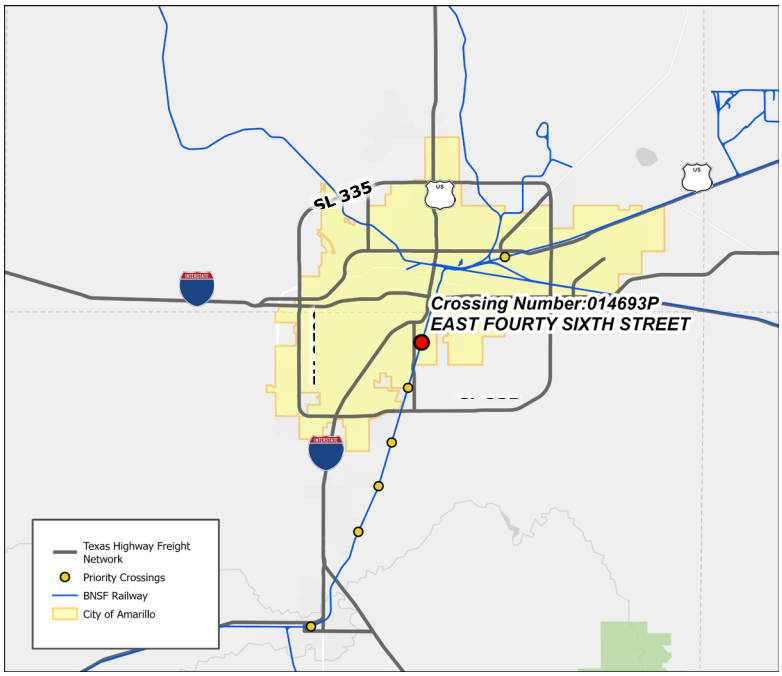
The following provides a summary of each of the 10 potential projects that were evaluated. A draft conceptual plan for each project was developed and circulated for stakeholder review and feedback after stakeholder meetings. For some projects, multiple alternatives were prepared to address different design considerations, such as the inclusion or exclusion of pedestrian accommodations. These alternatives were evaluated based on right-of-way constraints, safety, connectivity, and local context. The exhibits and cost estimate for improvement concepts can be found in **Appendix C**.

*Table 3: Summary of Improvements at Ten Priority At-Grade Crossings*

| DOT Num | Street | Section 130 Improvement | Study Recommendation |
|---|---|---|---|
| 014693P | EAST 46TH STREET | **Planned but Not Funded** Add cantilevers and medians | **Grade Separation (long term):** A two-lane overpass incorporating pedestrian and bicycle accommodations, along with surface-level access. |
| 014695D | FARMERS AVENUE | **Planned but Not Funded**<br>Planned for median, signs, and pavement markings | **Grade Separation (long term):** A two-lane overpass with surface-level access. |
| 014700X | MCCORMICK ROAD | - | **Safety Upgrade (short/medium term)**<br>**Grade Separation (long term):** A two-lane overpass with surface-level access. |
| 014701E | ROCKWELL ROAD | - | **Safety Upgrade (short/medium term)**<br>**Grade Separation:** A two-lane overpass with surface-level access. |
| 014602G | NORTH EASTERN STREET | **Planned but Not Funded**<br>Add cantilevers and medians | **Safety Upgrade (short/medium term)**<br>**Grade Separation:** A four-lane overpass |
| 014698Y | GEORGIA STREET | - | **Grade Separation:** A two-lane overpass |
| 014704A | 15TH STREET | - | **At-Grade Improvement (short/medium term)** |
| 275237J | SH 207/HURLEY AVENUE | - | **At-Grade Improvement (short/medium term)** |
| 014549X | FM 282/SOUTH PRICE ROAD | - | **At-Grade Improvement (short/medium term)** |
| 596188B | FM 807 | **Planned but Not Funded**<br>Add cantilevers, signage, gates, side lights, and cabin | **At-Grade Improvement (short/medium term)** |

## 4.1 DOT# 014639P, East 46th Street (Randall County)

| | |
|---|---|
| DOT Num | 014693P |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Hereford |
| Milepost | 556.278 |
| Warning Device | Gates |
| Traffic Volume | 3,268 |
| Crashes Since 2019 | 2 |
| Blocked Crossing Incidents Since 2019 | 9 |




Note: Crashes are retrieved from FRA database between 1/1/2019 and 11/25/2024 and blocked crossing incidents are retrieved from FRA database between 1/1/2019 and 10/23/2024.

East 46th Street is an east-west, two-lane, undivided roadway located in Amarillo, Randall County, Texas, within the TxDOT Amarillo District. It is classified as an Urban Collector. The roadway intersects with three BNSF Hereford Subdivision railroad tracks at MP 556.281, with a crossing angle between 60° to 90°. The nearest major intersection, 46th Street and Washington Street, is approximately 1,750 feet west of the railroad crossing. **Figure 4** shows the existing conditions around the crossing.

There have been two crashes at this crossing since 2019. Additionally, five blocked crossing incidents were reported in 2024 alone, with durations ranging from 16 minutes to 6 hours, totaling 9 blocked crossing incidents since 2019. Pedestrians were observed climbing on, over, or through the train cars. The incidents result in extended blocked crossing times, posing significant safety and economic concerns for roadway users and emergency response. The proposed overpass bridge presents an ideal solution to eliminate preventable blocked crossing incidents and address safety concerns associated with the at-grade crossing.


*Figure 4: East 46th Street and BNSF Crossings (DOT# 014693P)*

### *Proposed Improvements – East 46th Street and BNSF Crossing (DOT# 014693P)*

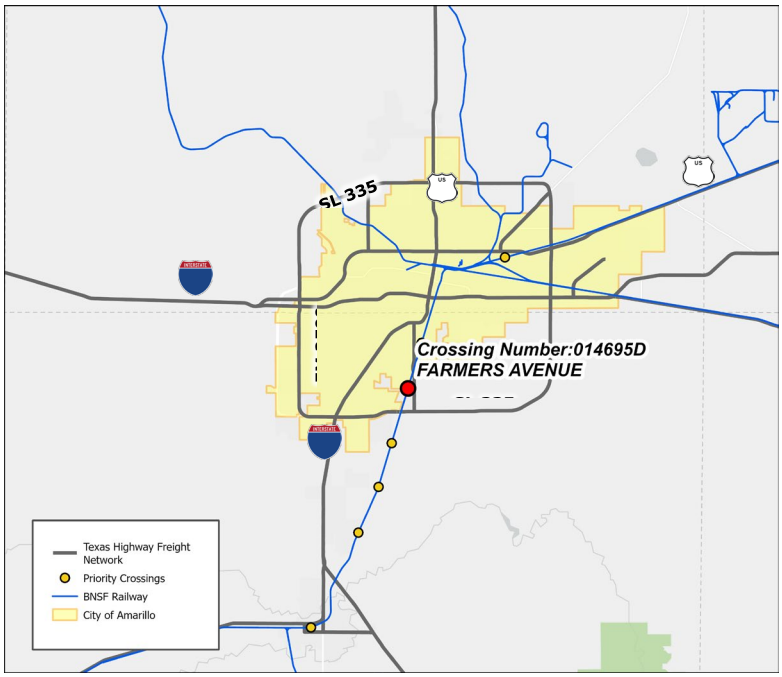
The conceptual plan for grade separation was developed with a two-lane overpass and maintained connectivity with existing parcels through a one-way access road with a turnaround on the east side of the crossing. The existing Right-of-Way (ROW) is approximately 70 feet west of the crossing with residential parcels on the north and commercial development on the south. To limit ROW acquisition and impact to residential property, a two-way access road is proposed with an extension to existing Polk Street connecting East 47th Street on the south. To develop the proposed typical section, the City of Amarillo Metropolitan Planning Organization (MPO) plan was considered with a 10 feet shared-use path shown on the exhibits for the grade separation and 6-feet sidewalk along the access roads.

The overall bridge length is about 1027 feet with approaches at 810 feet on either side of the railroad crossing using 5% vertical entry and exit grades based on TxDOT Roadway Design Manual (RDM) max grade criteria. Options to close Tyler Street and Jackson Street were discussed with the City of Amarillo, and it was confirmed that this will not violate the fire code ordinances.

The concept developed presents access to the businesses on the southwest side of 46th, via 47th Street thus limiting additional ROW acquisition making it an economical option. During the PS&E development as Topographic and ROW survey is obtained, A one-way frontage road connecting to proposed Polk Street extension could be with a 5’ sidewalk instead of a Shared use path and/or Bike Lane by an estimated 10’ of additional ROW acquisition along southwest side of 46th street.

## 4.2 DOT# 014695D, Farmers Avenue (Randall County)

| | |
|---|---|
| DOT Num | 014695D |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Hereford |
| Milepost | 558.36 |
| Warning Device | Gates |
| Traffic Volume | 2,866 |
| Crashes Since 2019 | 0 |
| Blocked Crossing Incidents Since 2019 | 2 |




Farmers Avenue is an east-west, two-lane, undivided roadway located in Amarillo, Randall County, Texas, within the TxDOT Amarillo District. It is classified as Minor Arterial. The roadway intersects with five BNSF Hereford Subdivision railroad tracks at MP 558.36, with a crossing angle between 60° to 90°. The nearest major intersection, Farmers Avenue and South Washington Street, is approximately 1,500 feet east of the railroad crossing. Randall County has indicated that BNSF plans to add two additional tracks east of the existing tracks. Therefore, the proposed grade separation concept includes a clearance envelope to accommodate the future tracks. **Figure 5** shows the existing condition around the crossing. Two blocked crossing incidents have been reported since 2019, with a combined duration ranging from 16 minutes to 6 hours. First responders were observed being unable to cross the tracks, and pedestrians were seen climbing on, over, or through the train cars.

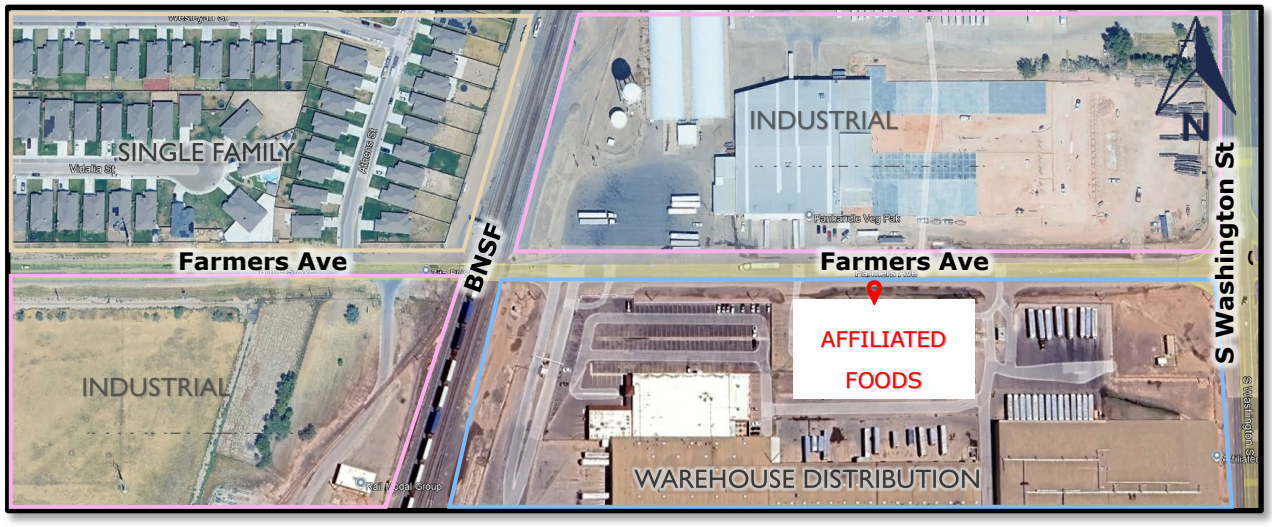



*Figure 5: Farmers Avenue and BNSF Crossing (DOT# 014695D)*

### *Proposed Improvements – Farmers Avenue and BNSF Crossing (DOT# 014695D)*

For this location, two conceptual options were developed. Option 1 is a full Grade Separation with one-way frontage roads and Sidewalks, and Option 2 is a Pedestrian bridge with the Crossing Closed.

**Option 1: Grade Separation**

The conceptual plan for Grade Separation was developed with two lanes and maintained connectivity with existing parcels through one-way access road and turnarounds on either side of the crossing. The existing ROW was approximately 80 feet. An option of Proposed Sidewalk is also shown on the typical section of the concepts. West of the crossing with residential parcels on the north and a major food distribution center on the east of the crossing, providing limited opportunity to acquire additional ROW. Closing commercial driveways on the east of the crossing will have significant impacts on the ingress and egress of commercial vehicles to and from the food distribution facility. If this option is selected for advanced design, parking on the public ROW may need to be addressed with the local business. The concept was developed with minimal proposed ROW need only to accommodate turnarounds. The overall Bridge length is about 1090' with approaches at 550' on either side of the crossing using 5% entry and exit grades based on TxDOT RDM max grade criteria. It is worth noting that there are high-voltage transmission towers and an electric utility owner easement on the west side of the crossing.

In addition to the proposed Grade Separation Concept as an advance future development, certain safety upgrades need to be considered in the short term such as adding Grade Crossing Advance Warning (W10-1) sign, DO NOT STOP ON TRACKS (R8-8) signs, Stop bars and highway-rail grade crossing (XX RR) pavement markings on both sides of the crossings as per Railroad Crossing Details Signing, Striping, and Device Placement RCD (1)-22 and Railroad Crossing Details Signing and Striping RCD (2)-22. It is also recommended to extend the planking by at least 3 feet beyond the existing edge of the pavement

**Option 2: Pedestrian Bridge**

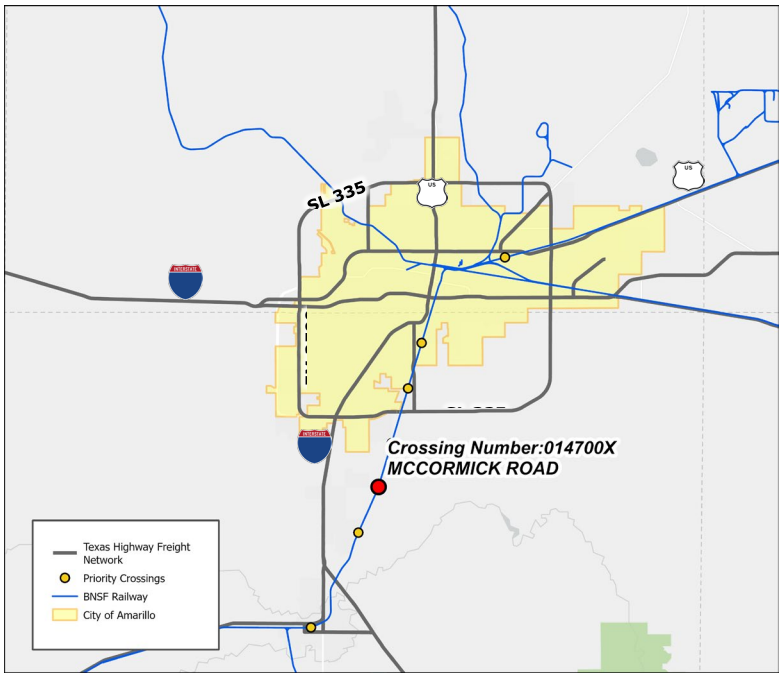
The conceptual plan for the pedestrian-only bridge option with on- and off-ramps presents a 10' clear width for the walkway and a 12' overall width. Pedestrian crossings over railroad are required to have a handrail with a fence. The Superstructure type is not determined at the concept level, however, prestressed concrete Girder such as I-Girders or Box beams offer low cost and ease of construction while Steel spans offer flexibility for longer span length crossing over railroad tracks. For the bridge portion, a vertical entry and existing grades of 2.5% are considered to provide the required 23.5 feet clearance over the Railroad envelope. The bridge length is 1085 feet. A perpendicular on ramp on the west is presented in the concept with proposed ROW acquisition. The off-ramp on the east is parallel to Farmers Ave positioned along the center of the roadway. A minimum clearance of 17.5' is to be maintained at the locations where Ramps cross over the Roadway.

To avoid truck crossings under the Ramp a centered median of a minimum 10' width is proposed at the off-ramp. The ramps have a typical vertical grade of 5.0% to 5.5% with intermediate landing spaces 5' in length and a max grade of 2%, spaced every 30' to satisfy ADA guidelines. The ramps also require handrails on both sides when the grade slope is equal or greater than 5 Percent. Adequate lighting should be provided for pedestrian and bike bridges that allow users to see one another in nighttime conditions, to avoid collisions and improve the perception of personal security. A fence or barrier will need to be installed along the Railroad ROW to deter pedestrians from trespassing or crossing at

grade. A benefit-cost analysis for the future pedestrian demand is recommended if this concept is selected for advance design.

## 4.3 DOT# 014700X, McCormick Road (Randall County)

| | |
|---|---|
| DOT Num | 014700X |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Hereford |
| Milepost | 562.87 |
| Warning Device | Gates |
| Traffic Volume | 2,665 |
| Crashes Since 2019 | 1 |
| Blocked Crossing Incidents Since 2019 | 11 |




McCormick Road is an east-west, two-lane, undivided local roadway located in Canyon, Randall County, Texas, within the TxDOT Amarillo District. It is classified as Minor Collector. The roadway intersects with two BNSF Hereford Subdivision railroad tracks at MP 562.87, with a crossing angle between 60° to 90°. The nearest major intersections are McCormick Road and South Western Street, located approximately 2,100 feet west of the railroad crossing, and McCormick Road and South Georgia Street, located approximately 3,000 feet east of the crossing. **Figure 6** shows the existing condition around the crossing. There was only one crash that has occurred since 2019. The crossing experienced 11 reported blocked crossing incidents since 2019, of which 9 reported occurred in 2022 alone. A total of 5 out of 11 reported incidents posed significant inconvenience to pupils through delaying several school buses.


*Figure 6: McCormick Road and BNSF Crossing (DOT# 014700X)*

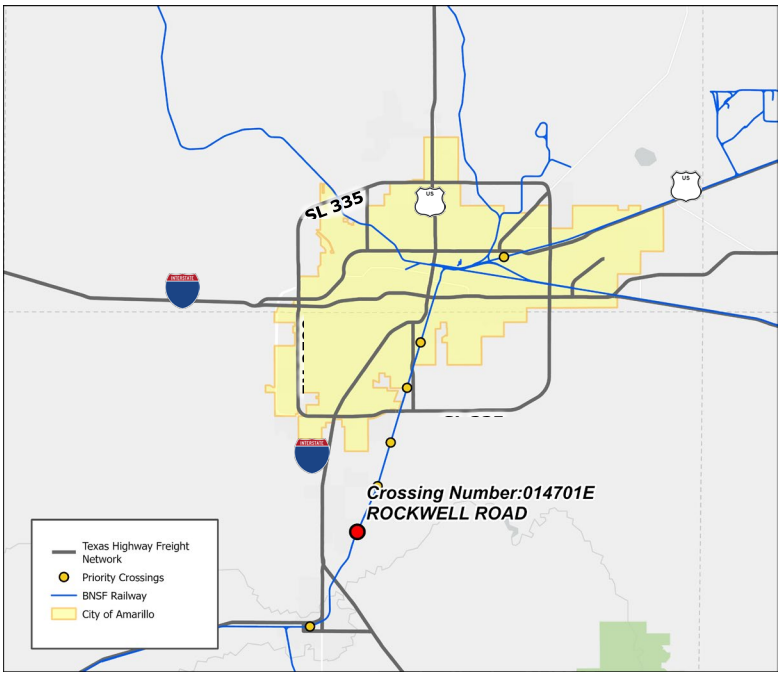
### *Proposed Improvements – McCormick Road and BNSF Crossing (DOT# 014700X)*

The conceptual plan for Grade Separation was developed with a two-lane overpass and maintained connectivity with existing parcels through one-way access road and turnarounds on either side of the crossing within existing ROW was approximately 108 feet. The overall Bridge length is about 593 feet with approaches at 600 feet on either side of crossing using 6% entry and exit grades based on TxDOT Roadway Design Manual (RDM) maximum grade criteria.

In addition to the proposed Grade Separation Concept as a long-term future development, certain safety upgrades should be considered in short term such as adding stop bars and railroad crossing pavement markings on both sides of the crossings, relocating W10-1 signs, R8-8 signs, to meet RCD (1) -22 and RCD (2)-22 standards. It is recommended to extend the planking by at least 3 feet beyond the existing edge of pavement.

## 4.4 DOT# 014701E, Rockwell Road (Randall County)

| | |
|---|---|
| DOT Num | 014701E |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Hereford |
| Milepost | 565.06 |
| Warning Device | Gates |
| Traffic Volume | 593 |
| Crashes Since 2019 | 0 |
| Blocked Crossing Incidents Since 2019 | 4 |




Rockwell Road is an east-west, two-lane, undivided local roadway located in Canyon, Randall County, Texas, within the TxDOT Amarillo District. It is classified as a local road. The roadway intersects with two BNSF Hereford Subdivision railroad tracks at MP 565.06, with a crossing angle between 60° to 90°. The nearest major intersection is Rockwell Road and the I-27 North Bound access road, located approximately 8,000 feet west of the railroad crossing. **Figure 7** shows the existing condition around the crossing. While no crashes have been reported at this crossing since 2019, it has experienced four blocked crossing incidents during that time, two of which caused delays for school buses. Although this crossing has relatively low Annual Average Daily Traffic (AADT), blocked crossing incidents still have a sizable impact on road users, given the extended detour route.

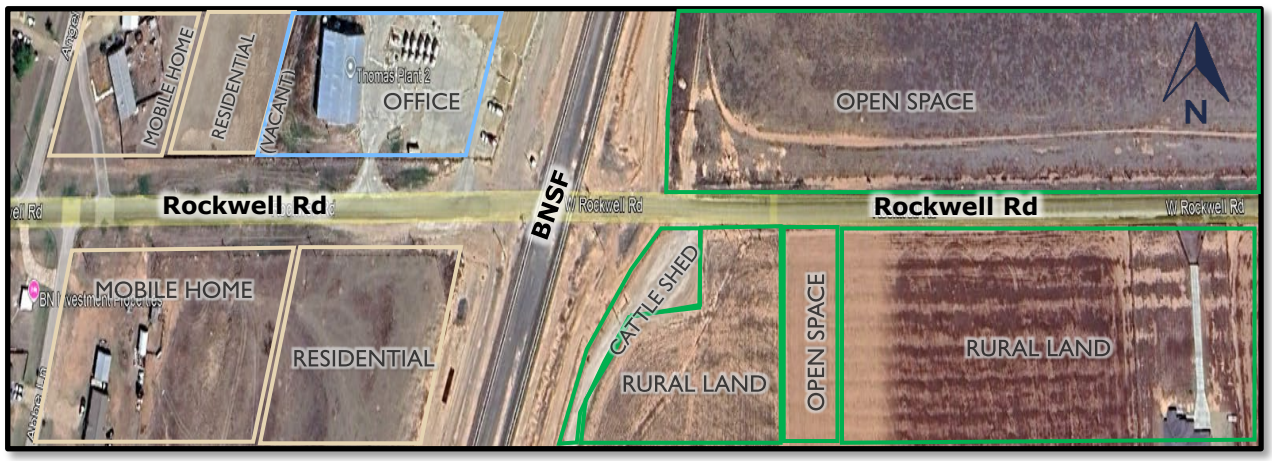



*Figure 7: Rockwell Road and BNSF Crossing (DOT# 014701E)*

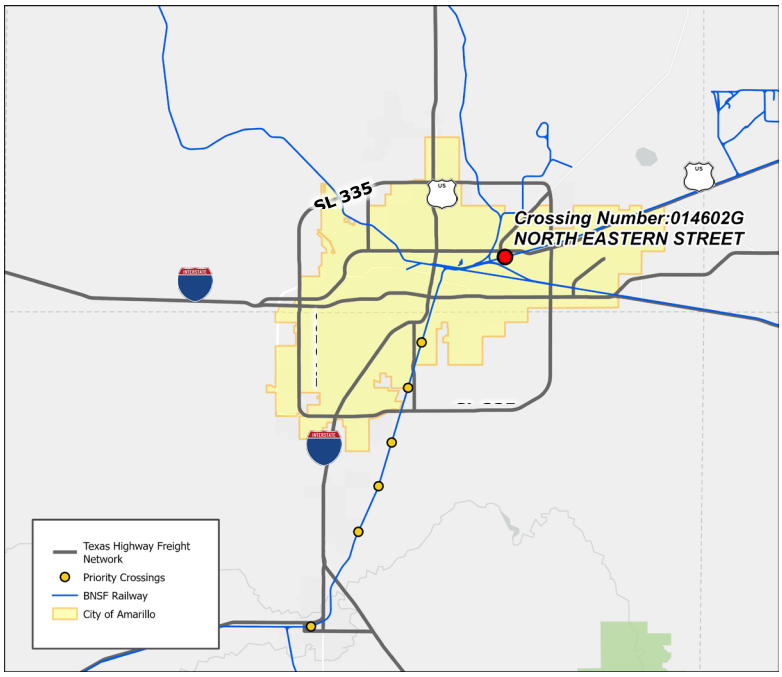
### *Proposed Improvements – Rockwell Road and BNSF Crossing (DOT# 014701E)*

The conceptual plan for grade separation includes a two-lane overpass, ensuring connectivity with existing parcels through a one-way access road and turnarounds on either side of the crossing. This design fits within the existing right-of-way, which is approximately 90 feet wide. The overall bridge length is about 520 feet with approaches at 500 feet on either side of crossing using 7% entry and exit grades based on TxDOT RDM max grade criteria.

In addition to the proposed Grade Separation Concept as a long-term future development, certain safety upgrades should be considered in the short term such as adding center line pavement markings, stop bars and railroad crossing pavement markings on both sides of the crossings, and relocating W10-1 signs, R8-8 signs to meet RCD (1) -22 and RCD (2)-22 standards. It is also recommended to extend the planking by at least 3 feet beyond the existing edge of pavement.

## 4.5 DOT# 014602G, North Eastern Street (Potter County)

| | |
|---|---|
| DOT Num | 014602G |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Panhandle |
| Milepost | 550.189 |
| Warning Device | Gates |
| Traffic Volume | 4,314 |
| Crashes Since 2019 | 2 |
| Blocked Crossing Incidents Since 2019 | 4 |




North Eastern Street is a north-south, two-lane, undivided roadway located in Amarillo, Potter County, Texas, within the TxDOT Amarillo District. It has a functional classification of a Major Collector. The roadway intersects with two BNSF Panhandle Subdivision railroad tracks at MP 550.189, with a crossing angle between 60° to 90°. Sanborn Street is located approximately 350 feet north of the crossing and Amarillo Boulevard is located approximately 500 feet south of the railroad crossing. Commercial properties with existing access are located on the east and west side of the roadway, north of the crossing, and high voltage transmission lines are located on the north side of the crossing and run parallel to the railroad. **Figure 8** shows the existing conditions around the crossing. This crossing has experienced two crashes since 2019, where both involved drivers traversing around the gate. No blocked crossing incidents have been reported since 2019.


*Figure 8: North Eastern Street and BNSF Crossing (DOT#014602G)*

### *Proposed Improvements – North Eastern Street and BNSF Crossing (DOT# 014602G)*

For this location, two conceptual options were developed. Option 1 is a fully grade-separated 4-lane roadway with sidewalks, and Option 2 is also a fully grade-separated 4-lane roadway with sidewalks and the addition of one-way frontage roads on the north side to maintain access to adjacent properties. Both options will likely impact the high-voltage transmission lines on the north side of the crossing.

In addition to the proposed Grade Separation Concepts, as an advanced future development, certain safety upgrades need to be considered in the short term, such as, updating and refreshing W10-1 signs, R8-8 signs, stop bars, and RR pavement markings on both sides of the crossings as per RCD (1)-22 and RCD (2)-22. Removing and replacing centerline pavement markings on both sides and replacing the existing tubular delineators along the centerline to prevent vehicles from crossing over the gates, will be necessary.

**Option 1: Grade Separation with No Frontage Road**

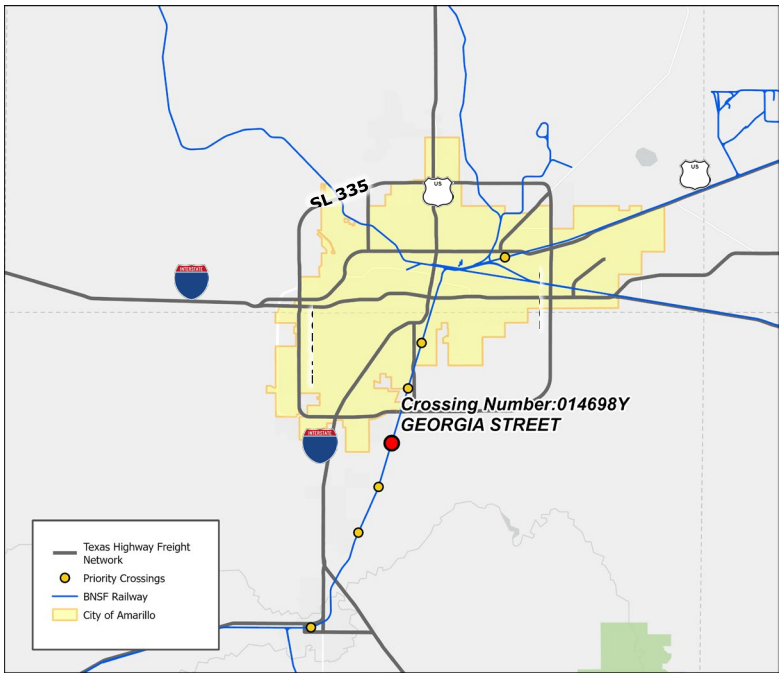
The conceptual plan for Grade Separation was developed with the existing typical section with the addition of sidewalks. This option would close the access to Sanborn St requiring adjacent properties to use Channing St for future access. The commercial properties with direct access to North Eastern Street would also be impacted possibly losing driveway egress without an access road. Properties located east of the crossing will be significantly impacted, losing egress to North Eastern Street and existing structures being impacted. The overall Bridge length is about 733 feet with approaches approximately 900 feet on either side of the crossing using a maximum 5% entry and exit grades based on TxDOT RDM grade criteria.

**Option 2: Grade Separation with One Way Frontage Road**

The conceptual plan for this grade-separation was developed with the same typical section as option one but maintains connectivity with existing parcels through one-way access road and turnarounds on the north side of the crossing. This option would maintain access to Sanborn Street and the adjacent properties using a one-way frontage road, however, will still significantly impact properties on the east side of the roadway requiring right-of-way acquisition on the east and west sides of the roadway. The overall Bridge length is about 733 feet with approaches approximately 900 feet on either side of the crossing using a maximum 5% entry and exit grades based on TxDOT RDM grade criteria.

## 4.6 DOT# 014698Y, Georgia Street (Randall County)

| | |
|---|---|
| Crossing | 014698Y |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Panhandle |
| Milepost | 560.86 |
| Warning Device | Gates |
| Traffic Volume | 1,314 |
| Crashes Since 2019 | 0 |
| Blocked Crossing Incidents Since 2019 | 4 |




Georgia Street is a north-south, two-lane, undivided roadway located in Amarillo, Randall County, Texas, within the TxDOT Amarillo District. It has a functional classification of Major Collector. The roadway intersects with two BNSF Hereford Subdivision railroad tracks at MP 500.84, with a crossing angle between 30° to 59°. The nearest major intersection, Georgia Street and Beacon Road, is approximately 450 feet north of the railroad crossing. **Figure 9** shows the existing condition around the crossing. Four blocked crossing incidents have been reported since 2019.


*Figure 9: Georgia Street and BNSF Crossing (DOT# 014698Y)*

### *Proposed Improvements – Georgia Street and BNSF Crossing (DOT# 014698Y)*

For this location, two conceptual options were developed. Option 1 is a full grade-separated 4-lane roadway with sidewalks, and Option 2 is a grade-separated 2-lane roadway with sidewalks and one-way frontage roads on the north side to maintain access to adjacent properties.

In addition to proposed grade-separation concepts as an advanced future development, certain safety upgrades should be considered in the short term such as upgrading and refreshing the W10-1 signs, R8-8 signs, Stop bars, and RR pavement markings on both sides of the crossings as per RCD (1)-22 and RCD (2)-22. Removing and replacing centerline pavement markings on both sides and installing tubular delineators along the centerline to prevent vehicles from crossing over the gates is also necessary.

**Option 1: Grade Separation with No Frontage Road**

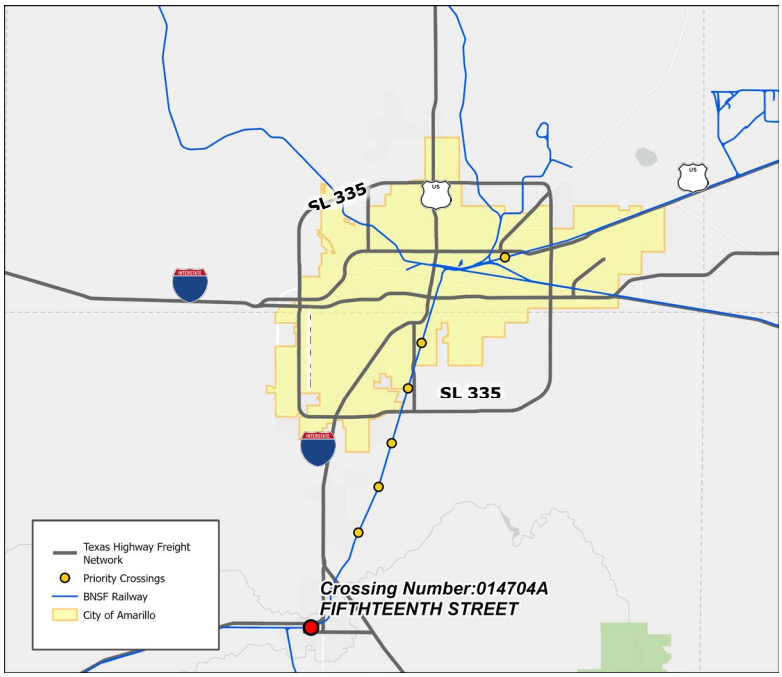
The conceptual plan for grade separation was developed by increasing the existing roadway from a two-lane to a four-lane typical section with sidewalks. This option would close the access to Beacon Road requiring adjacent properties to use Sundown Lane for future access. The commercial properties with direct access to Georgia Street would also be impacted possibly losing driveway egress without an access road. The overall Bridge length is about 733 feet with approaches approximately 800 feet to 900 feet on either side of the crossing using 5% entry and exit grades based on TxDOT RDM max grade criteria.

**Option 2: Grade Separation with One Way Frontage Road**

The conceptual plan for this grade separation was developed with two lanes with sidewalks and maintains connectivity with existing parcels through one-way access road and turnarounds on the north side of the crossing. The Existing ROW was approximately 100 feet wide, and this option would maintain access to Beacon Road and the adjacent properties using a one-way frontage road. The overall Bridge length is 950 feet with approaches approximately 500 feet to 800 feet on each side of crossing using a maximum 5% entry and exit grades based on TxDOT RDM grade criteria.

## 4.7 DOT# 014704A, 15th Street (Randall County)

| | |
|---|---|
| DOT Num | 014704A |
| Railroad Operator | BNSF Railway |
| County | Randall |
| Subdivision | Hereford |
| Milepost | 570.032 |
| Warning Device | Gates |
| Traffic Volume | 2,851 |
| Crashes Since 2019 | 0 |
| Blocked Crossing Incidents Since 2019 | 0 |




15th Street is a north-south, two-lane, undivided roadway located in Amarillo, Randall County, Texas, within the TxDOT Amarillo District. It has a functional classification of Major Collector. The roadway intersects with three BNSF Hereford Subdivision railroad tracks at MP 570.032, with a crossing angle between 60° to 90°. The nearest major intersection, 15th Street and 4th Avenue, is approximately 1,100 feet north of the railroad crossing. **Figure 10** shows the existing condition around the crossing. No blocked crossing incidents have been reported since 2019.


*Figure 10: 15th Street and BNSF Crossing (DOT# 014704A)*

### *Proposed Improvements – 15th Street and BNSF Crossing (DOT# 014704A)*

The proposed at-grade improvements involve reconstructing the crossing to enhance roadway and bicycle/pedestrian facilities, aligning with the city's downtown master plan. Additional upgrades include

new pavement, crossing panels, drainage improvements, and curb and gutter installations, with no additional ROW acquisitions anticipated.

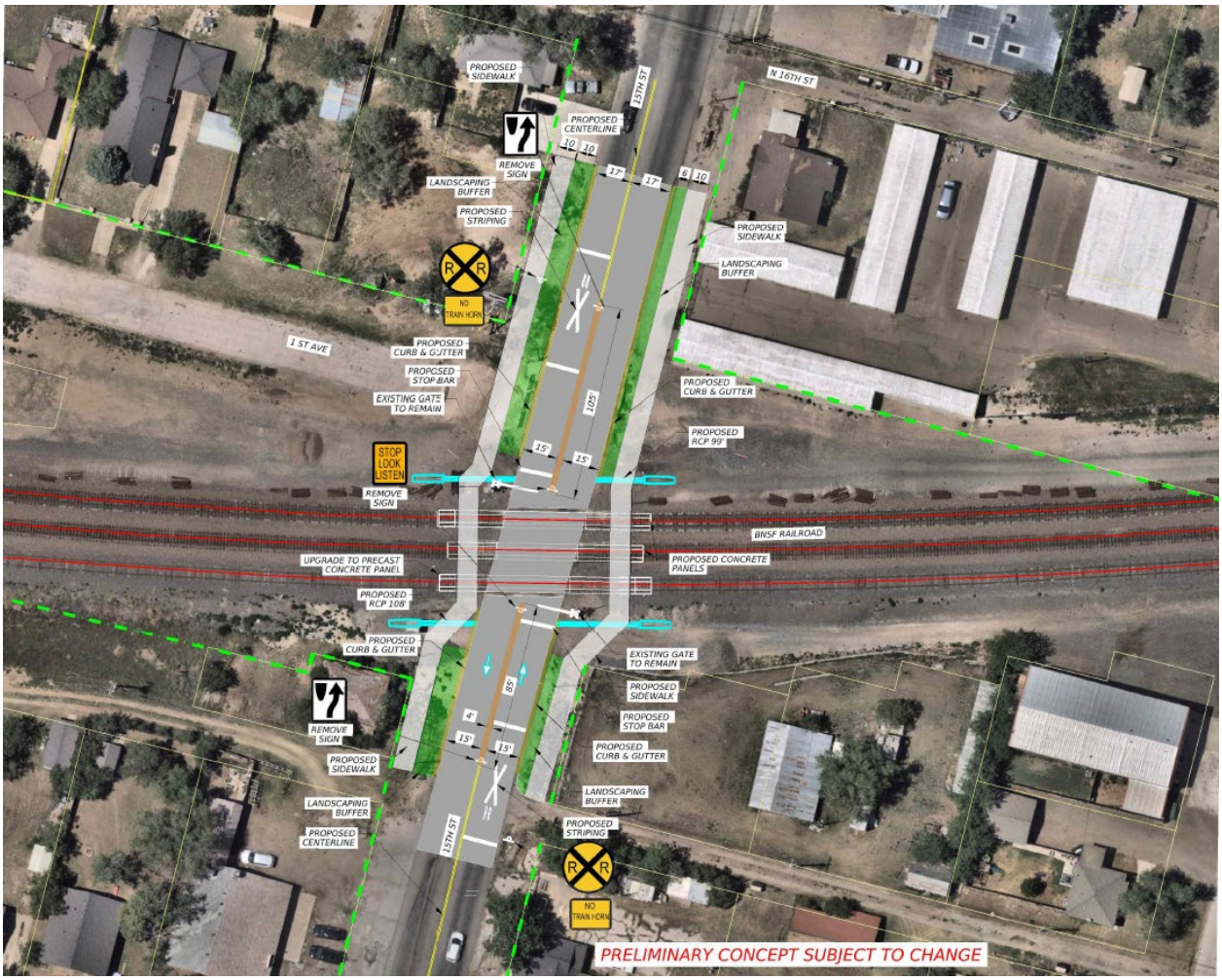
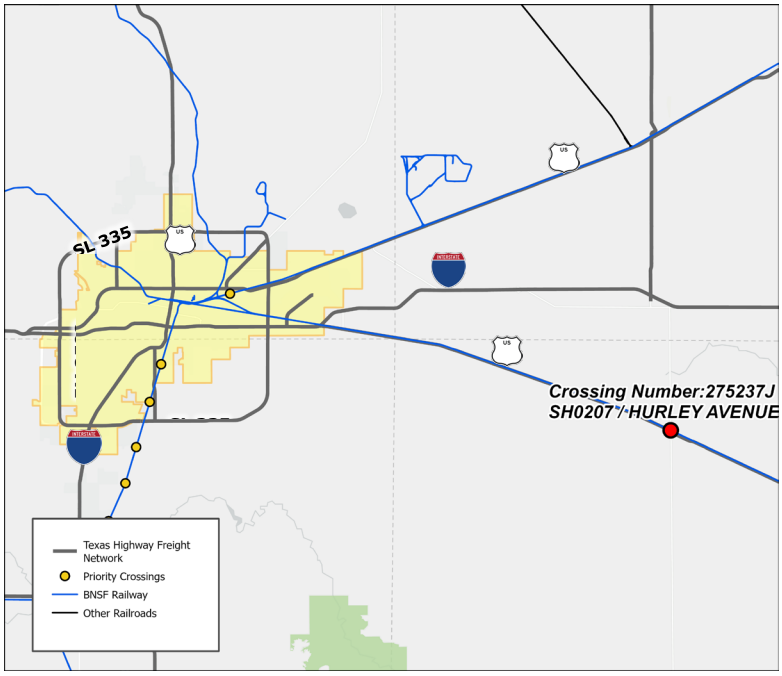



*Figure 11: BNSF Crossing (DOT# 014704A) Improvement*

## 4.8 DOT# 275237J, SH 207/Hurley Avenue (Armstrong County)

| | |
|---|---|
| DOT Num | 275237J |
| Railroad Operator | BNSF Railway |
| County | Armstrong |
| Subdivision | Red River Valley |
| Milepost | 308.2 |
| Warning Device | Gates |
| Traffic Volume | 569 |
| Crashes Since 2019 | 0 |
| Blocked Crossing Incidents Since 2019 | 0 |




Hurley Avenue is a north-south, two-lane, undivided roadway located in Claude, Armstrong County, Texas, within the TxDOT Amarillo District. It has a functional classification of Minor Arterial. The roadway intersects with three BNSF Red River Valley Subdivision railroad tracks at MP 308.2, with a crossing angle between 60° to 90°. The nearest major intersection, Hurley Avenue and US Highway 287, is approximately 500 feet south of the railroad crossing. **Figure 12** shows the existing condition around the crossing. No blocked crossing incidents have been reported since 2019.


*Figure 12: Hurley Avenue (SH 207) and BNSF Crossing (DOT# 275237J)*

### *Proposed Improvements – Hurley Avenue (SH 207) and BNSF Crossing (DOT# 275237J)*

This location was mentioned by multiple stakeholders as a local priority. The intersection of Hurley Avenue and US Highway 287 was recently improved, and a signal has been installed. No immediate improvements were recommended for this at-grade crossing. Given the intersection's local significance and recent upgrades, it is recommended that a traffic study be conducted to assess the potential need for signal pre-emption.

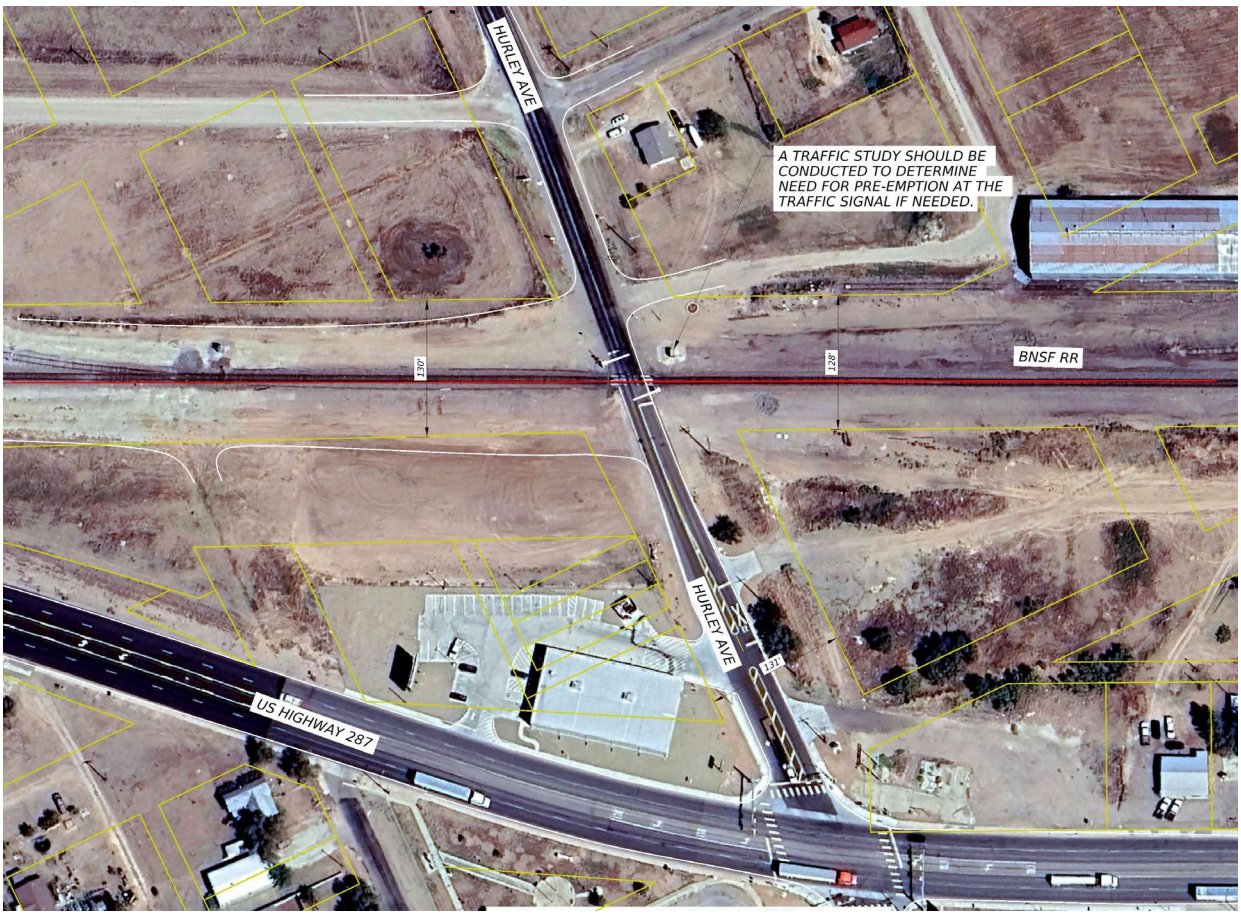
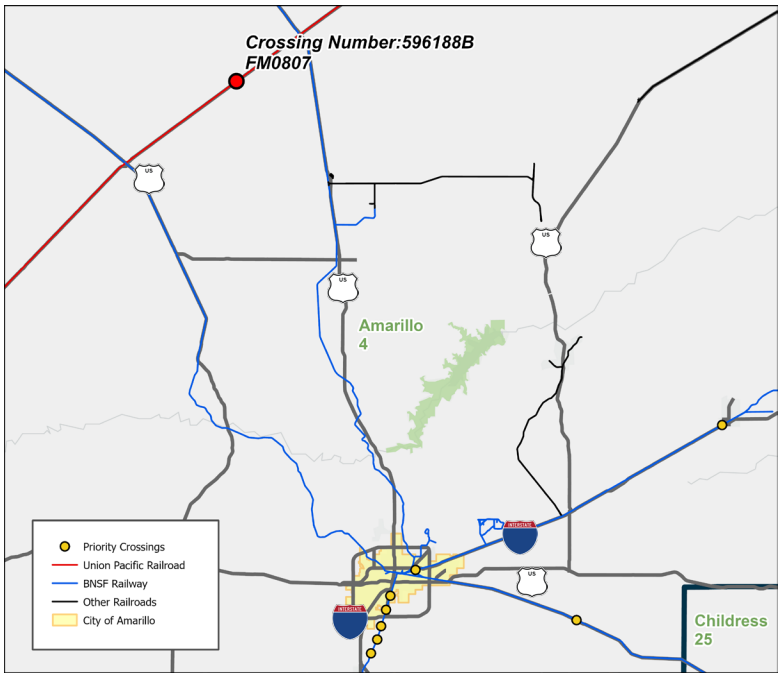



*Figure 13: BNSF Crossing (DOT# 275237J) Improvement*

## 4.9 DOT# 596188B, FM 807 (Dallam County)

| | |
|---|---|
| DOT Num | 596188B |
| Railroad Operator | Union Pacific Railroad |
| County | Dallam |
| Subdivision | Pratt |
| Milepost | 525.89 |
| Warning Device | Flashing lights |
| Traffic Volume | 216 |
| Crashes Since 2019 | 3 |
| Blocked Crossing Incidents Since 2019 | 8 |




Farm-to-Market Road 807 is a two-lane, undivided roadway running in a northwest-southeast direction, located in Conlen (unincorporated community), Dallam County, Texas. It has a functional classification of Major Collector. The roadway intersects with two Union Pacific Railroad Pratt Subdivision railroad tracks at MP 525.89, with a crossing angle between 60° to 90°. **Figure 14** shows the existing condition around the crossing. This crossing experienced three crashes since 2019, of which one resulted in one fatality, and one resulted in an injury. For the fatality injured accident, a train going east on Pratt sub mainline near the crossing, struck a truck and trailer that went over crossing in front of train, driver was fatally injured. There are eight blocked crossing incidents being reported in 2024 alone since 2019.


*Figure 14: FM 807 and UP Crossing (DOT# 596188B)*

### *Proposed Improvements - FM 807 and UP Crossing (DOT# 596188B)*

Proposed improvements for this at-grade crossing include reconstructing the crossing to address the sag in the existing profile between the railroad tracks and US Highway 54, as well as installing railroad crossing gates. Existing drainage currently flows northeast from the property to the west, and the profile adjustments must incorporate drainage improvements to preserve the current flow across the roadway.

The funded improvement listed in the Section 130 program includes adding railroad crossing gates and possibly keep the Southbound cantilever but relocating to accommodate gate configuration, considering the approach speed for Southbound traffic. Additionally, adding side lights for Eastbound Crabtree Lane (north side of track) and Eastbound Access Road (south side of track).

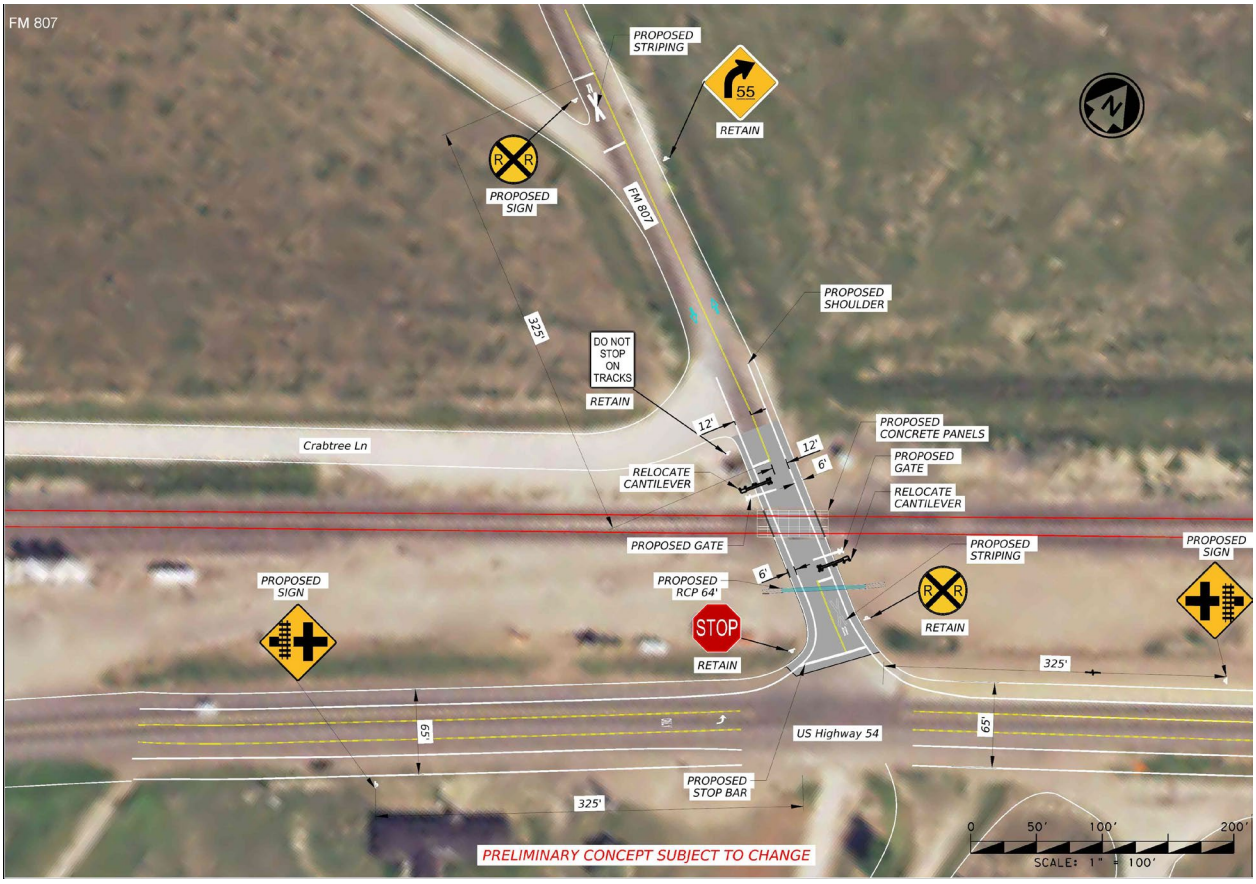
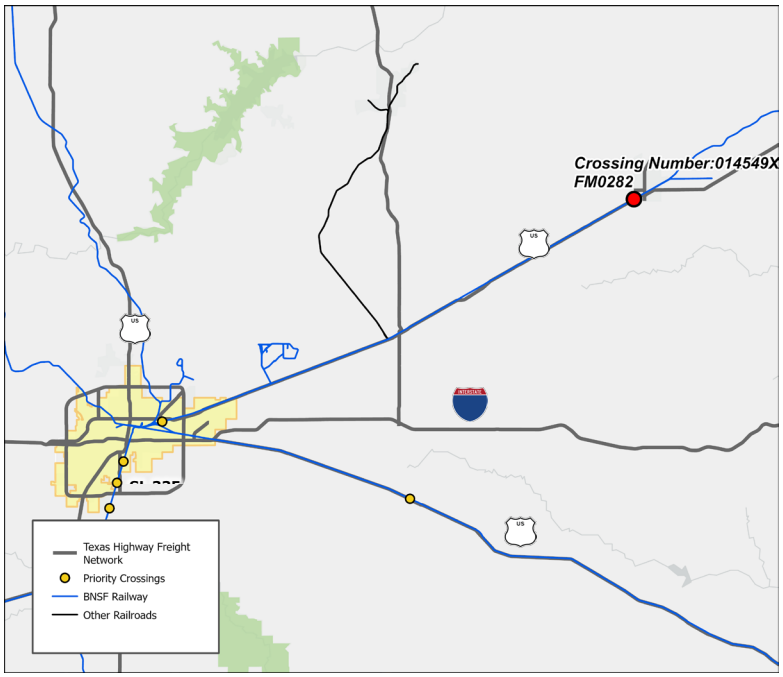



*Figure 15: UP Crossing (DOT# 596188B) Improvement*

## 4.10 DOT# 014549X, FM 282 (Gray County)

| | |
|---|---|
| Crossing | 014549X |
| Railroad Operator | BNSF Railway |
| County | Gray |
| Subdivision | Panhandle |
| Milepost | 500.84 |
| Warning Device | Gates |
| Traffic Volume | 3,282 |
| Crashes Since 2019 | 3 |
| Blocked Crossing Incidents Since 2019 | 1 |




South Price Road (FM 282) is a north-south, two-lane, undivided roadway located in Pampa, Gray County, Texas, within the TxDOT Amarillo District. It has a functional classification of Major Collector. The roadway intersects with two BNSF Panhandle Subdivision railroad tracks at MP 500.84, with a crossing angle between 30° to 59°. The nearest major intersection, South Price Road and US Highway 60, is approximately 150 feet south of the railroad crossing. **Figure 16** shows the existing condition around the crossing. Three crashes reported since 2019, no injury or death occurred. There has been one blocked crossing incident reported since 2019.

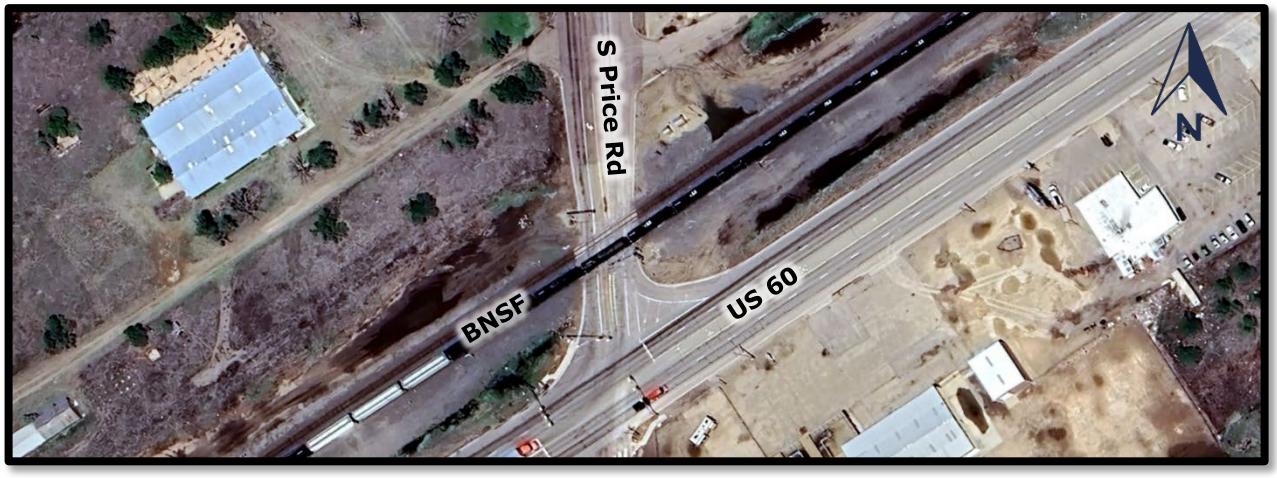



*Figure 16: South Price Road (FM 282) and BNSF Crossing (DOT# 014549X)*

### *Proposed Improvements – South Price Road (FM 282) and BNSF Crossing (DOT# 014549X)*

Proposed improvements for this at-grade crossing include widening the crossing to match the existing roadway cross-section of Price Road to the north, relocating the gates and cantilever, and eliminating the need for barrier protection around the cantilever. Additionally, the proposal includes expanding the existing sidewalk safety improvements across the railroad track on the west side of the road, where some sidewalk currently exists. The installation of a center median will also be required to accommodate gates for the proposed lanes.

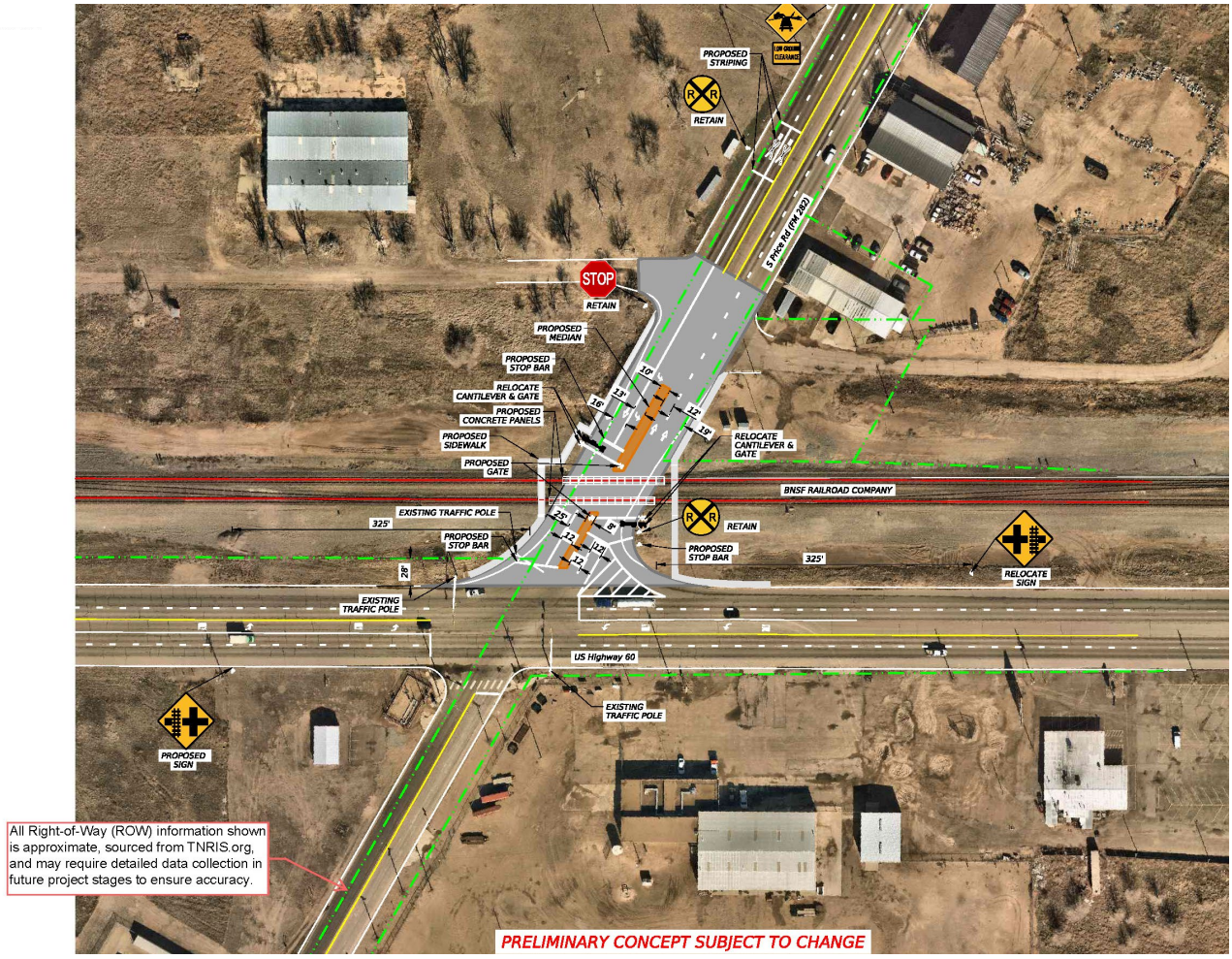



*Figure 17: BNSF Crossing (DOT# 014549X) Improvement*

# 5. Benefit-Cost Analysis

This benefit-cost analysis (BCA) quantifies the economic feasibility of replacing the rail grade-crossings for each of the six rail projects with grade separated crossings.

## 5.1 Approach

Annual costs and benefits for all six highway-rail grade crossing improvement projects are individually compared to the baseline scenario. The baseline existing plus committed scenario (e.g., the No-Build alternative) assumes no new rail crossing infrastructure and continuation of current railroad and roadway operating characteristics. This BCA compares estimated highway-rail grade crossing improvement costs (e.g., Build alternatives) to projected monetized societal benefits for each project. Costs and benefits are compared in net-present, real (constant) 2024 dollars.

- **Improvement costs**: include planning and engineering design (P/E), right-of-way (ROW), and construction.
- **Societal benefits**: comprise travel efficiencies associated with travel time, vehicle operating cost, accidents, and emissions. Pedestrian time savings and railroad operating costs were not considered due to data limitations and study area irrelevance.

Comparing discounted annual monetized benefits to costs in a BCA framework yields three standardized metrics of economic feasibility: benefit-cost ratio (BCR); net present value (NPV); and internal rate of return (IRR). Highway-rail grade crossing improvements under each project, BCA methodology, cost assumptions, and benefit assumptions are defined below.

### *5.1.1 Highway-Rail Grade Crossing Improvement Projects*

Baseline railroad operating characteristics and highway average annual daily traffic (AADT) volumes are drawn upon data provided by and discussed with TranSystems.

- **Project Location Detail**: Grade-crossing identification codes, street name, rail operator, county, land use, and milepost data are summarized in **Table 4**. Land use summary indicates the rural, undeveloped use; four of the six locations are classified as "Open Space" versus "Commercial" and "Industrial" for the other two. Notably, no residential, retail, or other urban oriented use currently exists in any of the six crossing locations.
- **Rail Characteristics:** Current BNSF operating characteristics include daily train counts, average train speeds (mph), and length (feet), as shown in **Table 5***.* The six locations accommodate many daily trains (72 to 90) moving relatively quickly (35 to 45 mph), which reflects the undeveloped land-use. Gate downtime associated with lowering/rising is estimated at 1.0 minute per train. Combined with train transit-time through the grade crossings (function of train length and speed), average total gate downtime delay per train ranges between 2.8 to 3.3 minutes. Annual train growth is forecast at 2.0% annually over the 2024 volumes[1] for both the No-Build and Build alternatives, while train length and speeds are assumed constant over the analysis period.
- **Road Characteristics:** Affected roadway volume and accident characteristics are summarized in Benefit-Cost Analysis Technical Memorandum **Appendix D***.* Year 2019 AADT ranges from extremely low (under 600 at Rockwell Road to relatively low (over 4,300 at North Eastern

Street), which aligns with the undeveloped land use (per above). Similarly, truck volumes are assumed at 3%, with modest compound annual (CAGR) of 2.0% through horizon-year 2060 (30-year lifecycle after construction).

*Table 4: Project Location Characteristics*

| Crossing ID | Street/Road | RR Ops. | County | Land Use | Milepost |
|---|---|---|---|---|---|
| 014602G | North Eastern Street | BNSF | Potter | Open Space | 550.19 |
| 014693P | East 46th Street | BNSF | Randall | Commercial | 556.28 |
| 014695D | Farmers Avenue | BNSF | Randall | Industrial | 558.36 |
| 014698Y | Georgia Street | BNSF | Randall | Open Space | 560.86 |
| 014700X | McCormick Road | BNSF | Randall | Open Space | 562.87 |
| 014701E | Rockwell Road | BNSF | Randall | Open Space | 565.06 |

*Table 5: Grade Separation Rail Characteristics*

| Street/Road | Count/Day (2024) | Train Speed (mph) | Train Length (feet) | Count Growth | Gate Time (min) | Avg. Train Delay (min.) |
|---|---|---|---|---|---|---|
| North Eastern Street | 72 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |
| East 46th Street | 90 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |
| Farmers Avenue | 90 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| Georgia Street | 90 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| McCormick Road | 86 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| Rockwell Road | 86 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |

Regarding accidents, data from the Highway-Rail Grade Crossing Accident Prediction System (GXAPS) compiled by the U.S. Department of Transportation's Federal Railroad Administration (USDOT-FRA) was used to summarize grade-crossing roadway accidents by study location and severity. Thirteen total accidents occurred across the six study locations over the most recent five years (2019-2023),

comprising one fatality (North Eastern Street), three injuries, and nine property-damage-only (PDO). Based on these and other characteristics, the GXAPS annual accident prediction rate ranges from effectively nothing (0.00 at Rockwell Road) to 0.23 at the two locations with five accidents (North Eastern Street and East 46th Street).

### *5.1.2 Benefit-Cost Analysis Methodology*

Benefits associated with the six improvement projects are compared to the improvement costs to ascertain if society is "better-off" economically with the proposed infrastructure. The following discussion defines the types of costs and benefits, and how they are evaluated.

- **Cost Types**: Reflect public sector expenditures to improve vehicle traffic flows in Potter and Randall counties. Improvement costs derived by TranSystems include design (planning and engineering), rights-of-way (ROW), and construction (including inspection and contingency). All costs are presented in constant 2024 dollars.
- **Benefit Types**: Reflect savings related to vehicle travel time, operating costs, accidents, and emissions associated with avoiding gate downtime delay. Quantification is based on BNSF operating characteristics, AADT volumes, and travel characteristics (discussed in following subsection). The four benefit types:
    - *Travel Time Cost-Savings* – Monetization of decreased vehicle-hours traveled (VHT) reflect avoided delay time from passing trains, AADT volume and growth, percent trucks, vehicle occupancy, and time-values. Time savings occur by decreasing the delays associated with gate-down time incidences and duration via grade separation.
    - *Fuel Cost-Savings (VOC)* – Monetization of decreased fuel consumption costs reflect reduced idling time while trains pass, idling fuel consumption rates, fuel efficiency improvements, and fuel price.
    - *Accident Cost-Savings* – Monetization of decreased accidents from grade separations reflect accident rates per crossing, accident severity, and costs by severity. The FRA's GXAPS provide historical accident incidence and severity data by crossing location.
    - *Emission Cost-Savings* – Monetization of decreased emissions resulting from fuel consumption savings reflect reduced idling time while trains pass, emission rates, and emission costs.
- **Project Evaluation**: Annual benefits and costs compared over the project lifecycle are discounted to the current year and evaluated in standard metric terms. The timing, discounting, evaluation metrices, and sensitivity steps are discussed below.
    - *Timing* – All improvement phase costs (e.g., P/E, ROW, and construction, etc.) for each project are assumed to occur over six years (2025 to 2030), with benefits beginning in the following year (2031). All benefits are extended through a 30-year horizon with time and fuel/emissions savings annually escalated from annual increases in traffic volume (AADT) and train counts.
    - *Discounting* – After tabulating costs and benefits in constant dollars (excluding inflation), a real discount rate adjustment is made to account for timing differences. Discounted future values reflect the principle that benefits and costs occurring sooner are more highly valued than those occurring later, and that an opportunity cost is associated with diverting investment funding from other productive uses. This process, known as

discounting, expresses future streams of benefits and costs in constant present value terms. A real discount rate (i.e., net of the inflation rate) of 3.1 percent per year is applied to benefit and cost estimates, per OMB Circular A-94 and current USDOT guidance.

- *Benefit Cost Evaluation Metrics* – Discounted project benefits are compared with discounted project costs over the multi-year analysis period from three perspectives. While each perspective indicates the same feasibility finding (yes or no), they provide different perspectives as to the dollar magnitude, relativity, and robustness:
  - *Net Present Value (NPV)* – discounted benefits less discounted costs; a positive monetary value indicates the investment is economically feasible.
  - *Benefit-Cost Ratio (BCR)* – discounted benefits divided by discounted costs; a ratio greater than 1.0 indicates the project is economically feasible.
  - *Internal Rate of Return (IRR)* – discount rate at which the present-value of the benefits is equal to the present-value of the costs; an IRR greater than the threshold discount rate (3.1%) indicates the project is economically feasible.

### *5.1.3 Cost Assumptions*

**Table 6** summarizes project improvement costs by type and year, based on TranSystems estimates. P&E (design) is assumed to occur in the years 2025 to 2027, ROW in 2026, and construction from 2028 to 2030. Total costs average $35.2m, ranging from a low of $19.5m (Rockwell Road) to a high of $51.3m (North Eastern Street).

Table 6: Improvement Type Costs (2024$m)

| Street/Road | P&E (2025-27) | ROW (2026) | Construction (2028-30) | Total |
|---|---|---|---|---|
| North Eastern Street | $6.0 | $4.0 | $41.3 | $51.3 |
| East 46th Street | $5.4 | $2.7 | $37.3 | $45.4 |
| Farmers Avenue | $4.6 | $0.0 | $31.8 | $36.4 |
| Georgia Street | $4.0 | $0.0 | $27.5 | $31.5 |
| McCormick Road | $3.4 | $0.1 | $23.7 | $27.3 |
| Rockwell Road | $2.5 | $0.0 | $17.1 | $19.5 |

Note: The costs are based on a preliminary estimate.

### *5.1.4 Benefit Assumptions*

Benefit assumptions focus on vehicular traffic since no pedestrian or railroad operating data were available, and no such benefit categories were identified (e.g., no notable pedestrians or train operation changes). AADT count data by railroad crossing were used, to estimate reductions in travel time, operating cost, accidents, and emissions from avoided gate-down times. Travel characteristic changes

are monetized based on monetization factors and other assumptions, yielding estimates of net travel time, vehicle operating, accident, and emission cost (dis)savings. Such assumptions concern vehicle occupancy rates, values-of-time, fuel consumption (idling rates and costs), idling emissions values, and accidents (rates, severity, and costs). All monetized factors are in 2024$.

## 5.2 Findings

Project findings include the summary BCA Results and the Conclusion, additional details can be found in the benefit-cost analysis technical memorandum **Appendix D**.

### *5.2.1 Summary BCA Results*

Economic feasibility metrics (NPV, BCR, and IRR) are summarized for all six projects in **Table 7** under the 3.1% real discount rate. The red font highlights the infeasible economic metrics for all projects, with BCR ranging from an extremely low 0.07 (Rockwell Road) to a medium-low of 0.40 (North Eastern Street).

*Table 7: BCA Metrics*

| Street/Road | BCR | NPV (2024$m) | IRR |
|---|---|---|---|
| North Eastern Street | 0.40 | -$27.5 | -2.0% |
| East 46th Street | 0.17 | -$34.0 | -5.6% |
| Farmers Avenue | 0.25 | -$24.5 | -3.9% |
| Georgia Street | 0.13 | -$24.5 | -6.6% |
| McCormick Road | 0.30 | -$17.2 | -3.2% |
| Rockwell Road | 0.07 | -$16.4 | -9.3% |

### *5.2.2 Conclusion*

Six proposed grade-separation projects were evaluated for economic feasibility, based on available assumptions. Key takeaways include:

- Vehicular benefits from the grade separations, mostly in terms of travel time and accident savings, are insufficient to surpass the improvement costs.
- Relatively low traffic-user benefits compared to costs stem from multiple factors affecting estimated gate downtime (VHT delay), including assumed AADT, train speeds, train length, staging, etc.
- Generally, too few trains, traveling too quickly, and/or interfacing with relatively low AADT volumes generate insubstantial travel delay benefits to economically justify the comparatively high improvement costs.

- Additionally, accident prediction rates are relatively low with only one fatality for all crossings in the last year. Consequently, accident monetization is relatively minor, especially compared to $35.2m (on average) implementation costs.

The BCA conducted is one of several areas of 'feasibility' assessed for the six grade separation projects. Others include engineering, environmental, funding, etc. While the BCA does not provide strong economic feasibility metrics, the project may warrant development for other reasons. Rather, the BCA results illustrate how traffic volume assumptions affect economic feasibility, key variables that affect benefits, and how the projects compare to one another.

# 6. Implementation Plan

This implementation plan outlines the steps necessary to execute the proposed improvements for priority highway-rail grade crossings.

**Project phases** for the rail crossing improvements include planning, environmental assessments, design, right-of-way acquisition, and construction. This study represents the initial planning and conceptual improvement phase. If an interested party, whether a local jurisdiction, the Amarillo District, or the Rail Division—wishes to advance one or more projects, the next steps would involve design and environmental evaluation while securing construction funding. The interested party can utilize the concepts, cost estimates, and data developed in this study, to apply for alternative funding sources.

**Stakeholder coordination** is critical, as implementing rail crossing improvements requires multi-agency collaboration. This includes working with local and regional agencies, rail companies, and TxDOT to ensure efficient project execution.

**Financial sources and strategies** were identified to support project implementation, including federal and TxDOT funding, MPO funding, local government contributions, and potential partnerships with rail companies.

Federal funding programs include:

- Federal Railroad Administration (FRA) CRISI Grant Program (Consolidated Rail Infrastructure and Safety Improvements)
    - Ideal for high-risk crossing eliminations or upgrades, such as installing gates or advanced warning systems, or constructing grade separations.
- FRA RCE Grant Program (Railway Crossing Elimination)
    - Applicable to projects that close or grade separate at-grade crossings such as constructing overpasses/underpasses to replace at-grade crossings.
- Federal Highway Administration (FHWA) Section 130 (Highway-Rail Grade Crossing Safety)
    - Applicable to projects that improve at-grade crossing safety, such as upgrading crossing signals, pavement markings, or lighting, or adding raised medians.
- FHWA TAP (Transportation Alternatives Program)
    - Applicable to projects that improve active transportation at the grade crossings, such as building a pedestrian bridge or adding sidewalks and bike lanes.

State & MPO funding programs include:

- TxDOT Section 130 & TAP
    - TxDOT administers the FHWA Section 130 program and TAP.
- MPO STBG (*Surface Transportation Block Grant*)
    - MPOs administer the federal STBG program, which provides flexible funding for capital improvements such as rail crossing improvements.
- MPO CMAQ (*Congestion Mitigation and Air Quality*)
    - MPOs administer the federal CMAQ program, which includes projects intended to reduce idling at congested crossings.
- MPO TAP

- MPOs might administer TAP within its boundaries; this is applicable to projects improves active transportation at the grade crossings such as building a pedestrian bridge or adding sidewalk and bike lanes.

Local & Partnership Contributions

- Local capital improvement program (CIP) funding or bonds.
- Railroad contributions.

# Appendix

Appendix A: Existing Conditions Technical Memorandum

Appendix B: Grade Crossing Improvement Toolbox Technical Memorandum

Appendix C: Improvement Concepts & Cost Estimate

Appendix D: Benefit-Cost Analysis Technical Memorandum

# Appendix A:

# Existing Conditions Technical Memorandum


# Amarillo District Highway-Rail Grade Crossing Study

## Technical Memorandum – Existing Conditions

July 2024

Texas Department of Transportation

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# Introduction

The purpose of the Amarillo District Highway-Rail Grade Crossing Study is to identify and address key issues, and develop candidate projects that could potentially improve safety and efficiency at highway-rail grade crossings with the BNSF Railway (BNSF), Union Pacific Railroad (UP), Panhandle Northern Railroad Company (PNR), and Texas North Western Railway Company (TXNW) freight rail system located in the Texas Department of Transportation (TxDOT) Amarillo District. This study includes the analysis, planning, conceptual development of improvements, a benefit-cost analysis, and the creation of a strategic implementation plan for priority highway-rail at-grade crossings within the study area.

## Study Area

The study area consists of approximately 710 miles of track operated mostly by BNSF, as illustrated in study area map in **Figure 1**. This district includes a seventeen-county region within the Texas Panhandle and includes Dallam, Sherman, Hansford, Hartley, Moore, Hutchinson, Oldham, Potter, Carson, Deaf Smith, Randall, Armstrong, Ochiltree, Roberts, Gray, Lipscomb, and Hemphill Counties.

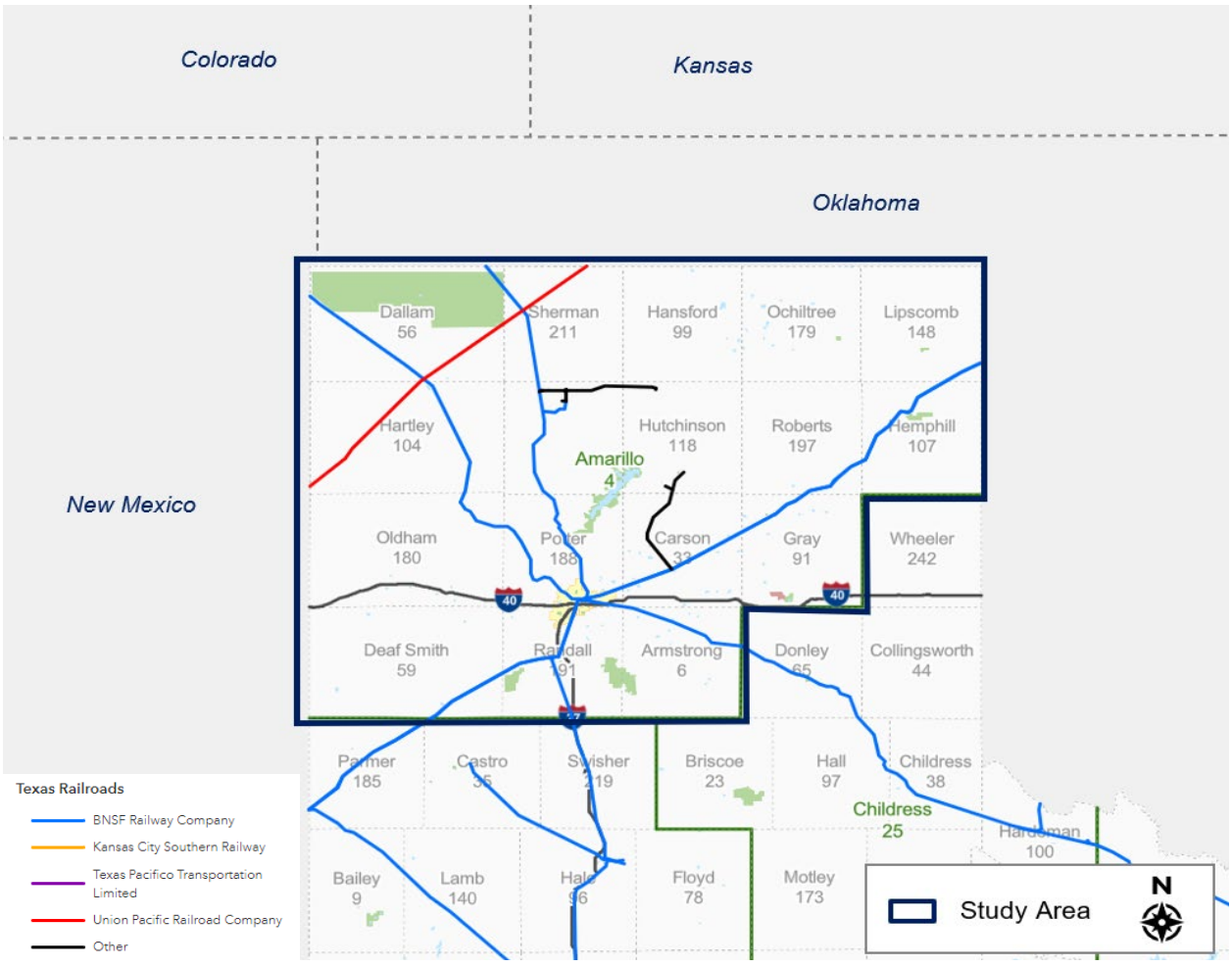


*Figure 1. Seventeen-County Study Area and Railroad Map*

# Existing Conditions

The existing conditions analysis is based on data collected in April 2024 from various sources, including the Texas Information Management System (TRIMS) from TxDOT and the Federal Railroad Administration (FRA). There are currently 345 public rail crossings in the Amarillo District, including 279 at-grade crossings, 35 railroad overpasses, and 31 railroad underpasses (**Figure 2**). The key focus of this study is at-grade crossings. As shown in ***Table 1***, BNSF owns the majority of the at-grade crossings, with a total of 210 crossings.

Among these 279 at-grade rail crossings, 245 crossings (88%) have an average annual daily traffic count (AADT) of less than 2,500. Only 10 crossings experience an AADT greater than 5,000 (**Figure 3**). The crossings with an AADT exceeding 10,000 are Grand Street and US 287 (Taylor Street) crossings, both of which already have grade separations but still maintain surface streets with grade crossings, and the Hereford Feed Yard Road crossing, which connects to a Livestock Nutrition Center Feed Mill adjacent to US 60 with high AADT.

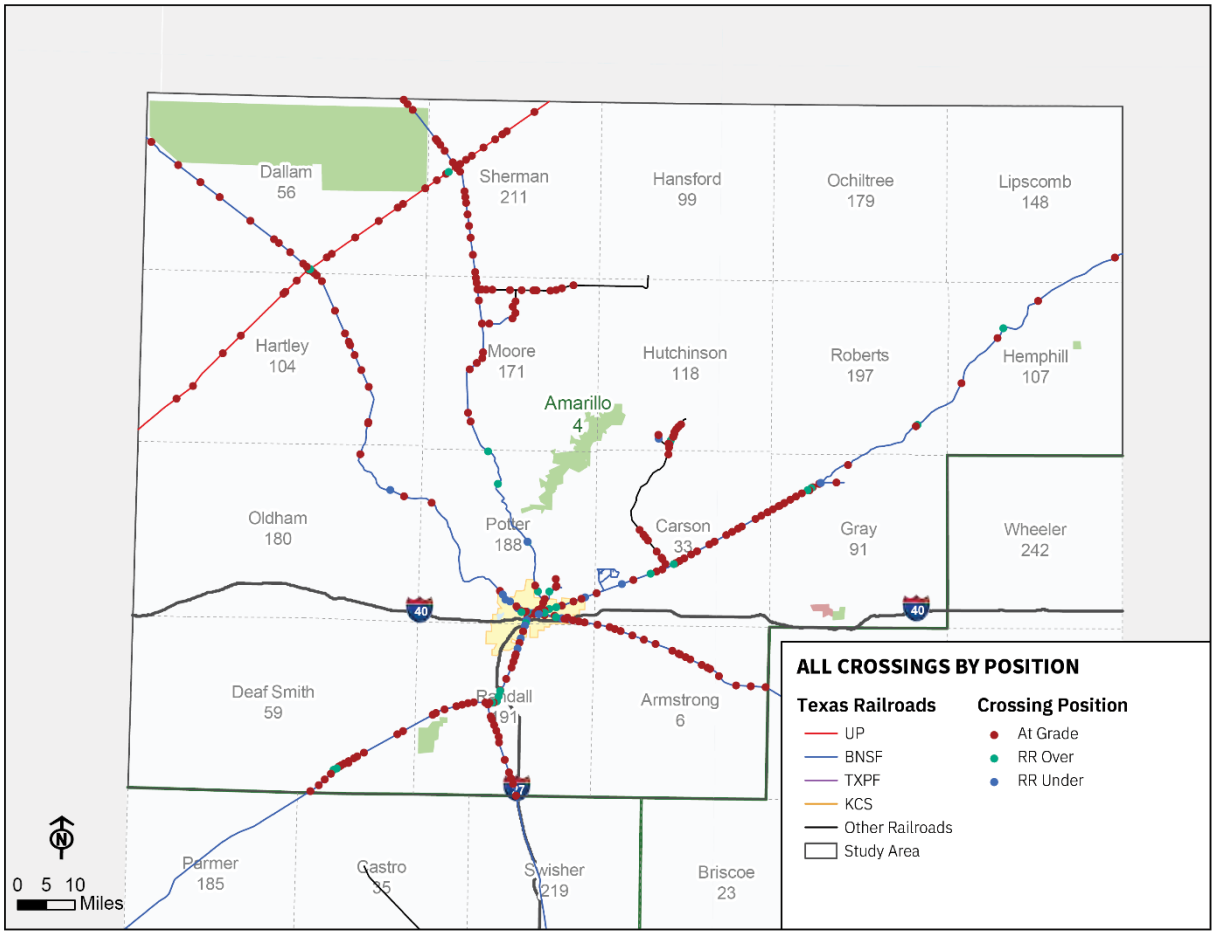


*Figure 2: Public Rail Crossings by Position in the Amarillo District*

**Table 1. Number of At-Grade Crossings by Railroad**

| Railroad | No. of At-Grade Crossings |
|---|---|
| BNSF Railway | 210 |
| Panhandle Northern Railroad | 23 |
| Texas North Western Railway Company | 18 |
| Union Pacific Railroad Company | 28 |

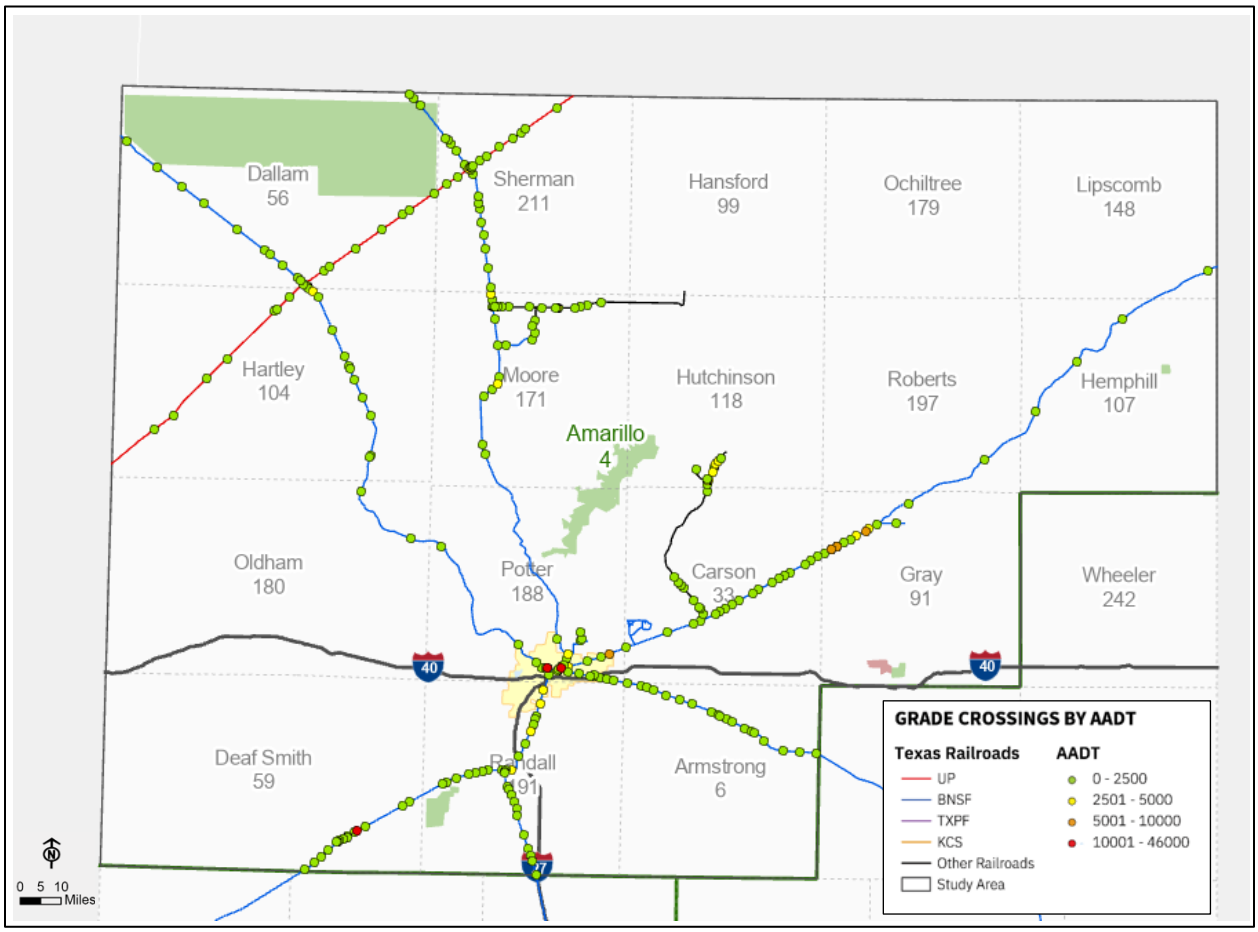


*Figure 3: At-Grade Rail Crossings by AADT in the Amarillo District*

FRA specifies rail crossing warning devices to enhance safety at highway-rail grade crossings. These warning devices are designed to alert motorists, pedestrians, and cyclists of an approaching train.

**Figure 4** demonstrates the types of warning devices present at each of the 279 at-grade crossings within the study area. As summarized in the

**Table 2**, 100 (36%) crossings are equipped with crossbucks or stop signs, which are considered passive warning devices and offer lower safety protection compared to active warning devices.

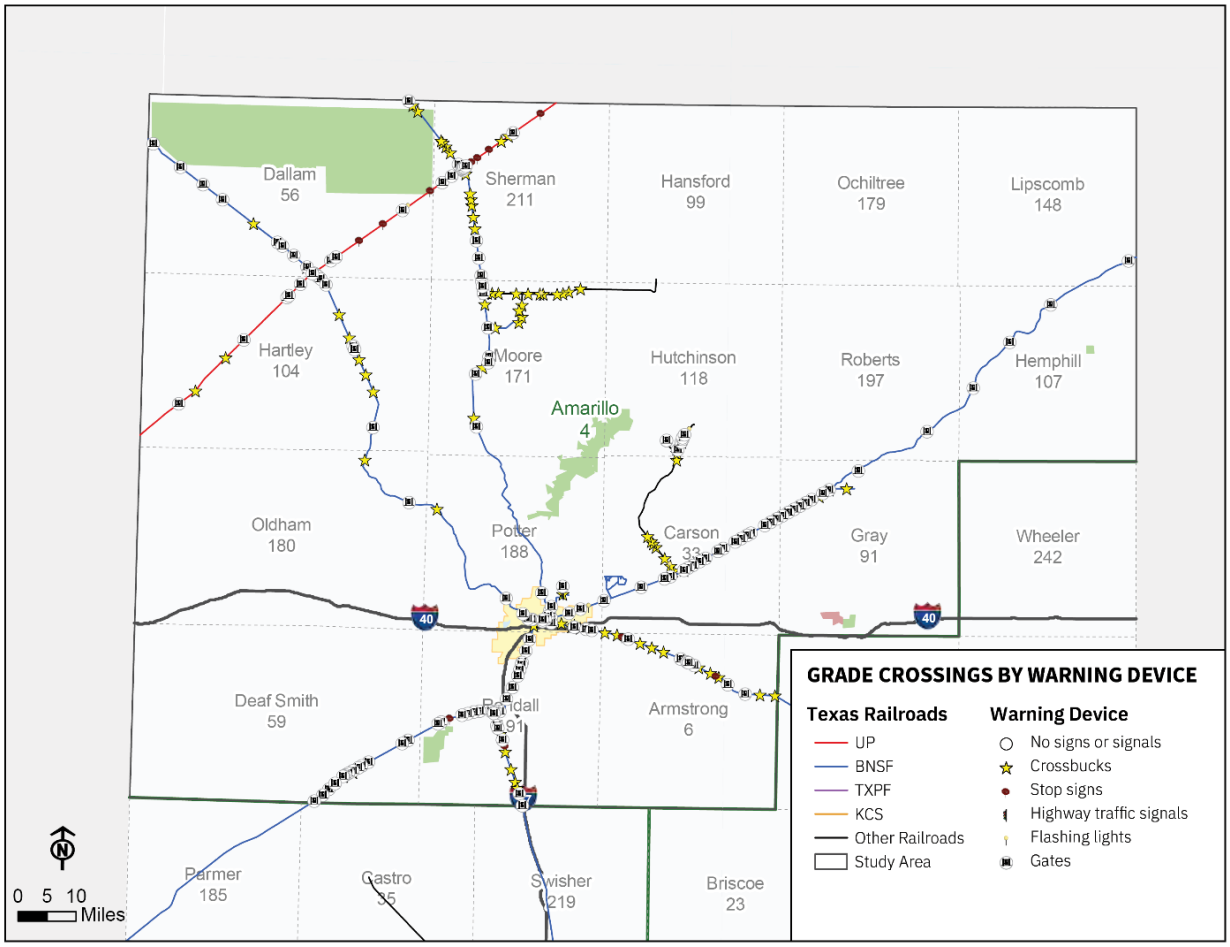


*Figure 4: At-Grade Rail Crossings by Warning Device in the Amarillo District*

**Table 2. Number of At-Grade Crossings by Warning Device Types**

| Warning Device Types | No. of At-Grade Crossings |
|---|---|
| Crossbucks | 88 |
| Stop Signs | 12 |
| Highway traffic signals, wigwags, bells, or other activated devices | 6 |
| Flashing lights | 10 |
| Gates | 161 |
| Four quad gates | 1 |
| **Total** | **279** |

Sharper crossing angles, such as 0°-29°, have less visibility of approaching trains, increasing the risk of crashes at these crossings. **Table 3** summarizes the number of at-grade crossings by the crossing angle at which highways intersect with railway tracks. Crossings with angles closer to 90° have better visibility, providing more reaction time to vehicle drivers, thereby enhancing crossing safety. As shown in **Table *3***, out of 279 at-grade crossings, only 10 crossings have sharp crossing angles of 0°-29°, while 224 crossings have safer crossing angles of 60°-90°.

**Table 3. Number of At-Grade Crossings by Crossing Angle**

| Crossing Angle | No. of At-Grade Crossings |
|---|---|
| 0°-29° | 10 |
| 30°-59° | 45 |
| 60°-90° | 224 |
| **Total** | **279** |

**Table 4** summarizes the number of crossings categorized by daily train counts sourced from TRIMS, while **Figure 5** maps these crossings in the Amarillo District. The higher the number of trains occupying a crossing each day, the greater the potential for crashes. As shown in the following table, there are 31 crossings identified with more than 80 trains per day, indicating frequently occupied crossings.

**Table 4. Number of At-Grade Crossings by Daily Train Counts**

| Train Count Per Day | No. of At-Grade Crossings |
|---|---|
| <10 | 78 |
| 11-25 | 108 |
| 26-80 | 62 |
| >80 | 31 |
| **Total** | **279** |

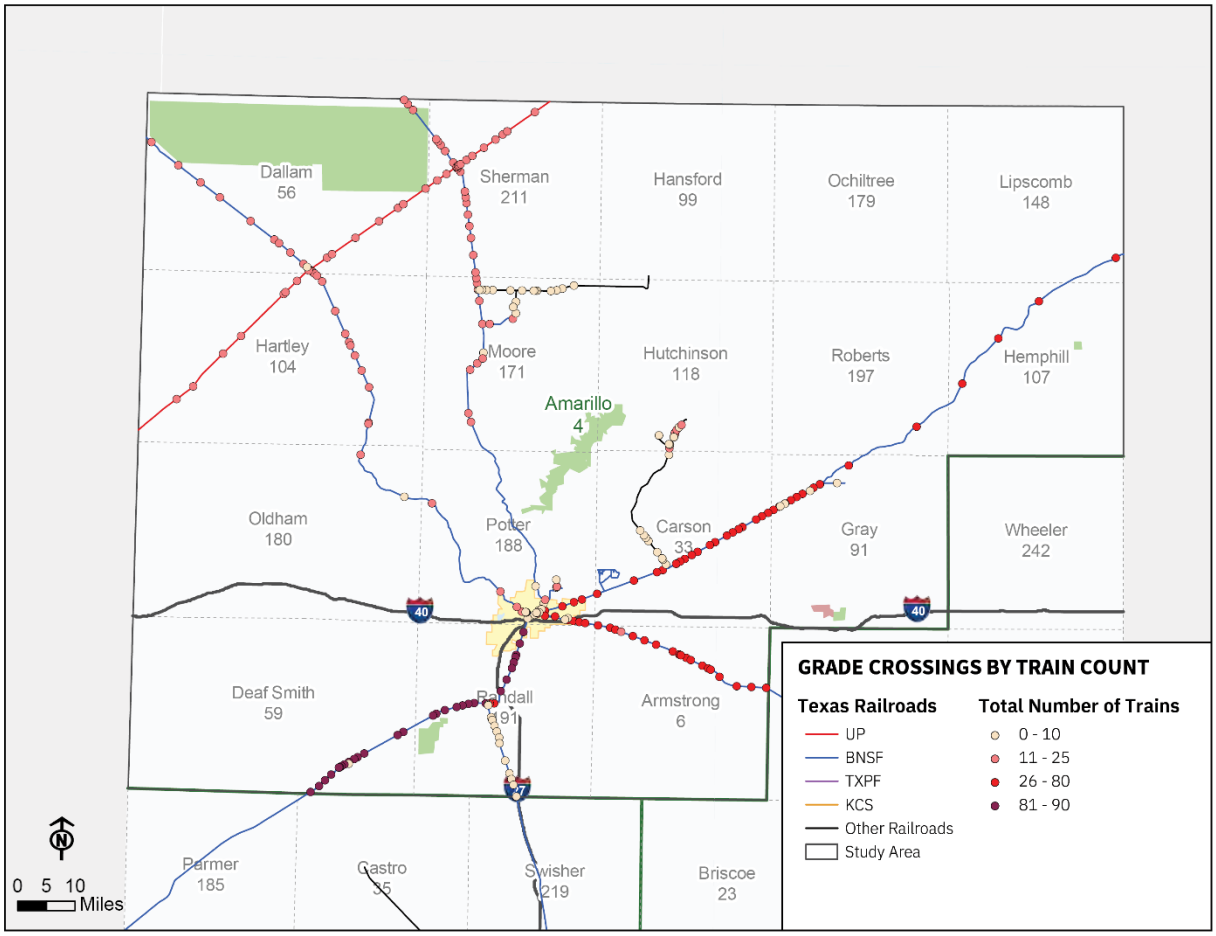


*Figure 5: At-Grade Rail Crossings by Daily Train Counts in the Amarillo District*

Based on the last five-year crash history data (2019-2023) obtained from FRA, the following observations were made regarding the at-grade crossings within the study area:

Crash Frequency:

- 4 crashes: One crossing (#014733K - FM 2943 / BNSF)
- 3 crashes: One crossing (#014556H - CR 3 / BNSF)
- 2 crashes: Seven crossings
- 1 crash: 17 crossings
- No crashes: 253 crossings

Crash Severity:

- Fatalities: Two incidents (#596199N - CR 11 / UP, #014733K - FM 2943 / BNSF)
- Injuries: Seven incidents
- Vehicle Damage Only: 17 incidents

This analysis highlights that while most of the crossings (253) have not experienced any crashes in the past five years, there are specific crossings with higher frequencies and severities of crashes, necessitating focused safety improvements at these locations.

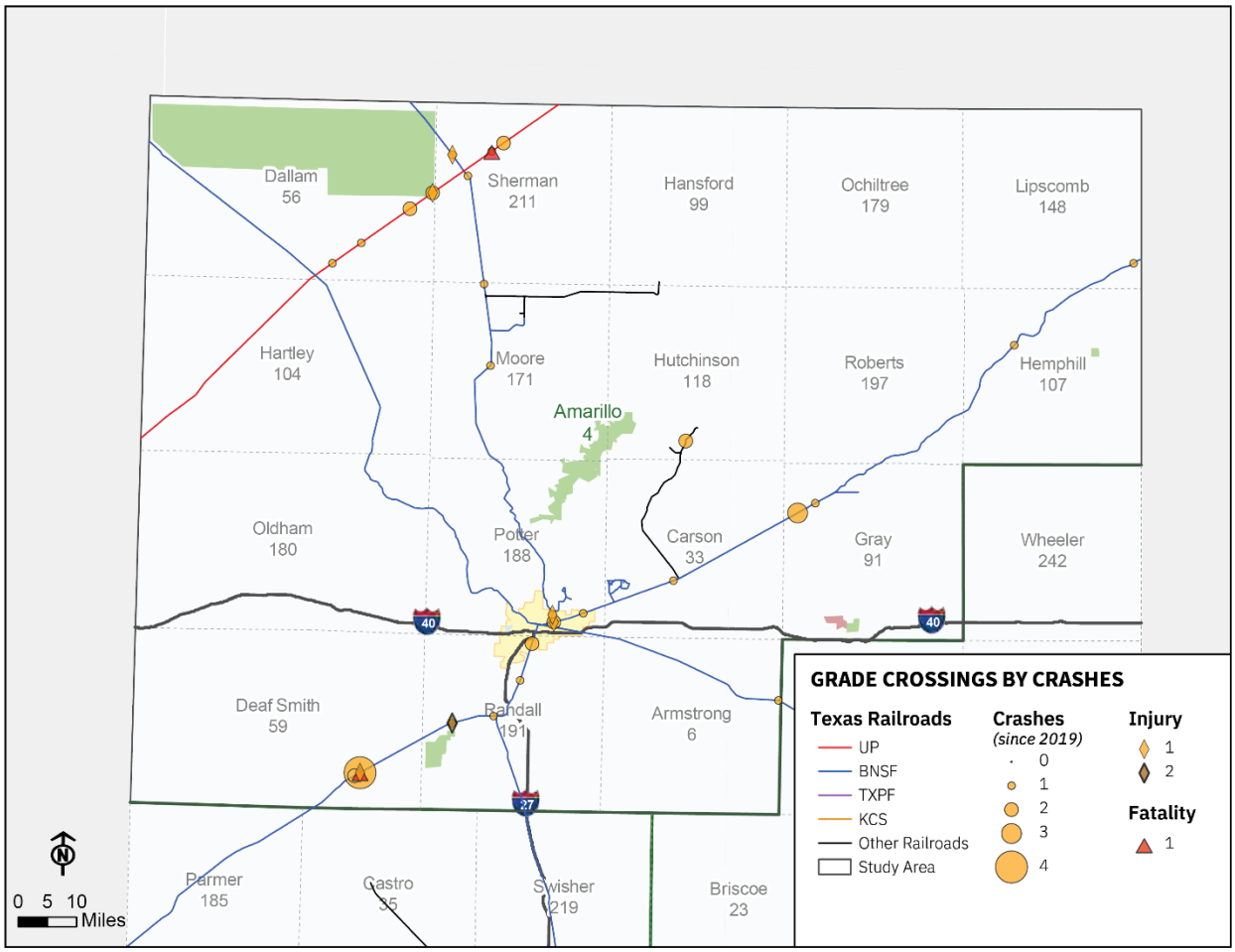


*Figure 6: Crash History (2019-2023) for At-Grade Rail Crossings in the Amarillo District*

# Previous Studies and Plans

To establish a comprehensive understanding of the Amarillo District's transportation context, relevant issues, and planned projects, multiple studies and plans were reviewed. The documents considered include but not limited to:

- Connecting Texas 2050
- Texas Rail Plan (2019)
- Amarillo Metropolitan Transportation Plan 2020-2045
- City of Amarillo City Plan – Vision 2045
- Amarillo In Motion – Multimodal Mobility Plan
- Unified Transportation Program (2024)

The City of Amarillo, the largest urban center in the Texas Panhandle, is a critical hub due to its significant intermodal rail facilities, which process over 30,000 containers and trailers each year. It also functions as a key terminal for BNSF's Southern TransCon corridor, linking Los Angeles to Chicago. This strategic role makes BNSF's intermodal route vital to regional freight transport, influencing development priorities throughout the Amarillo District to enhance freight industry efficiency.

The reviewed plans highlight key concerns, including congestion at intermodal facilities for rail-truck transfers and safety and delays at at-grade highway-rail crossings. Notably, the Texas Rail Plan (2019) proposes a grade separation project at Farmers Avenue to improve safety, mobility, and reliability for both passenger and freight movement.

By integrating these studies and plans, a comprehensive understanding of the Amarillo District's transportation needs is achieved, focusing on addressing current challenges and planning for future improvements in safety, efficiency, and capacity.

# Initial Screening

The study employed a multifaceted approach, incorporating the Priority Index, ten-year crash history, district and stakeholder priorities, and previous plans to evaluate the 279 at-grade crossings in the study area, as shown in **Figure 7**. Following the initial screening, the highest priority at-grade crossings will be subjected to a detailed evaluation for potential conceptual improvements. These improvements may include upgrades to warning devices, grade separations, or other necessary enhancements. The recommended improvements will be categorized into short, medium, and long-term projects, taking into account factors such as funding availability, right-of-way constraints, and other relevant considerations.

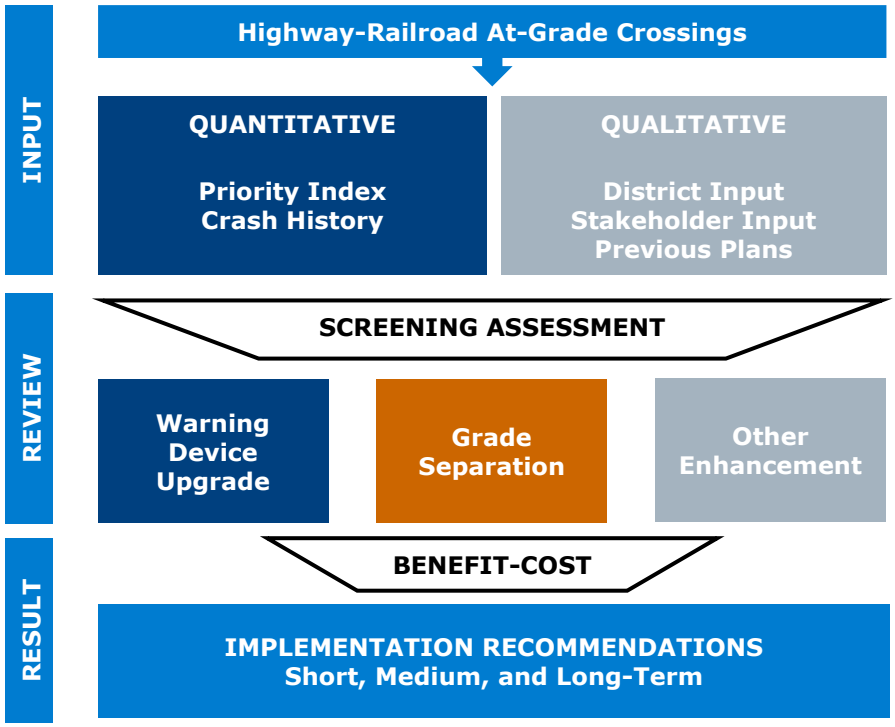


*Figure 7: Screening Methodology Flow Chart*

## Texas Priority Index (TPI) Formula

The original TPI formula: $TPI = 0.001 \times AADT \times T \times S \times P_f \times A^{1.15}$

Where AADT is annual average daily traffic,

T is daily train traffic,

S is maximum speed of trains,

$P_f$ is protection factor for warning device type (such as 0.1 for gates), and

A is the number of crashes in the last five years.

## Revised Texas Priority Index Formula

A revised TPI ($TPI_{revised}$) formula was developed based on a report completed by UTSA/TTI in 2013, which considers more parameters than the original formula to better reflect the improvement needs of existing at-grade crossings.

The $TPI_{revised}$ formula: $TPI_{revised}=1000\times\hat{\mu}\times(A_5+0.1)$

$A_5$ = number of crashes in last five years at crossing

$$\begin{aligned}\hat{\mu} = \exp\big[&-6.9240 + P\_f\_indicator\_T \\ &+ 0.2587\times HwyPaved - 0.3722\times UrbanRural + 0.0706\times TrafLane \\ &+ 0.0656\times TotalTrack + 0.0022\times ActualSD1 + 0.0143\times MaxSpeed \\ &+ 0.0126\times MinSpeed + 1.0024\times Log_{10}(TotalTrn + 0.5) \\ &+ 0.4653\times Log_{10}(AADT) - 0.2160\times NearbyInt + 0.0092\times Higher\_SPD\_Lmt\big]\end{aligned}$$

HwyPaved: highway paved or not

UrbanRural: urban or rural

TrafLane: number of roadway lanes

TotalTrack: number of mainline and other tracks

ActualSD1: actual stopping distance

MaxSpeed: maximum train speed

MinSpeed: minimum typical speeds for switching

TotalTrn: number of total trains

NearbyInt: the presence of nearby intersections

Higher_SPD_Lmt: maximum vehicular speed limit

## Priority Crossing Selection

After the initial screening, the top priority at-grade crossings were identified based on the weighted score using TPI/Revised TPI, crash data, district and stakeholder priorities, and previous plans. **Table** and **Figure 8** provides the summary of the top priority at-grade crossing locations.

**Table 5. Initial Top Priority At-Grade Crossings**

| DOT Num | Street/Road | County | RR Operator Name |
|---|---|---|---|
| 014693P | EAST FOURTY SIXTH STREET | Randall | BNSF Railway Company |
| 014602G | NORTH EASTERN STREET | Potter | BNSF Railway Company |
| 014733K | FM2943 | Deaf Smith | BNSF Railway Company |
| 014700X | MCCORMICK ROAD | Randall | BNSF Railway Company |
| 014698Y | GEORGIA STREET | Randall | BNSF Railway Company |
| 014695D | FARMERS AVENUE | Randall | BNSF Railway Company |
| 014734S | PROGRESSIVE ROAD | Deaf Smith | BNSF Railway Company |
| 596188B | FM0807 | Dallam | Union Pacific Railroad Company |
| 014701E | ROCKWELL ROAD | Randall | BNSF Railway Company |
| 014704A | FIFTEENTH STREET | Randall | BNSF Railway Company |
| 014714F | JOHNSON RANCH ROAD | Randall | BNSF Railway Company |
| 014556H | COUNTY ROAD 3 | Gray | BNSF Railway Company |
| 014707V | BROWN ROAD | Randall | BNSF Railway Company |
| 596201M | COUNTY ROAD 13 | Sherman | Union Pacific Railroad Company |
| 014702L | BUFFALO STADIUM ROAD | Randall | BNSF Railway Company |
| 014706N | FOURTH STREET | Randall | BNSF Railway Company |

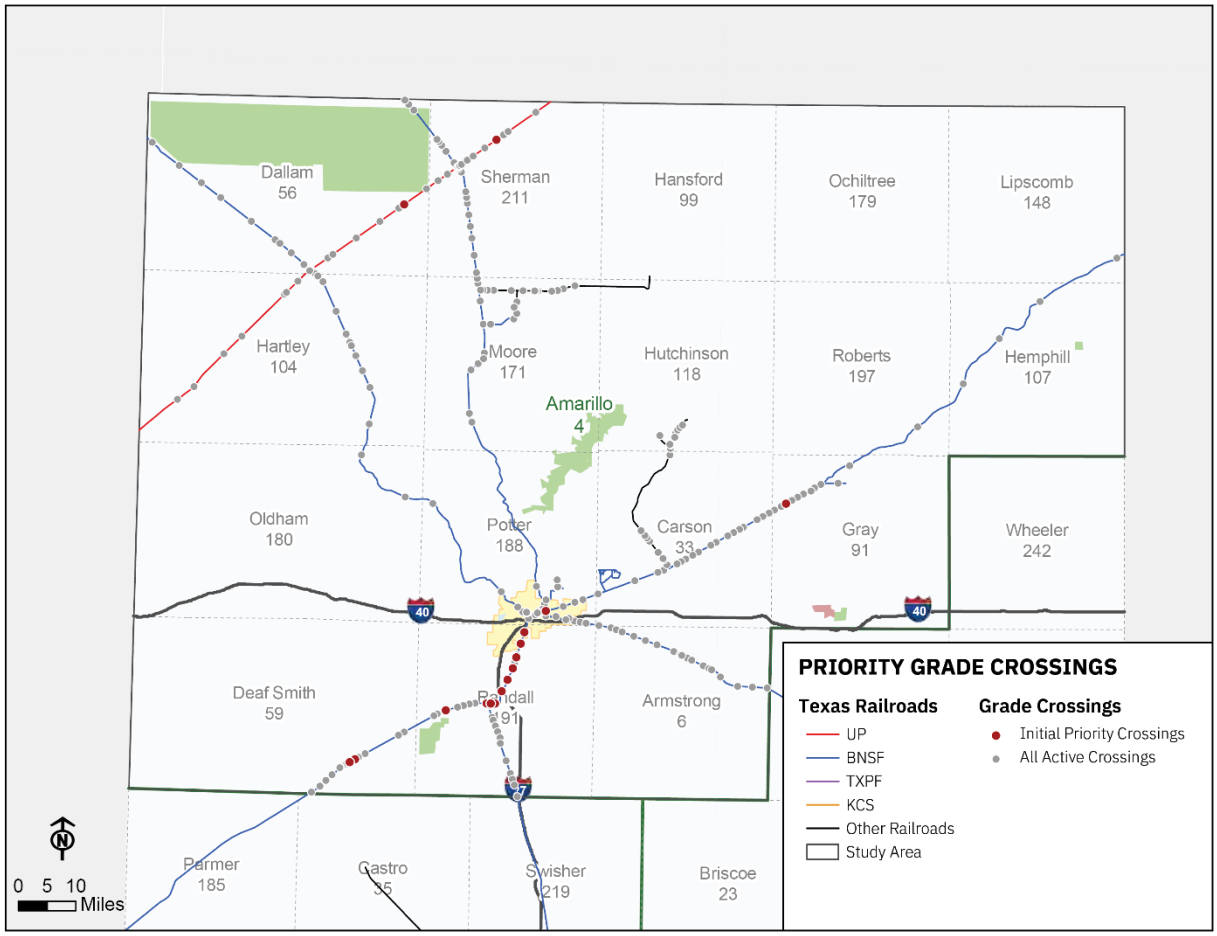


*Figure 8: Initial Priority At-Grade Public Railroad Crossings*

# Conclusion and Next Steps

The study assessed existing conditions, identified safety and mobility issues, and prioritized the 279 at-grade crossings in the seventeen-county study area based on initial TPI scores, crash history, district and stakeholder priorities, and a review of previous planning documents. The top priority locations will undergo further evaluation, including the preparation of improvement concepts, benefit-cost analysis, and the development of an implementation strategy.

# Appendix B:

# Grade Crossing Improvement Toolbox Technical Memorandum

# Amarillo District Highway-Rail Grade Crossing Study

## Technical Memorandum – Grade Crossing Improvement Toolbox

July 2024

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# Introduction

The purpose of the Amarillo District Highway-Rail Grade Crossing Study is to develop a program of projects to improve safety, mobility and reduce vehicular delays through improvements to highway-railroad at-grade crossings associated with the existing BNSF Railway (BNSF), Union Pacific Railroad (UP), Panhandle Northern Railroad Company (PNR), and Texas North Western Railway Company (TXNW) freight rail system located in the seventeen-county study area (**Figure 1**), which includes Dallam, Sherman, Hansford, Hartley, Moore, Hutchinson, Oldham, Potter, Carson, Deaf Smith, Randall, Armstrong, Ochiltree, Roberts, Gray, Lipscomb, and Hemphill Counties in Texas. This study includes the analysis, planning, and conceptual development of improvements, a benefit-cost analysis, and the creation of a strategic implementation plan for priority highway-rail at-grade crossings within the study area.

The study area consists of approximately 710 miles of existing freight rail systems operated by BNSF, UP, PNR, and TXNW. In the Amarillo District, there are a total of 345 public rail crossings, including 279 at-grade crossings, 35 railroad overpasses, and 31 railroad underpasses.

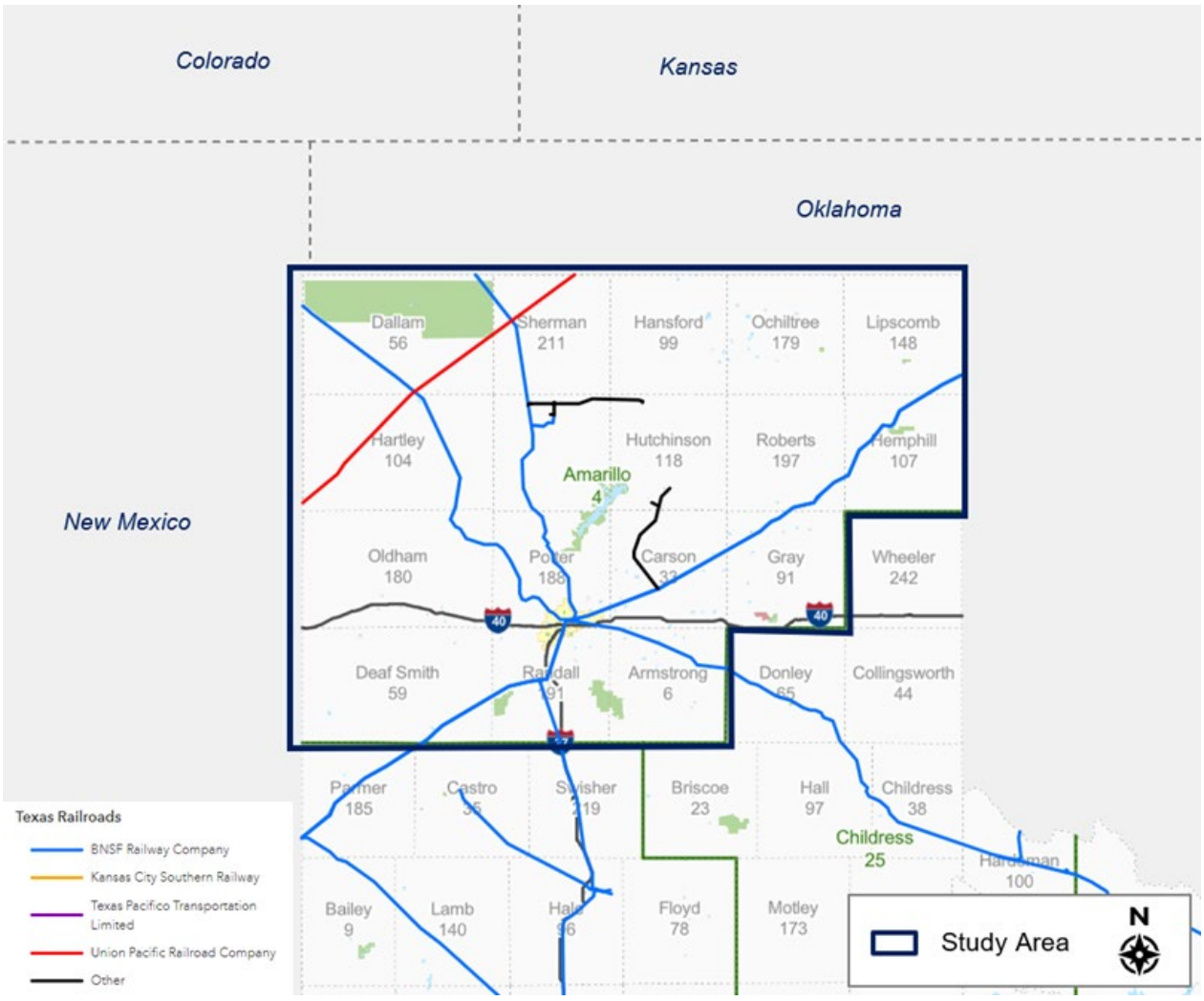



*Figure 1. Seventeen-County Study Area and Railroad Map*

## Memorandum Outline

The Technical Memorandum –*Grade Crossing Improvement Toolbox* includes the following sections:

- Improvement Toolbox: This section provides an overview of the improvement types that may be considered at highway-railroad at-grade crossings.
- Application of Improvement Toolbox: This section describes in more detail how each improvement type will be applied to crossing locations.

# Improvement Toolbox

A grade crossing improvement toolbox includes possible improvements that address mobility and safety at highway-railroad at-grade crossings. For the Amarillo District Feasibility Study, three basic improvement types are considered at highway-railroad at-grade crossings. Although the inventory of improvement types could be expanded, this Study focuses on the three improvement types listed here:

- Warning Device Upgrade
- Grade Separation
- Other Enhancements

## Warning Device Upgrades

Warning device systems are railroad crossing safety improvements that inform motorists and pedestrians of the approach or presence of trains at highway-railroad at-grade crossings. These systems include active and passive warning devices. As shown in **Figure 2**, active warning devices include flashing lights, bells, wig-wags, and gates. Upgrading flashing lights to highly visible signals improve visibility in all weather conditions, alerting drivers and pedestrians to the presence of an approaching train. Complementing the flashing lights, bells provide an audible warning with a repetitive sound. Gate arms act as physical barriers to prevent vehicles and pedestrians from crossing the tracks when a train is approaching. As shown in **Figure 3**, passive warning devices include crossbucks, stop or yield signs, and advance pavement markings on the road surface. Upgrading these passive visual warning devices to high-visibility enhancements provides enhanced warnings to drivers, indicating the location of the railroad crossing zone and preparing them for crossings ahead.


*Figure 2. Examples of Active Warning Devices, Source: Google Earth Street View.*

Each year, Federal Highway Administration (FHWA) funding (through programs such as annually allocated Section 130 formula funds, but other programs can be used) are distributed nationwide for warning device upgrades. Warning device upgrades are most often the combination of flashing lights and gates; other enhancements such as crossing surface upgrades may be completed in conjunction with warning device upgrades.

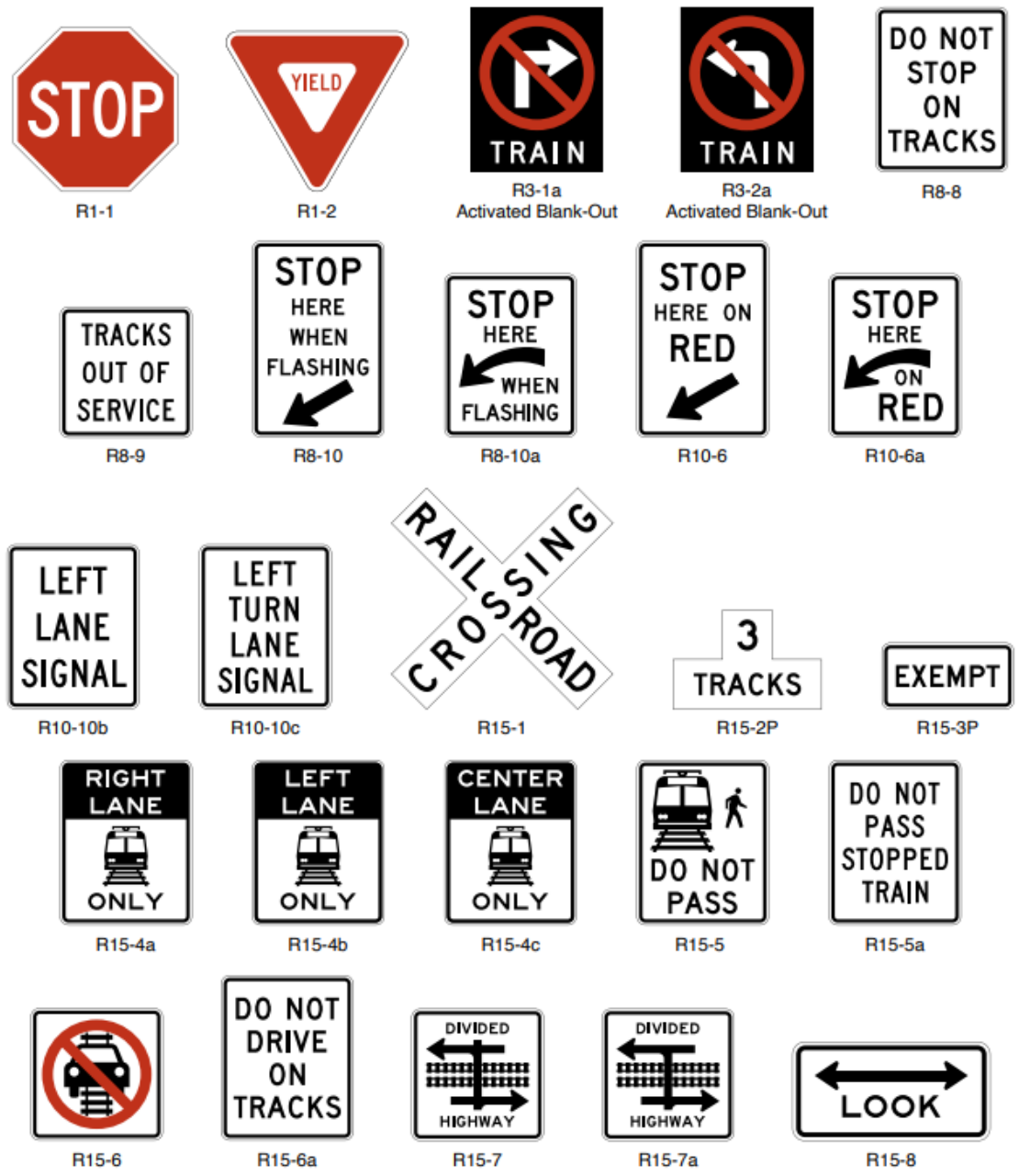



*Figure 3. Examples of Passive Warning Devices*

*Source: Manual of Uniform Traffic Control Devices (11th ed.). Part 8. Figure 8B-1.*

## Grade Separations

Grade separations eliminate an existing highway-railroad grade crossing by elevating or depressing either the highway or the railroad tracks, thereby allowing vehicular traffic to move unimpeded at crossings occupied by trains. By physically separating the road and rail traffic, the elimination of a grade crossing eliminates vehicle-train collisions at the crossing and therefore greatly increases safety at the location. In addition, grade-separated crossings improve pedestrian and bicyclist safety by providing a safer alternative that reduces the chances of pedestrians and bicyclists interacting with moving trains, which is particularly important in areas with high pedestrian and bicyclist traffic.

Also, vehicles at grade crossings experience delays, especially during peak train periods. Grade separation allows for improved traffic flow, reducing vehicular delay and congestion by eliminating the need for vehicles to stop when a train occupies the crossing. Rear-end crashes caused by vehicular queues are also eliminated. Grade separation projects may require the financial support of federal, state and/or local agencies as well as the cooperation of the railroad. Federal discretionary grants are highly sought after funding sources for grade separations. Two programs in particular, the Railroad Crossing Elimination (RCE) and Consolidated Rail Infrastructure and Safety Improvements (CRISI) programs, award millions of dollars each year to safety rail projects.

Grade separations can be achieved either by elevating the roadway over the railroad or by elevating the railroad tracks over the highway. Highway grade separations take the roadway over the railroad providing sufficient vertical clearance for a double stack train to pass underneath the roadway bridge[1] while rail grade separations take the railroad tracks over the highway providing sufficient vertical clearance for roadway vehicles[2].

[1] For planning purposes, this vertical distance will be approximately 30 feet, which includes the required vertical clearance of 23 feet – 6 inches over the rail plus the depth of roadway structure assumed to be 6 feet – 6 inches. Depth of structure may vary and is dependent upon various factors including but not limited to span length and soil conditions.

[2] For planning purposes, the vertical distance to the proposed top of rail will typically be 20 feet, which includes an arterial roadway vertical clearance of 16 feet – 6 inches plus a depth of railroad structure assumed to be 3 feet – 6 inches. Depth of structure may vary and is dependent upon factors including g but not limited to span length and soil conditions.

San Marcos Overpass (San Marcos, Texas)

Figure 4. Example of Railroad Grade Separation – Roadway Over Railroad[3]

Wellborn Grade Separation (College Station, Texas)

Figure 5. Example of Railroad Grade Separation – Railroad Over Roadway[4]

[3] Source: CBS Austin. (2018, August 20). San Marcos overpass helping first responders bypass trains. CBS Austin. Retrieved July 19, 2024, from https://cbsaustin.com/news/local/san-marcos-overpass-helping-first-responders-bypass-trains

[4] Clark Condon. (n.d.). Wellborn Grade Separation Underpass, Texas A&M University. Retrieved July 30, 2024, from https://clarkcondon.com/portfolio/wellborn-grade-separation-underpass-texas-am-university/

## Other Enhancements

A series of other enhancements to consider when reviewing mobility and safety at highway-railroad at-grade crossings include:

- Existing Planned or Programmed Improvements
- Corridor and Land Use Plans
- Crossing Geometry

**Existing Planned or Programmed Improvements**: TxDOT works with local communities and railroads to advance improvements at highway-railroad at-grade crossings on an on-going basis. Additionally, TxDOT maintains the Texas Railroad Information Management System (TRIMS) to track and prioritize rail-related projects. These projects were reviewed during the initial stage of the Study. They include grade separations in various design stages, safety enhancements at high-risk crossings, and ongoing upgrades through TxDOT's regular program.

**Corridor and Land Use Plans**: According to the TxDOT Project Development Process Manual, a transportation corridor is a broad geographic band along an interstate or major principal arterial that follows a linear flow integrating operational surface transportation networks of origin-destination trip generators. Furthermore, corridor and network planning are early opportunities to establish a framework for integrating specific thoroughfare projects into local area overall objectives. This represents an early opportunity to bring public and private stakeholders together to discuss the transportation project. Public engagement helps expedite the project development process by identifying and addressing key issues, opportunities, and community objectives before the design and engineering process begins.

Generally, land use planning involves the regulation of land and resources to efficiently manage its functionality and protect the surrounding environment. The compatibility of adjacent land uses is extremely important for the safety and general welfare of the public in addition to the economic development of the region.

As it relates to highway-railroad at-grade crossings, corridor plans can be helpful in situations where a major highway-transportation corridor closely parallels a railroad track with numerous intersecting roadways. A comprehensive review of a corridor to plan for future grade separations in a complex environment is good practice. Land use plans are crucial in guiding development patterns to avoid generating significant traffic across highway-railroad at-grade crossings.

**Crossing Geometry**: Sight distance at the approach of a highway-railroad at-grade crossing can be an issue for motorists, pedestrians, bicyclists, and the locomotive engineer when the highway is not perpendicular to the railroad tracks at the crossing. This results in a skewed crossing, which needs to be avoided when possible. Aligning a highway-railroad at-grade crossing at a ninety-degree angle to the railroad tracks creates a larger visibility triangle.

A high-profile or "hump" crossing occurs when the crossing's approach grade is relatively steep, causing the crossing to be the high point of the intersection. High-profile crossings can cause vehicles with long wheelbases (such as semi-trucks and school buses) or low-hanging equipment to get caught on such a crossing.

When a train occupies the crossing, turning vehicles from the roadway parallel to the tracks must wait until the train has passed to cross the tracks. This can create congestion in adjacent through lanes. By extending turn-lanes to allow for more vehicular queuing capacity, the flow of through traffic on a parallel roadway is improved during the passage of a train.

When a highway-railroad grade crossing is near an intersection, interconnecting traffic signals with railroad signals to clear vehicles from the crossing at the detection of an approaching train, adding an extra layer of safety protection.

# Application of Improvement Toolbox

It is anticipated that up to four (4) highway-railroad crossing improvements and up to six (6) highway-railroad grade separations will be prioritized for this Study. For each of these improvement types, the toolbox is applied following the general principles described in the following sections.

## Warning Device Upgrades

The consideration for a warning device upgrade focuses on crossings controlled by passive devices and with one or more crashes in the last five years. Each location reviewed considers consolidation with adjacent crossings, physical conditions, and train and traffic volumes.

## Grade Separations

At-grade highway-rail crossings that are ideal candidates for grade separation typically exhibit certain key characteristics. High traffic volume, either vehicular or rail, is a primary factor, as frequent interactions between vehicles and trains can lead to significant delays and increased accident risks. Locations with a history of frequent accidents, especially those resulting in fatalities or severe injuries, are also prioritized for grade separation to enhance safety. Additionally, crossings expected to see substantial increases in traffic due to planned developments or economic growth warrant consideration for future-proofing against congestion and safety issues.

Other important factors include limited visibility at the crossing, which can make it difficult for drivers to see approaching trains in time to react safely. Crossings near schools, parks, or areas with high pedestrian traffic should be considered for grade separation to protect vulnerable road users. Similarly, crossings on critical emergency response routes, where delays caused by trains could impede emergency vehicles, are important candidates for grade separation to ensure timely emergency responses.

Surrounding land use also plays a crucial role in determining the need for grade separations. Areas with high-density development or land uses that generate significant traffic, such as commercial zones and industrial areas, often necessitate grade separations to manage traffic flow and safety. Crossings with sufficient right-of-way for constructing a grade separation without causing significant disruptions to surrounding properties are preferable, as are locations where multiple at-grade crossings are closely spaced, benefiting from a broader improvement in traffic flow and safety.

Lastly, economic and strategic importance of the crossing can influence prioritization. Crossings that are vital for economic activities, such as those serving major ports, industrial hubs, or freight corridors, may be prioritized for grade separation to ensure efficient transportation logistics. By considering these factors, transportation agencies can effectively prioritize and select at-grade highway-rail crossings for grade separation projects, thereby enhancing safety, efficiency, and overall transportation network reliability.

## Other Enhancements

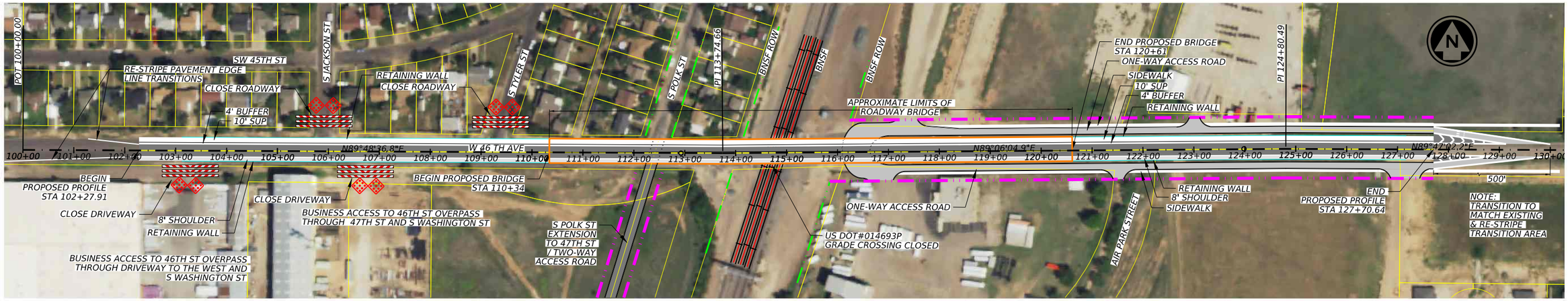
A series of other enhancements to consider when reviewing mobility and safety at highway-railroad at-grade crossings include:

- Existing Planned or Programmed Improvements: Locations with planned or programmed improvements are suggested to be continuously monitored to maintain project coordination and integration with other adjacent locations.
- Corridor and Land Use Plans: Crossing locations along a stretch of railroad track that parallels a highway corridor could benefit from a future corridor plan to preserve right-of-way and dictate access management to protect the ability to grade separate.
- Crossing Geometry: Crossing upgrades at passive locations or crossings with existing geometric deficiencies will be reviewed for geometric improvements.
- Replacing Active Equipment: Active equipment may need to be upgraded to meet current standards.
- Preemption: Crossings near adjacent intersections with a traffic signal can be considered for preemption - interconnecting the traffic signals with the active railroad warning devices.
- Civil Work: Civil portions such as medians, sidewalks, and roadway surfaces can be improved to improve safety for automobile users and pedestrians.

# Appendix C:

# Improvement Concepts & Cost Estimate

# 46TH STREET GRADE SEPARATION

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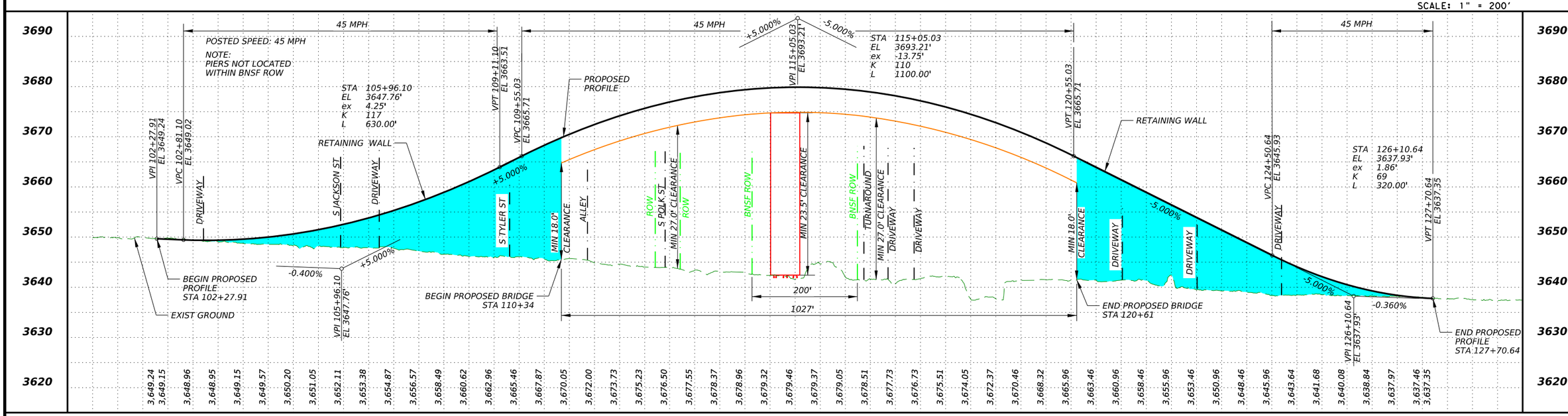
SCALE: 1" = 200'




PRELIMINARY CONCEPT SUBJECT TO CHANGE

**INTERIM REVIEW ONLY**

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LEGEND
- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- ACCESS RD
- PARCELS
- BRIDGE
- SIDEWALK



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014693P, RRMP 0556.281

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DISCLAIMER:
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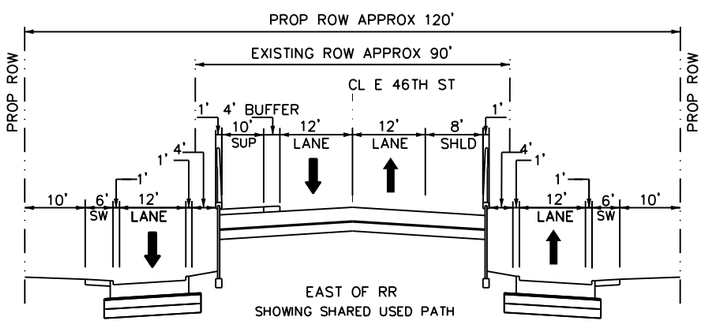
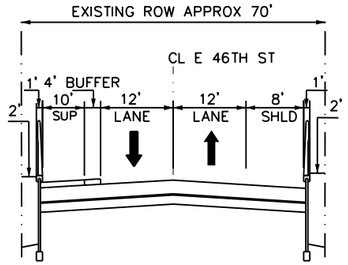
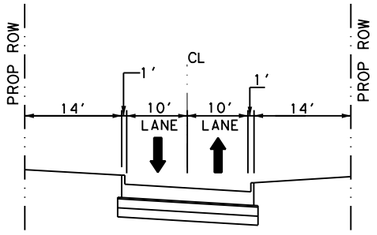


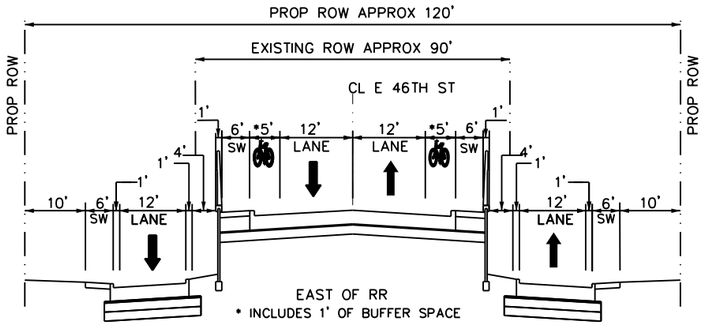

EAST OF RR
SHOWING SHARED USED PATH



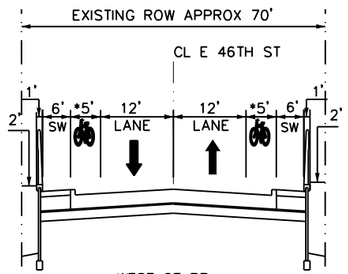

WEST OF RR
SHOWING SHARED USED PATH



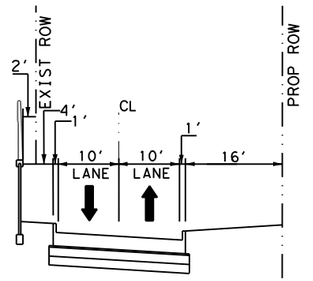

POLK STREET EXTENSION/TWO-WAY ACCESS ROAD




EAST OF RR
* INCLUDES 1' OF BUFFER SPACE
BIKE/SW OPTION




WEST OF RR
* INCLUDES 1' OF BUFFER SPACE




TWO-WAY ACCESS ROAD

NOT TO SCALE

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*PRELIMINARY CONCEPT SUBJECT TO CHANGE*



TRANSYSTEMS

CivilCorp an ESP COMPANY

**TXDOT RAILROAD CROSSING STUDY AMARILLO DIST.**
CROSSING ID #014693P, RRMP 0556.281

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

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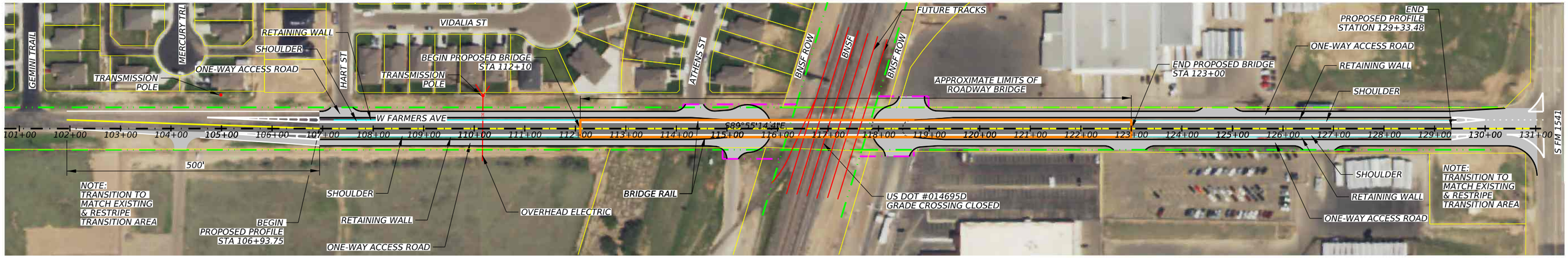
# FARMERS AVE GRADE SEPARATION

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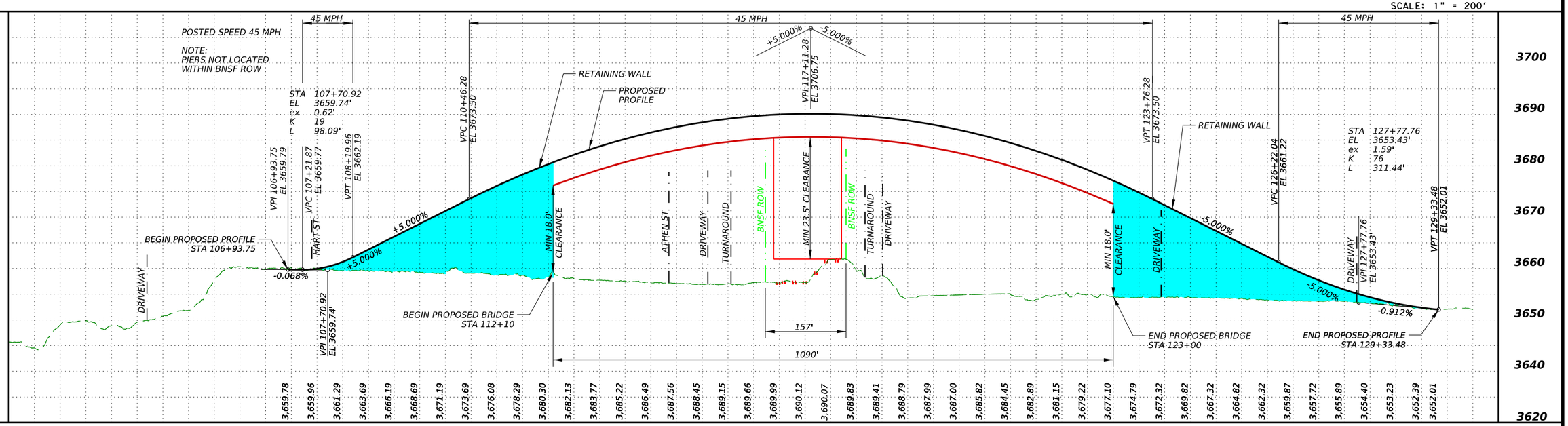
SCALE: 1" = 200′

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PRELIMINARY CONCEPT SUBJECT TO CHANGE

LEGEND
RETAINING WALL
EXISTING ROW
PROPOSED ROW
PAVEMENT
ACCESS RD
PARCELS
BRIDGE
SIDEWALK



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014695D, RRMP 0558.365

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

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DISCLAIMER:
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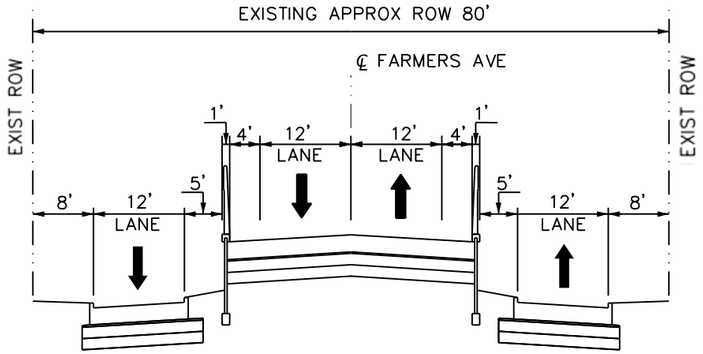
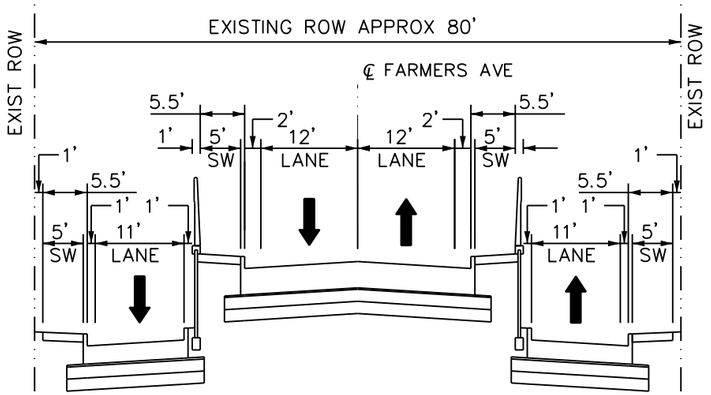



FARMERS AVE
TYPICAL SECTION
OPTION 1




FARMERS AVE
TYPICAL SECTION
OPTION 2 : SHOWING SIDEWALK

NOT TO SCALE

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*PRELIMINARY CONCEPT SUBJECT TO CHANGE*



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014695D, RRMP 0558.365

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

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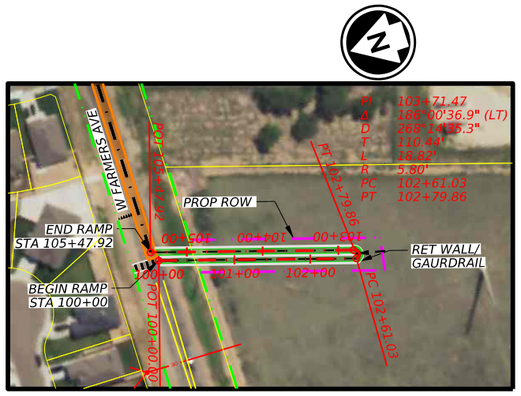
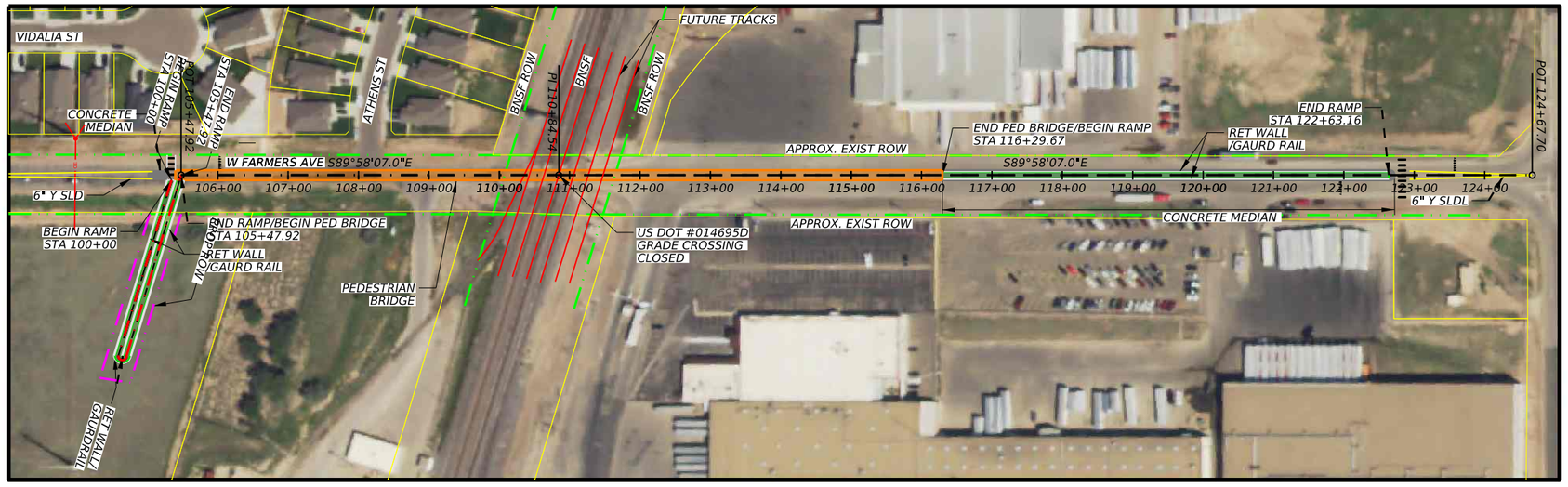
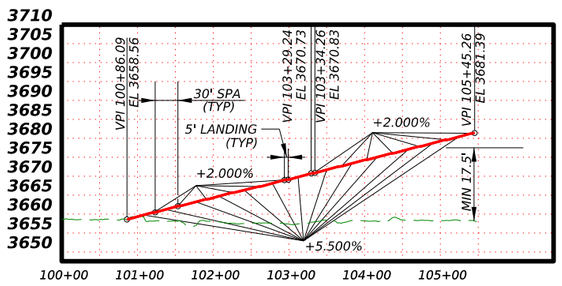
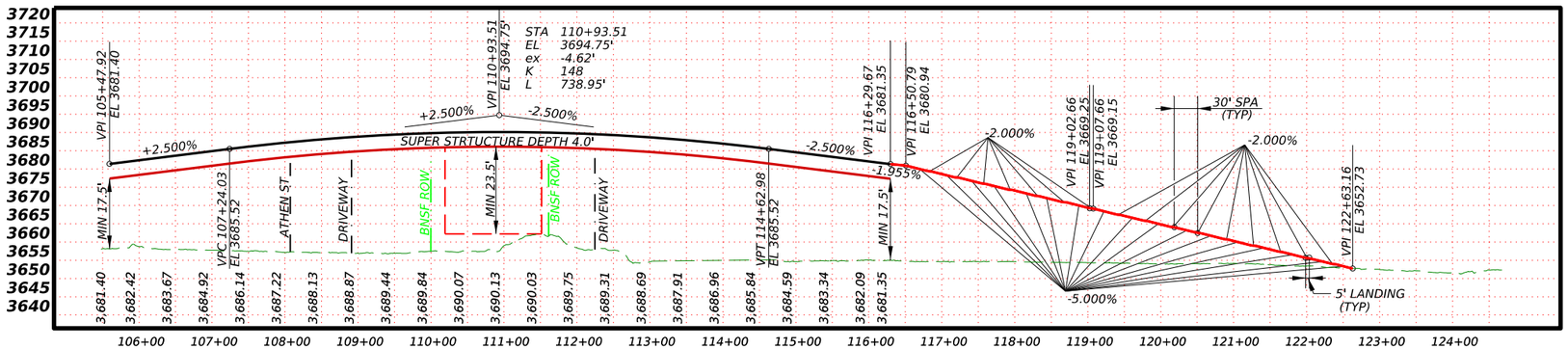
# FARMERS AVE PEDESTRIAN BRIDGE OPTION



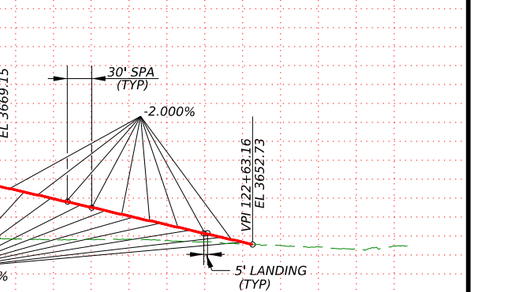




## PERPENDICULAR PEDESTRIAN RAMP




## PEDESTRIAN BRIDGE




## PARALLEL PEDESTRIAN RAMP

PRELIMINARY CONCEPT SUBJECT TO CHANGE

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LEGEND
PED RAMP
EXISTING ROW
PROPOSED ROW
CONC MEDIAN
PARCELS
BRIDGE
SIDEWALK



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DATE: 4/24/2025 11:25:58 AM
FILE: c:\pw\working\dir\civilcorp-pw.bentley.com_civilcorp-pw-01\rhall@civilcorp.us\d0126637\014695D FARMERS AVE PED BRIDGE PP01.dgn

DISCLAIMER:
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NOTES:
PROPOSED CLOSURE OF FARMERS AVE AT GRADE CROSSING SHOULD BE COORDINATED WITH RAILROAD PRIOR TO ADVANCE DESIGN PHASE. ADDITIONAL ADJACENT AT-GRADE CROSSING CLOSURES OR OTHER IMPROVEMENTS WILL BE EVALUATED IN FURTHER DESIGN.

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DRIVEWAY AND PARKING IMPACTS TO BE EVALUATED IN PS&E DEVELOPEMENT.

PEDESTRAIN BRIDGE CONSTRUCTION AND AT-GRADE CROSSING CLOSURE TO VEHICULAR TRAFFIC WILL AFFECT SOME TRAFFIC PATTERNS TO ADJACENT ROADWAYS, FINAL DESIGN WILL NEED TO ADDRESS TRAFFIC CHANGES. THIS COULD BE HANDLED THROUGH SIGNALIZATION AND OTHER TRAFFIC CONTROL MEANS.

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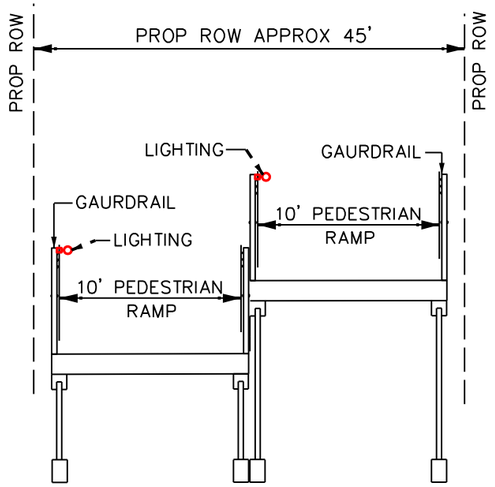
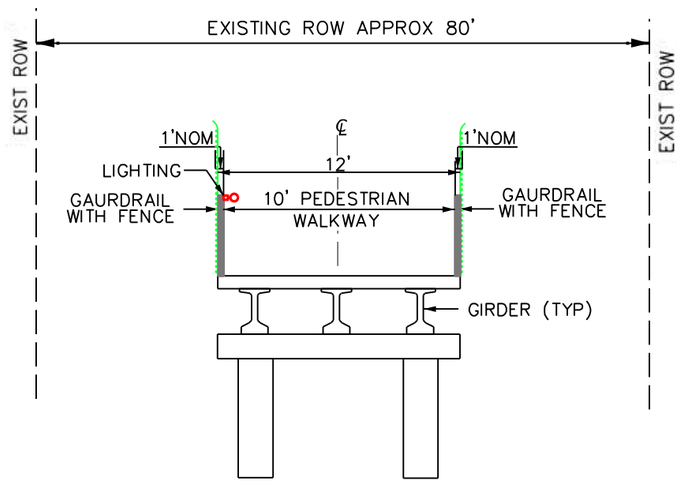
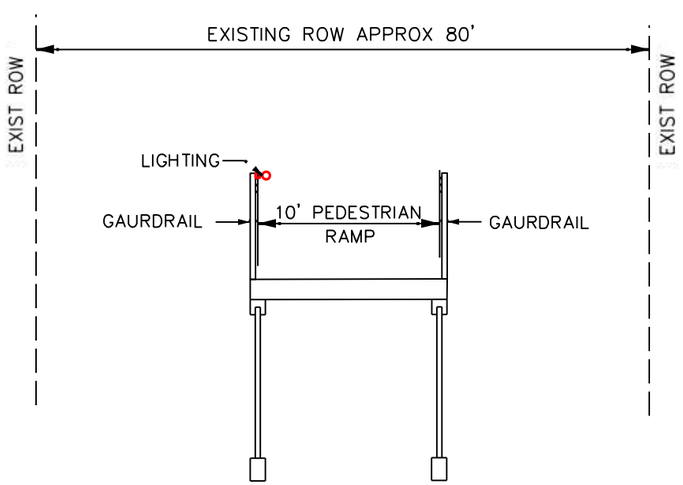



PERPENDICULAR RAMP
(BEGIN BRIDGE)
STA 100+00 TO STA 105+47.92




PEDESTRIAN BRIDGE
STA 105+47.92 TO STA 116+30




PARALLEL RAMP
(END BRIDGE)
STA 116+30 TO STA 122+64

NOT TO SCALE

*INTERIM REVIEW ONLY*

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*PRELIMINARY CONCEPT SUBJECT TO CHANGE*



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #14695D

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DATE: 4/24/2025 11:29:12 AM
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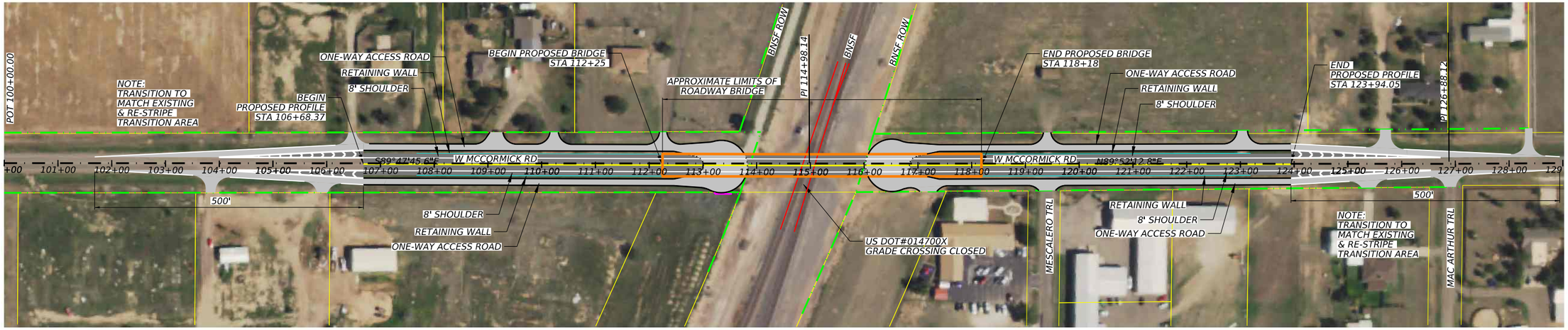
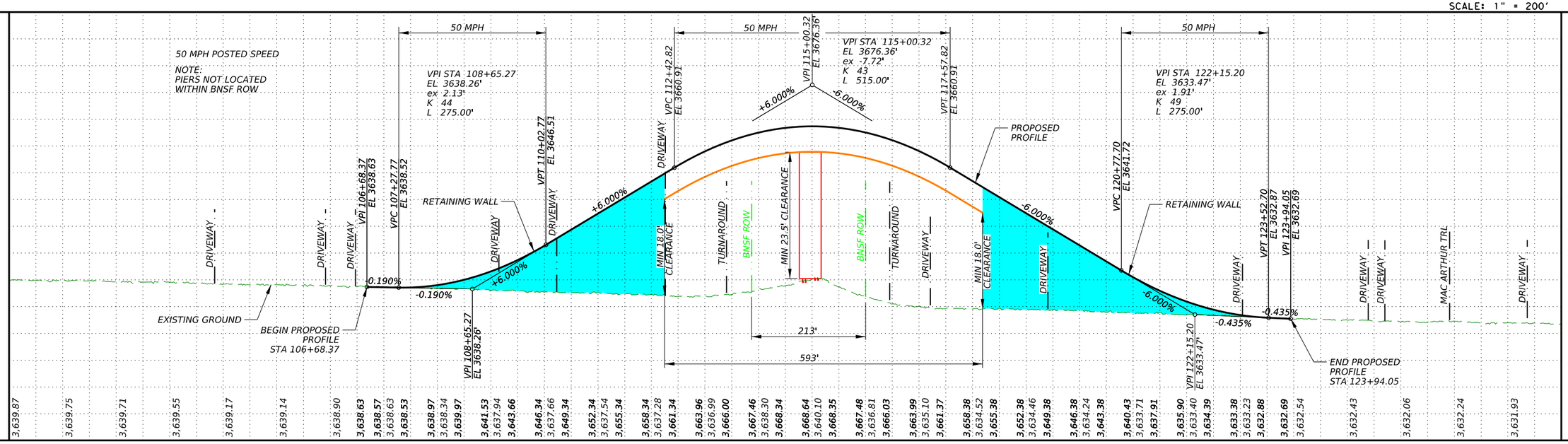
# MCCORMICK ROAD GRADE SEPARATION




0 100' 200' 400'

SCALE: 1" = 200'

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LEGEND
RETAINING WALL
EXISTING ROW
PROPOSED ROW
PAVEMENT
ACCESS RD
PARCELS
BRIDGE
SIDEWALK



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014700X, RRMP 0562.868

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

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DISCLAIMER:
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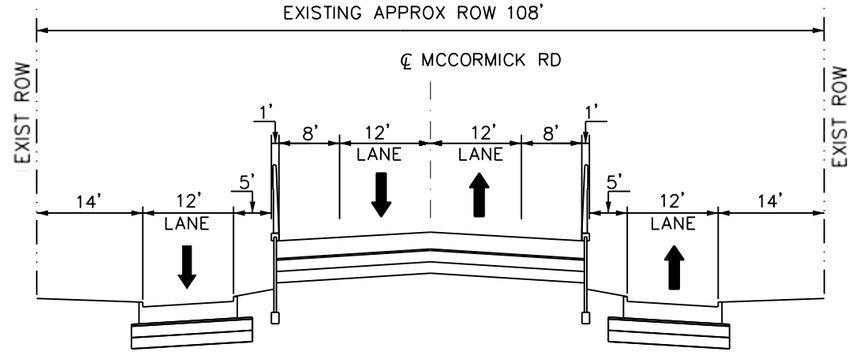


MCCORMICK RD
TYPICAL SECTION

NOT TO SCALE

*INTERIM REVIEW ONLY*

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*PRELIMINARY CONCEPT SUBJECT TO CHANGE*



TRANSYSTEMS

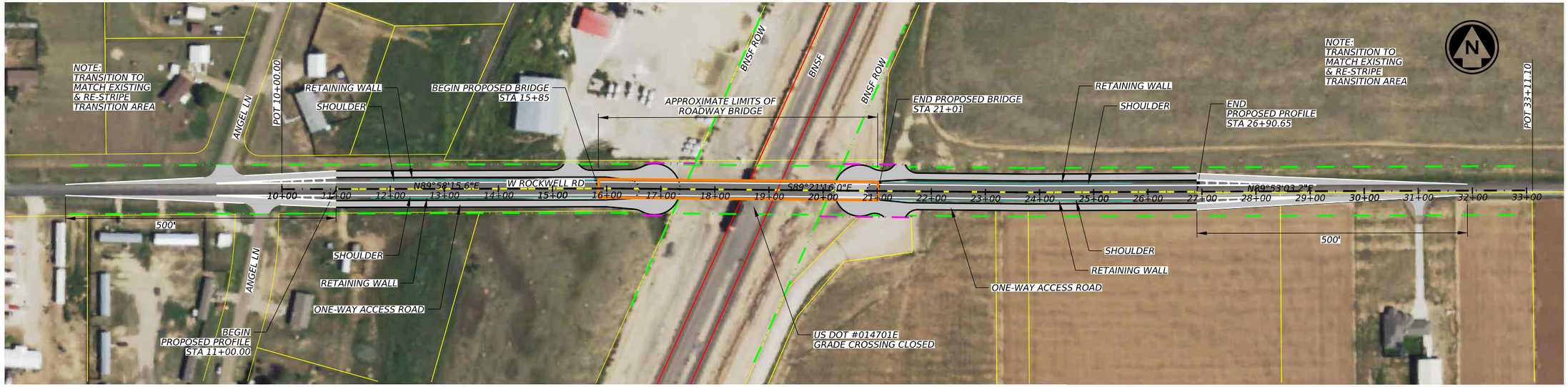
CivilCorp an ESP COMPANY

*TXDOT RAILROAD CROSSING STUDY AMARILLO DIST.*
*CROSSING ID #014700X, RRMP 0562.868*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

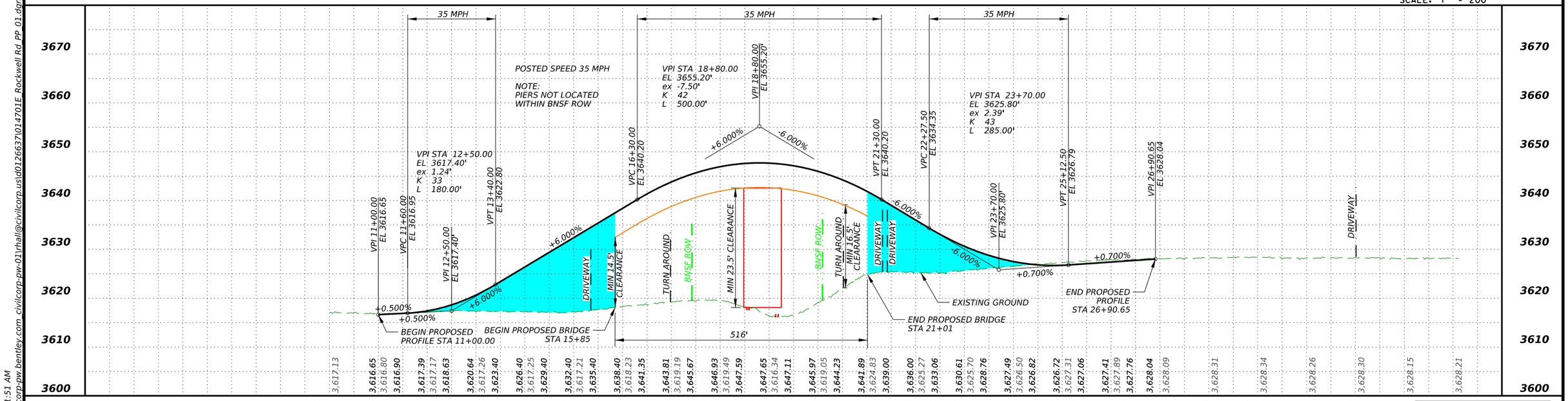
DATE: 4/24/2025 10:10:56 AM
FILE: c:\pw\working\dir\civilcorp-pw.bentley.com_civilcorp-pw-01\rhall@civilcorp.us\d0127718\014700X_TYPICAL SECTIONS.dgn

# ROCKWELL ROAD GRADE SEPARATION




0 100′ 200′ 400′

SCALE: 1" = 200′

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LEGEND
- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- ACCESS RD
- PARCELS
- BRIDGE
- SIDEWALK



TRANSYSTEMS

CivilCorp an ESP COMPANY

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014701E, RRMP 0565.064

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DATE: 4/24/2025 11:41:51 AM
FILE: c:\pw\working\dir\civilcorp-pw.bentley.com_civilcorp-pw-01\rhall@civilcorp.us\d0126637\014701E Rockwell Rd_PP_01.dgn

DISCLAIMER:
THE EXACT LOCATION, DESIGN AND RIGHT-OF-WAY FOR THE E ROCKWELL ROAD ALIGNMENT CANNOT BE DETERMINED FROM THESE CONCEPTS AND COULD BE DIFFERENT FROM THAT SHOWN. THE ALIGNMENT DESIGN IS CONCEPTUAL IN NATURE AND WAS DEVELOPED TO CONVEY INTENT AS WELL AS IDENTIFY AREAS FOR COORDINATION IN ASSOCIATION WITH A GRADE SEPARATION OF THE RAILROAD. PRELIMINARY DESIGN WILL NEED TO BE CONDUCTED TO REFINE THE TYPE OF IMPROVEMENTS AND RIGHT-OF-WAY REQUIREMENTS. AT THE TIME OF DESIGN, ALL APPLICABLE GUIDELINES WILL BE UTILIZED AND COULD BE DIFFERENT FROM SHOWN.

NOTES:
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U-TURNS WILL ACCOMMODATE TXDOT WB-62 SEMI-TRAILERS AND OTHER DESIGN VEHICLES WITH THE SAME OR SMALLER TURNING PATHS.

ROADWAY TAPER LENGTHS FOR TIE-IN TO EXISTING PAVEMENT AND NEED FOR PROTECTION (CCA) OR WHITE CHEVRON MARKINGS AT RETAINING WALL ENDS ARE RECOMMENDED AND NEED TO BE EVALUATED DURING PS&E DEVELOPMENT.

ONE-WAY ACCESS ROAD TRAFFIC FLOWS NEEDS TO BE EVALUATED DURING THE PS&E DEVELOPMENT.

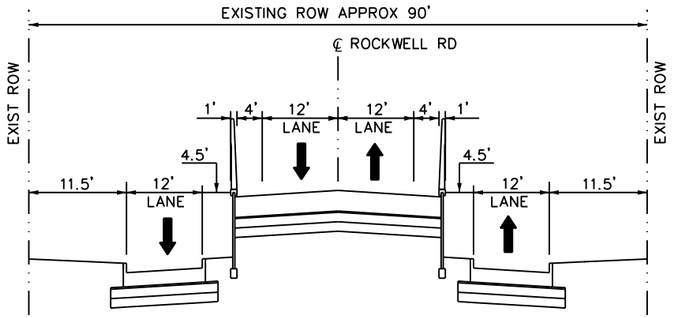
SOIL IMPROVEMENTS UNDER THE APPROACHES OR EMBANKMENT HEIGHT RESTRICTIONS MAY BE REQUIRED BASED ON SUBSURFACE SOIL CONDITIONS EVALUATED IN FUTURE PROJECT DEVELOPMENT PHASES.

ADDITIONAL ADJACENT AT-GRADE CROSSING CLOSURES OR OTHER IMPROVEMENTS WILL BE EVALUATED IN FURTHER DESIGN.

DRIVEWAY IMPACTS TO BE EVALUATED IN PS&E DEVELOPEMENT.

BRIDGE WILL AFFECT SOME TRAFFIC PATTERNS, FINAL DESIGN WILL NEED TO ADDRESS TRAFFIC CHANGES. THIS COULD BE HANDLED THROUGH SIGNALIZATION AND OTHER TRAFFIC CONTROL MEANS.

THE LOCATION OF EXISTING UNDERGROUND UTILITIES FOR POTENTIAL CONFLICTS AT PROPOSED RAILROAD OVERPASS NEED TO BE EVALUATED DURING PS&E DEVELOPEMENT.

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TRANSYSTEMS

CivilCorp an ESP COMPANY

*TXDOT RAILROAD CROSSING STUDY AMARILLO DIST.*
*CROSSING ID #014701E, RRMP 0565.064*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DATE: 4/24/2025 10:15:44 AM
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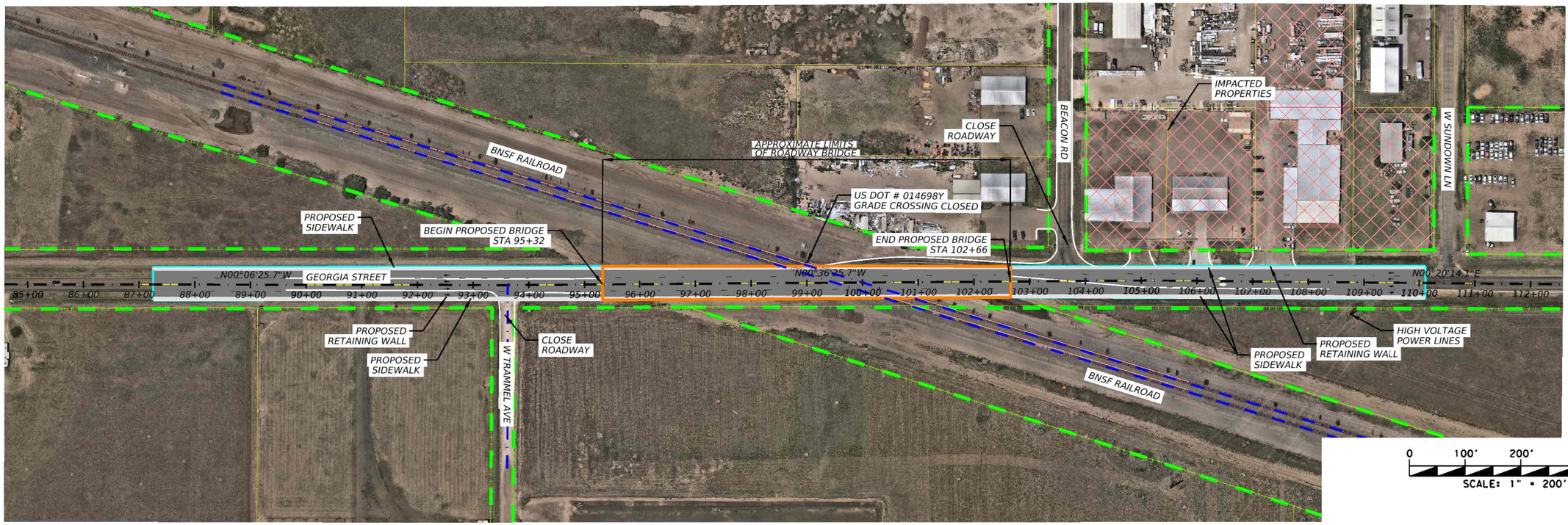
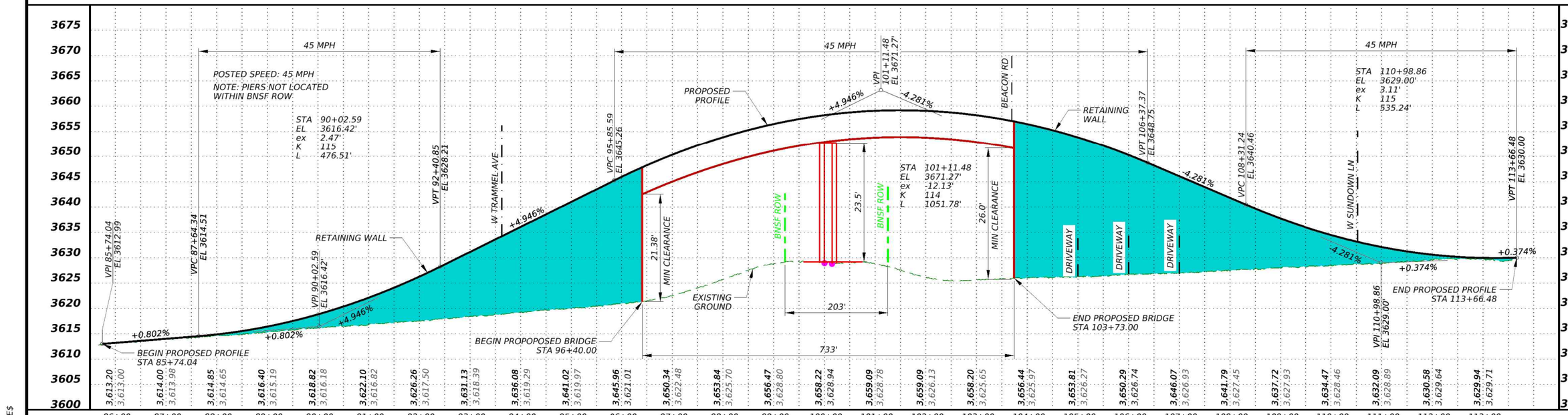
# Georgia Street - Option 1: Grade Separation with No Frontage Road




PRELIMINARY CONCEPT SUBJECT TO CHANGE



LEGEND

RETAINING WALL | EXISTING ROW | PROPOSED ROW | PAVEMENT | CURB & GUTTER | PARCELS | MEDIAN | SIDEWALK | IMPACTED PROPERTY

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2777 ALLEN PARKWAY, SUITE 500
HOUSTON, TX 77019
(713) 807-0600


TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID 014549X, RRMP 500.84

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

$TIME$
DATE: $DATE$
FILE: $FILE$

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*DRIVEWAY IMPACTS TO BE EVALUATED IN PS&E DEVELOPEMENT.*

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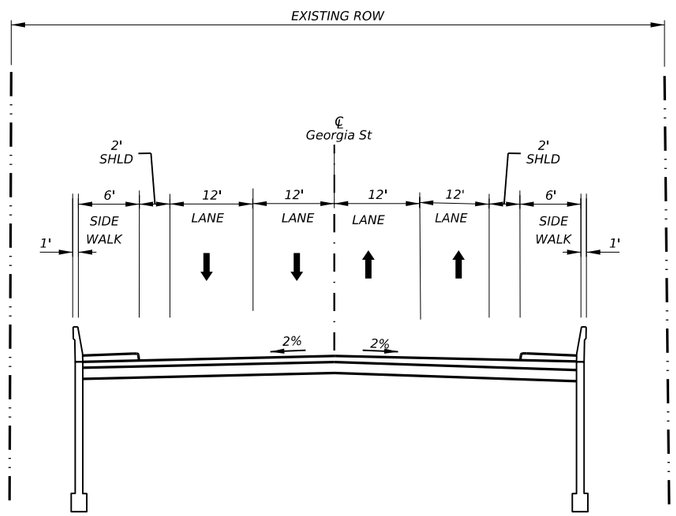


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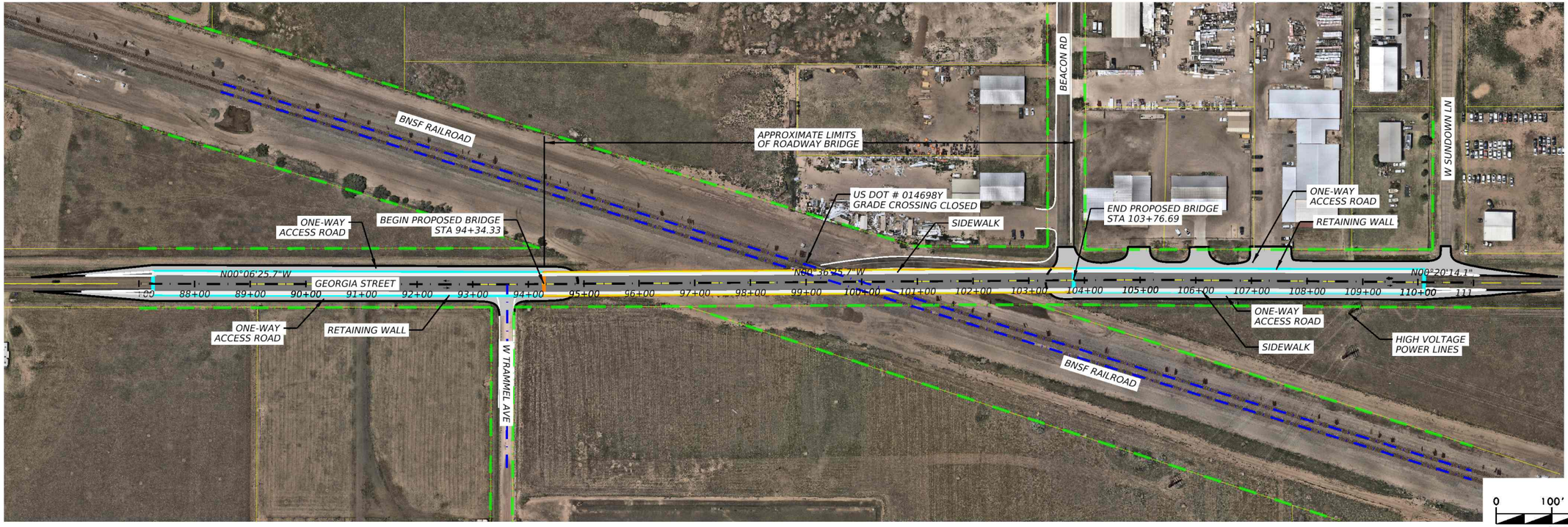
TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

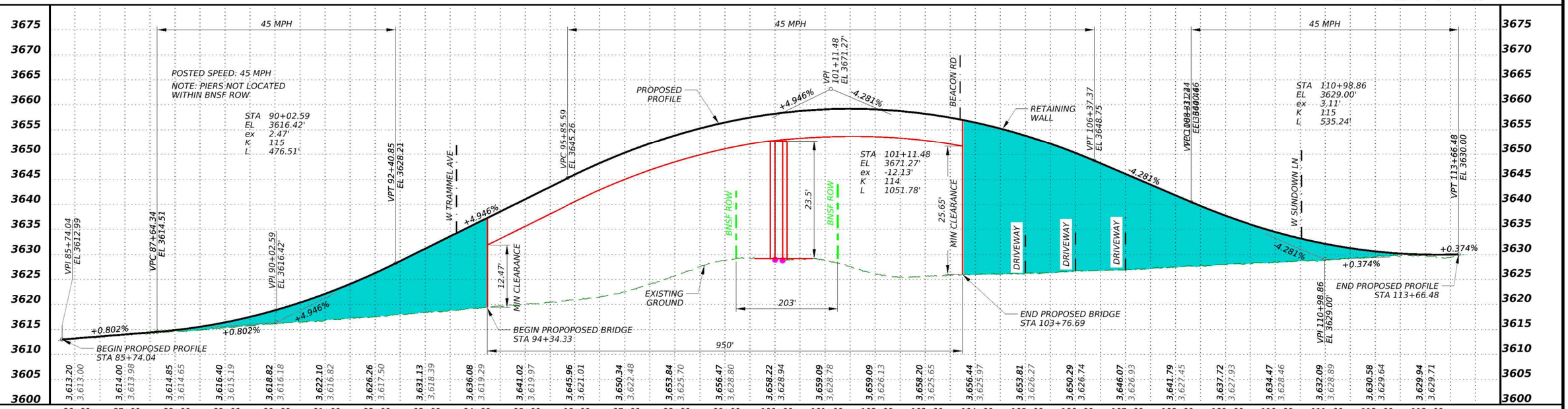
*TXDOT RAILROAD CROSSING STUDY*
*AMARILLO DIST.*
*CROSSING ID 014549X, RRMP 500.84*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 of 2 |
| REVISION NO. | |

DATE: $DATE$ $TIME$
FILE: $FILE$

# Georgia Street - Option 2: Grade Separation with One Way Frontage Road

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LEGEND
RETAINING WALL
EXISTING ROW
PROPOSED ROW
PAVEMENT
CURB & GUTTER
PARCELS
MEDIAN
SIDEWALK
IMPACTED PROPERTY

Texas Department of Transportation


TRANSYSTEMS
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HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID 014549X, RRMP 500.84

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

$TIME$
DATE: $DATE$
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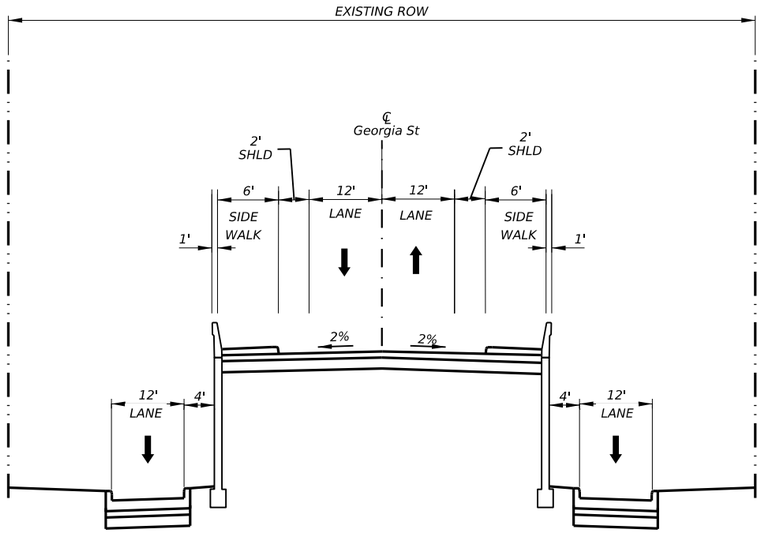


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DATE: $DATE$ $TIME$
FILE: $FILE$



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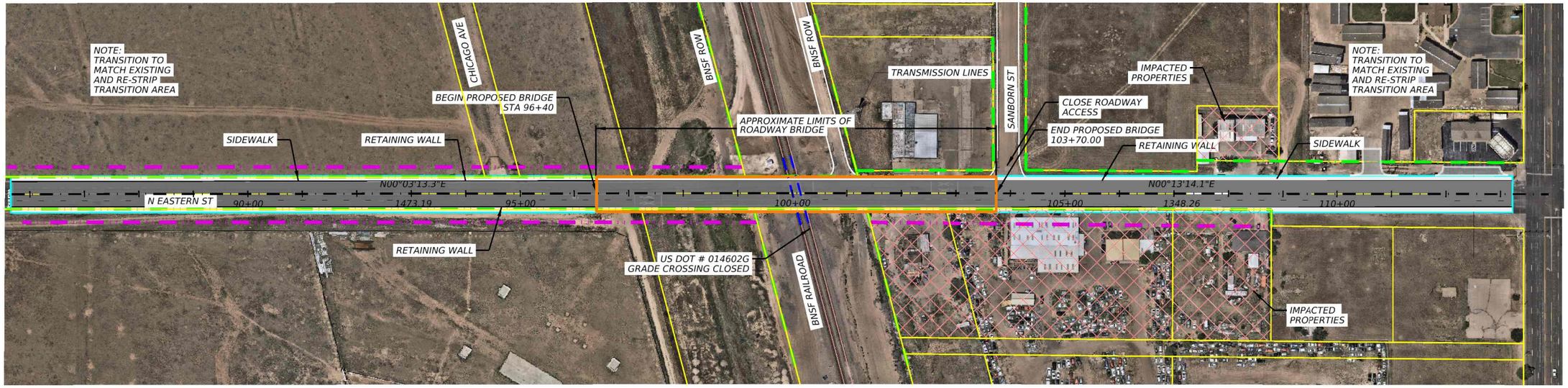
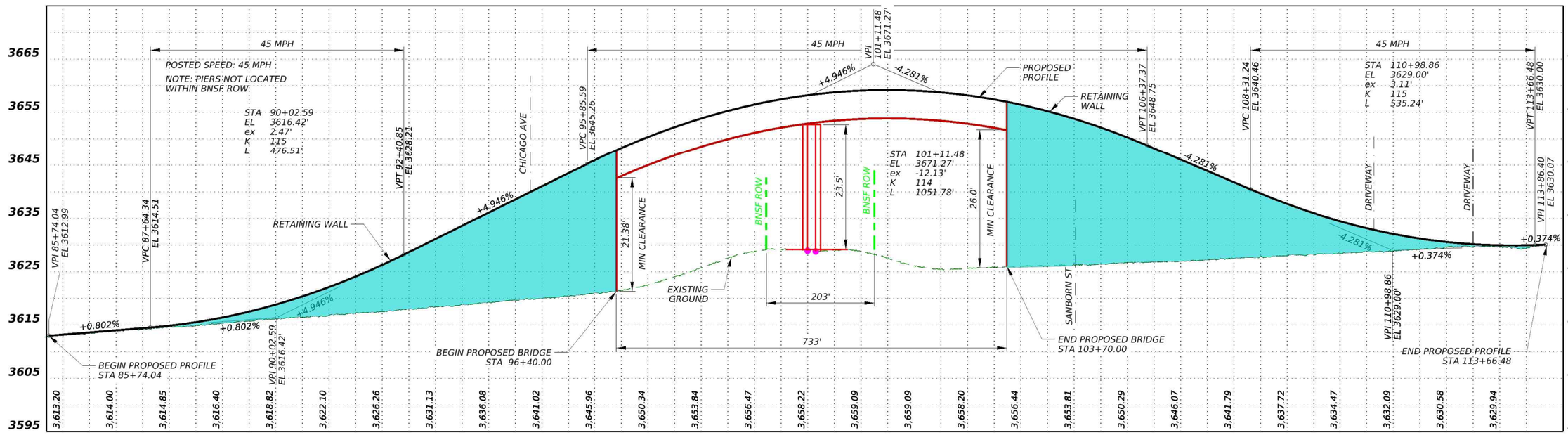
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID 014549X, RRMP 500.84

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 of 2 |
| REVISION NO. | |

# North Eastern Street - Option 1: Grade Separation with No Frontage Road

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LEGEND
RETAINING WALL
EXISTING ROW
PROPOSED ROW
PAVEMENT
CURB & GUTTER
PARCELS
MEDIAN
SIDEWALK
IMPACTED PROPERTY



TRANSYSTEMS
2777 ALLEN PARKWAY, SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014602G, RRMP 0550.189

| | |
|---|---|
| DIST. | AMA |
| COUNTY | POTTER |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

DATE: $DATE$
FILE: $FILE$
$TIME$

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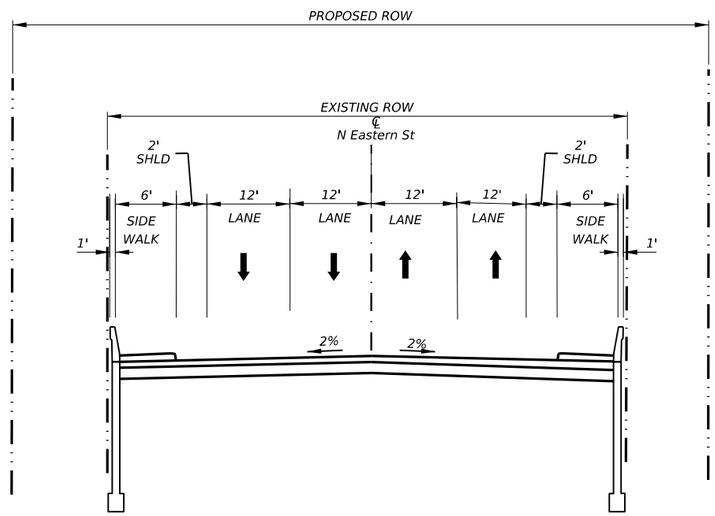


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DATE: $DATE$ $TIME$
FILE: $FILE$



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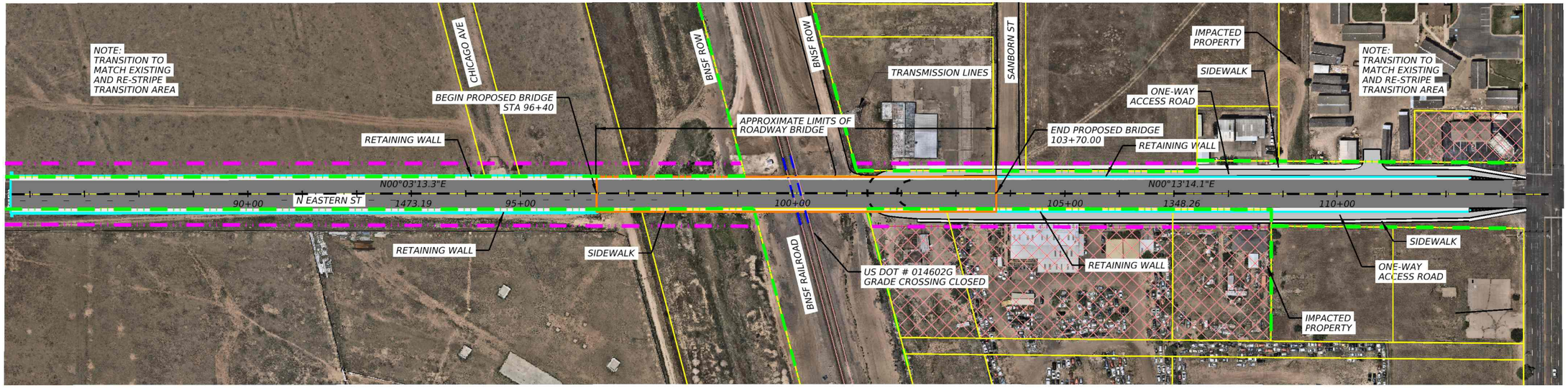
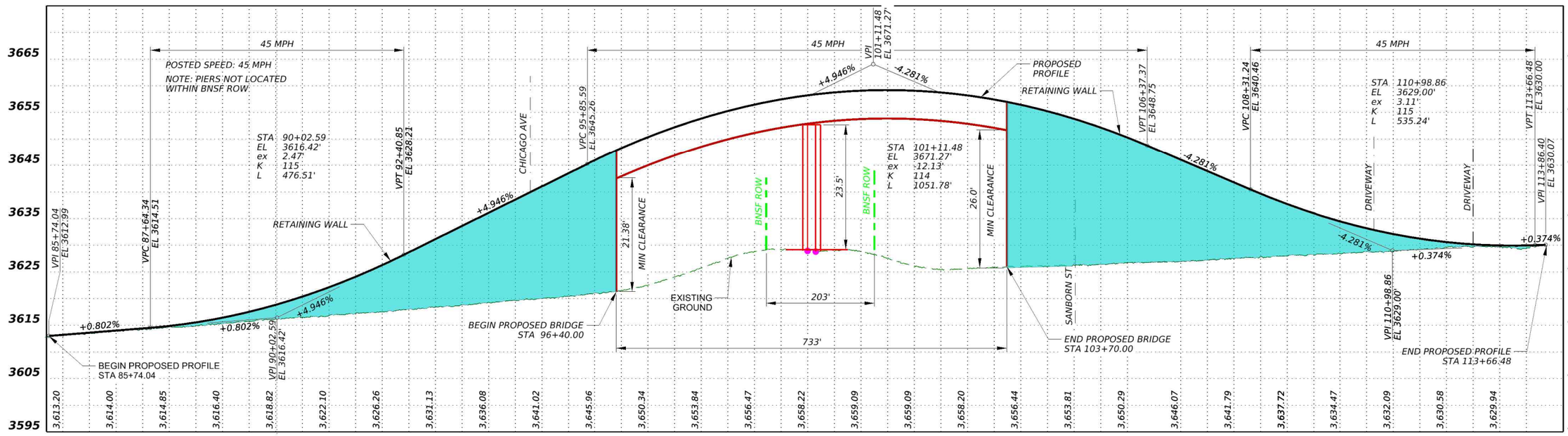
HOUSTON, TX 77019
(713) 807-0600

*TXDOT RAILROAD CROSSING STUDY*
*AMARILLO DIST.*
*CROSSING ID 014549X, RRMP 500.84*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 of 2 |
| REVISION NO. | |

# North Eastern Street - Option 2: Grade Separation with One Way Frontage Road

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LEGEND
- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- CURB & GUTTER
- PARCELS
- MEDIAN
- SIDEWALK
- IMPACTED PROPERTY



TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014602G, RRMP 0550.189

| | |
|---|---|
| DIST. | AMA |
| COUNTY | POTTER |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

DATE: $DATE$
FILE: $FILE$
$TIME$

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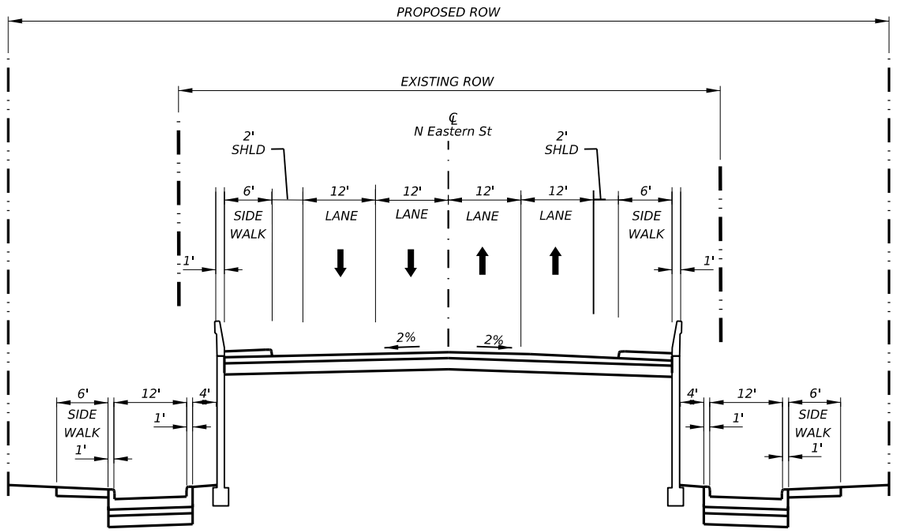
THE LOCATION OF EXISTING UNDERGROUND UTILITIES FOR POTENTIAL CONFLICTS AT PROPOSED RAILROAD OVERPASS NEED TO BE EVALUATED DURING PS&E DEVELOPMENT.




PRELIMINARY CONCEPT SUBJECT TO CHANGE

NOT TO SCALE

INTERIM REVIEW ONLY

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DATE: $DATE$ $TIME$
FILE: $FILE$



TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID 014549X, RRMP 500.84

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 OF 2 |
| REVISION NO. | |

15th Street


0 25' 50' 100'

SCALE: 1" = 50'

PRELIMINARY CONCEPT SUBJECT TO CHANGE

INTERIM REVIEW ONLY

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LEGEND

| | | | |
|---|---|---|---|
| RETAINING WALL | PROPOSED ROW | PARCELS | |
| EXISTING ROW | PAVEMENT | MEDIAN | |
| | CURB & GUTTER | SIDEWALK | |

Texas Department of Transportation



TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

CROSSING ID #014704A, RRMP 0570.03

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

DATE: 2/19/2025 2:26:25 PM
FILE: pw://transystems-pw.bentley.com:transyscorp-pw1-hosted/Documents/Projects 2024/HU206/206240017/Road/Sheets/C-AMA-102-02.dgn

CK DW CK DW

*DISCLAIMER:*
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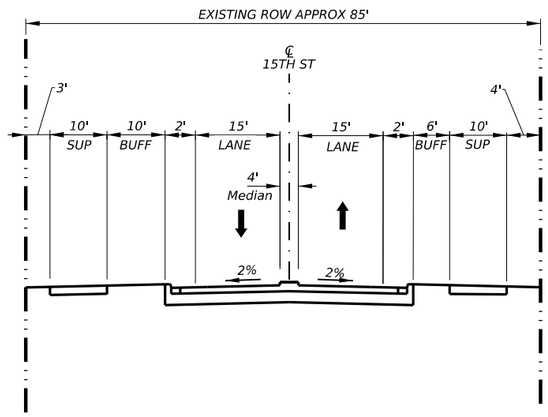
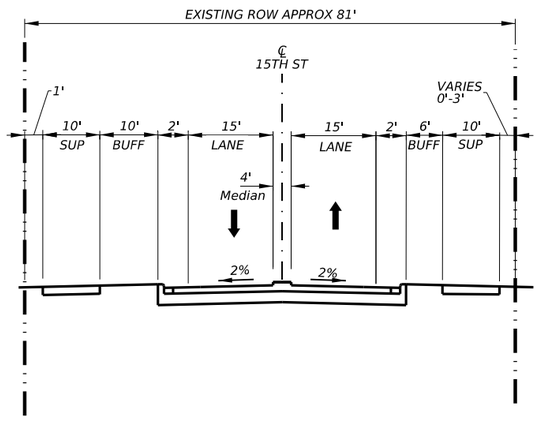



NORTH OF RR




SOUTH OF RR

*PRELIMINARY CONCEPT SUBJECT TO CHANGE*

NOT TO SCALE

*INTERIM REVIEW ONLY*

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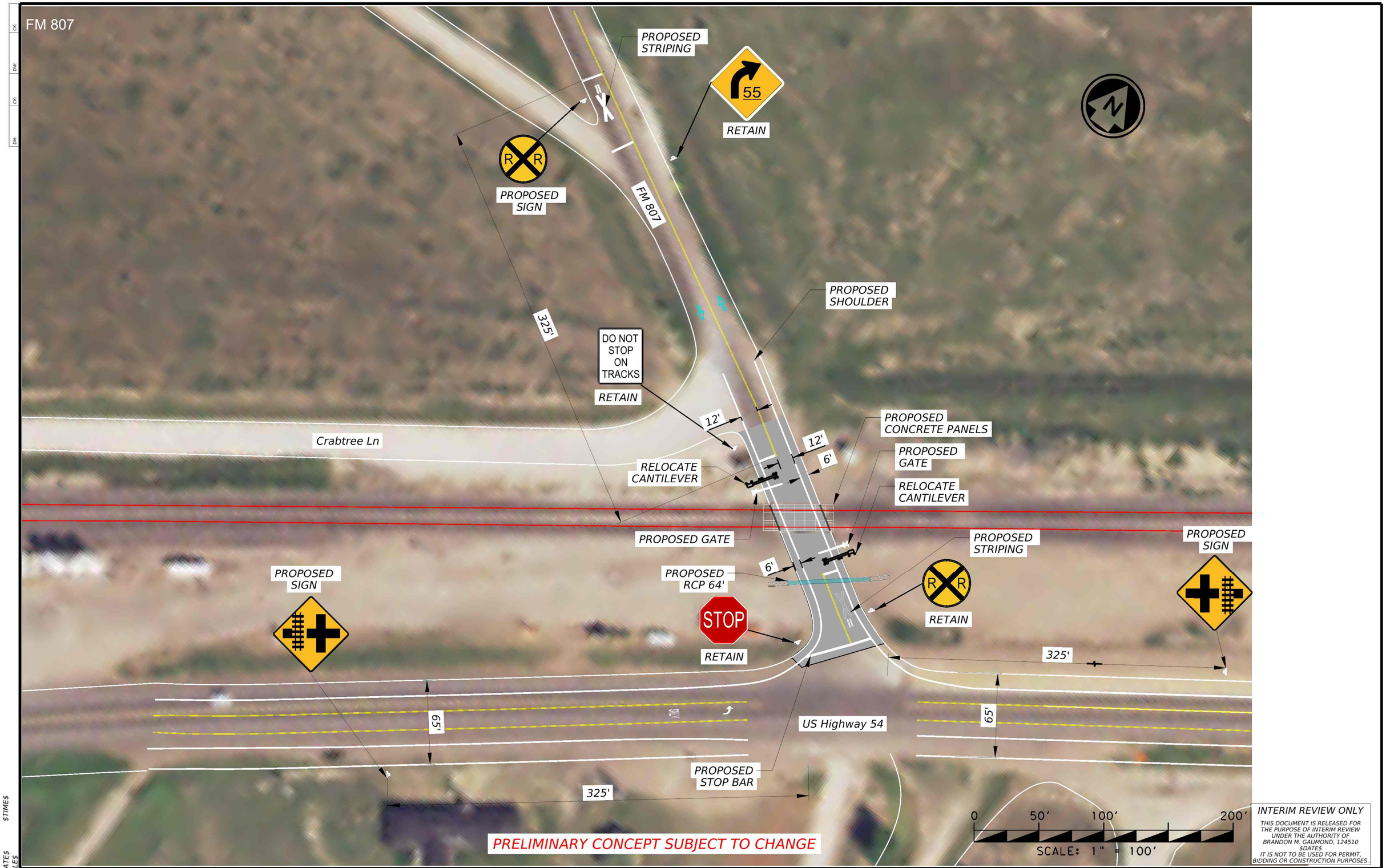
TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014704A, RRMP

| | |
|---|---|
| DIST. | AMA |
| COUNTY | RANDALL |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 OF 2 |
| REVISION NO. | |

DATE: 2/19/2025 2:16:33 PM
FILE: pw://transystems-pw.bentley.com:transyscorp-pw1-hosted/Documents/Projects 2024/HU206/206240017/Road/Sheets/C-AMA-TYP102-02.dgn

CK DW CK DW

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LEGEND

- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- CURB & GUTTER
- PARCELS
- MEDIAN
- SIDEWALK

Texas Department of Transportation



TRANSYSTEMS
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HOUSTON, TX 77019
(713) 807-0600

# TXDOT RAILROAD CROSSING STUDY AMARILLO DIST.

CROSSING ID #599618B, RRMP 0525.89

| | |
|---|---|
| DIST. | AMA |
| COUNTY | DALLAM |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

DATE: $DATE$ $TIME$
FILE: $FILE$

CK:
DWF:
CK:
DN:

*DISCLAIMER:*
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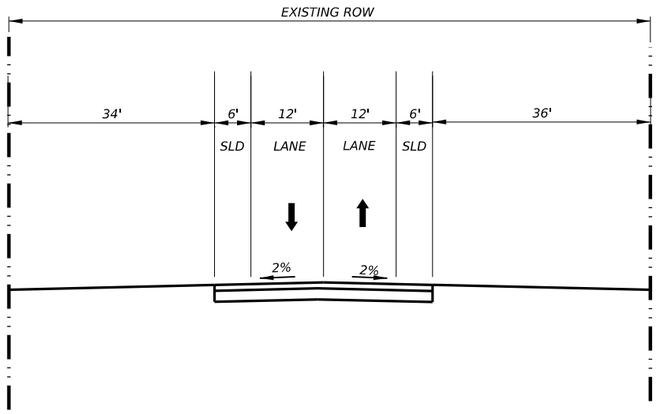
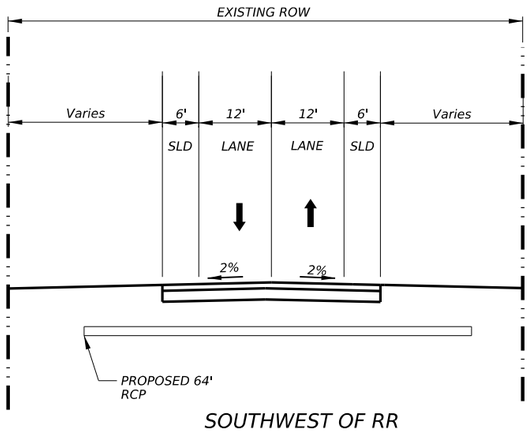



*NORTHEAST OF RR*




*SOUTHWEST OF RR*

NOT TO SCALE

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*PRELIMANARY CONCEPT SUBJECT TO CHANGE*



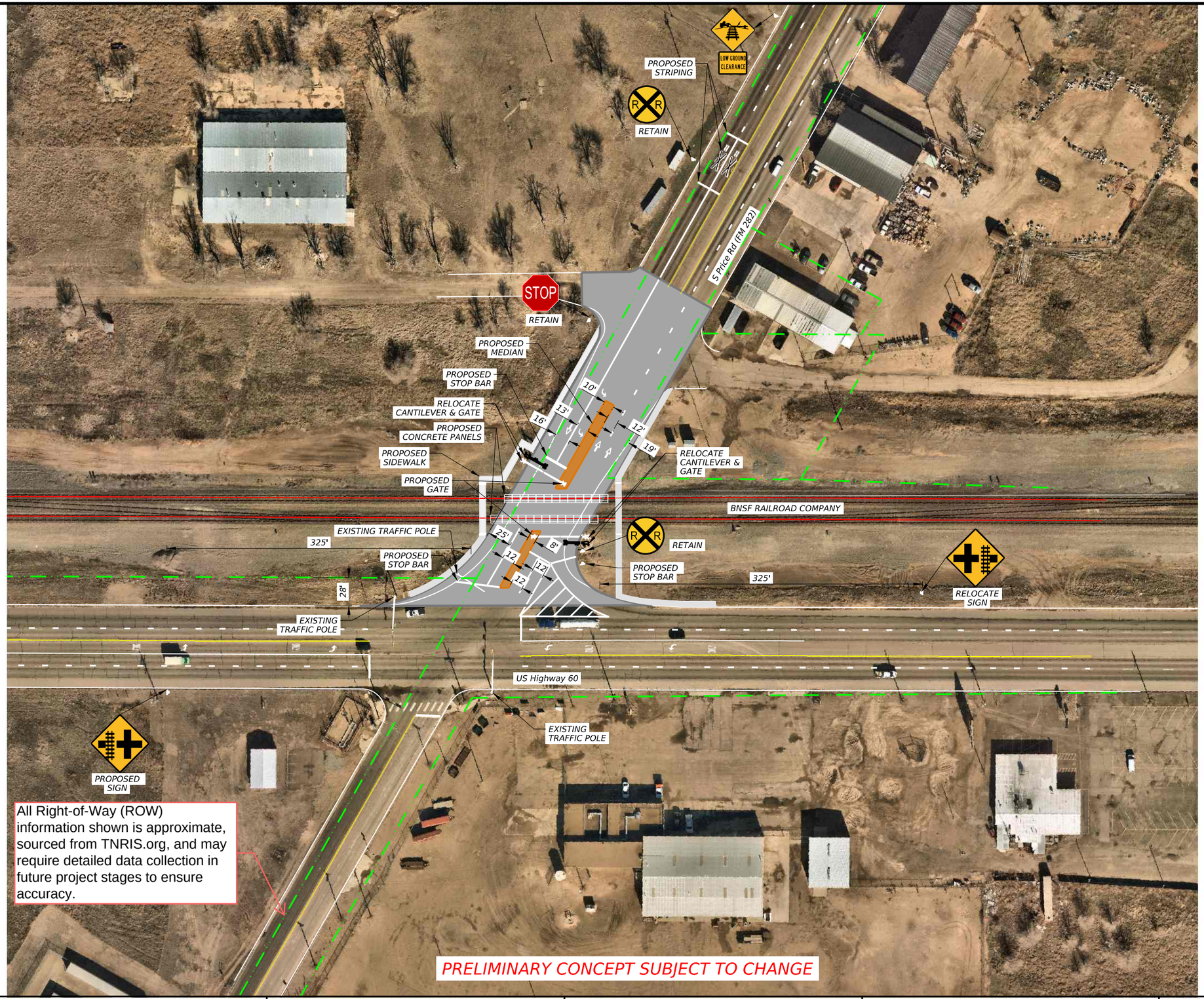
TRANSYSTEMS
2777 ALLEN PARKWAY,
SUITE 500
HOUSTON, TX 77019
(713) 807-0600

*TXDOT RAILROAD CROSSING STUDY*
*AMARILLO DIST.*
*CROSSING ID #596188B, RRMP 525.81*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | DALLAM |
| CONTRACT NO. | |
| DRAWING NO. | 2 OF 2 |
| SHEET NO. | |
| REVISION NO. | |

DATE: $DATE$ $TIME$
FILE: $FILE$

FM 282




All Right-of-Way (ROW) information shown is approximate, sourced from TNRIS.org, and may require detailed data collection in future project stages to ensure accuracy.

PRELIMINARY CONCEPT SUBJECT TO CHANGE

0 50' 100' 200'
SCALE: 1" = 100'

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LEGEND

- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- CURB & GUTTER
- PARCELS
- MEDIAN
- SIDEWALK



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SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #014549X, RRMP 0500.84

| | |
|---|---|
| DIST. | AMA |
| COUNTY | GRAY |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 2 |
| REVISION NO. | |

DATE: $DATE$ $TIME$
FILE: $FILE$

CK:
DWF:
CK:
DW:

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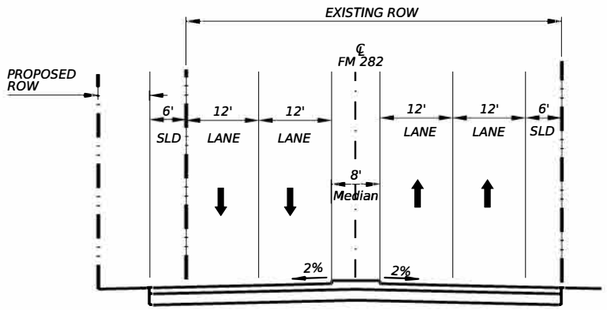
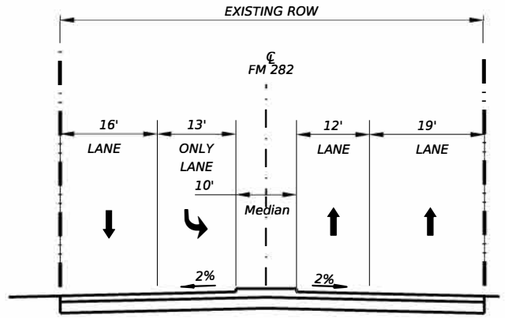



*SOUTH OF RR*




*NORTH OF RR*

NOT TO SCALE

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*PRELIMANARY CONCEPT SUBJECT TO CHANGE*

DATE: $DATE$ $TIME$
FILE: $FILE$

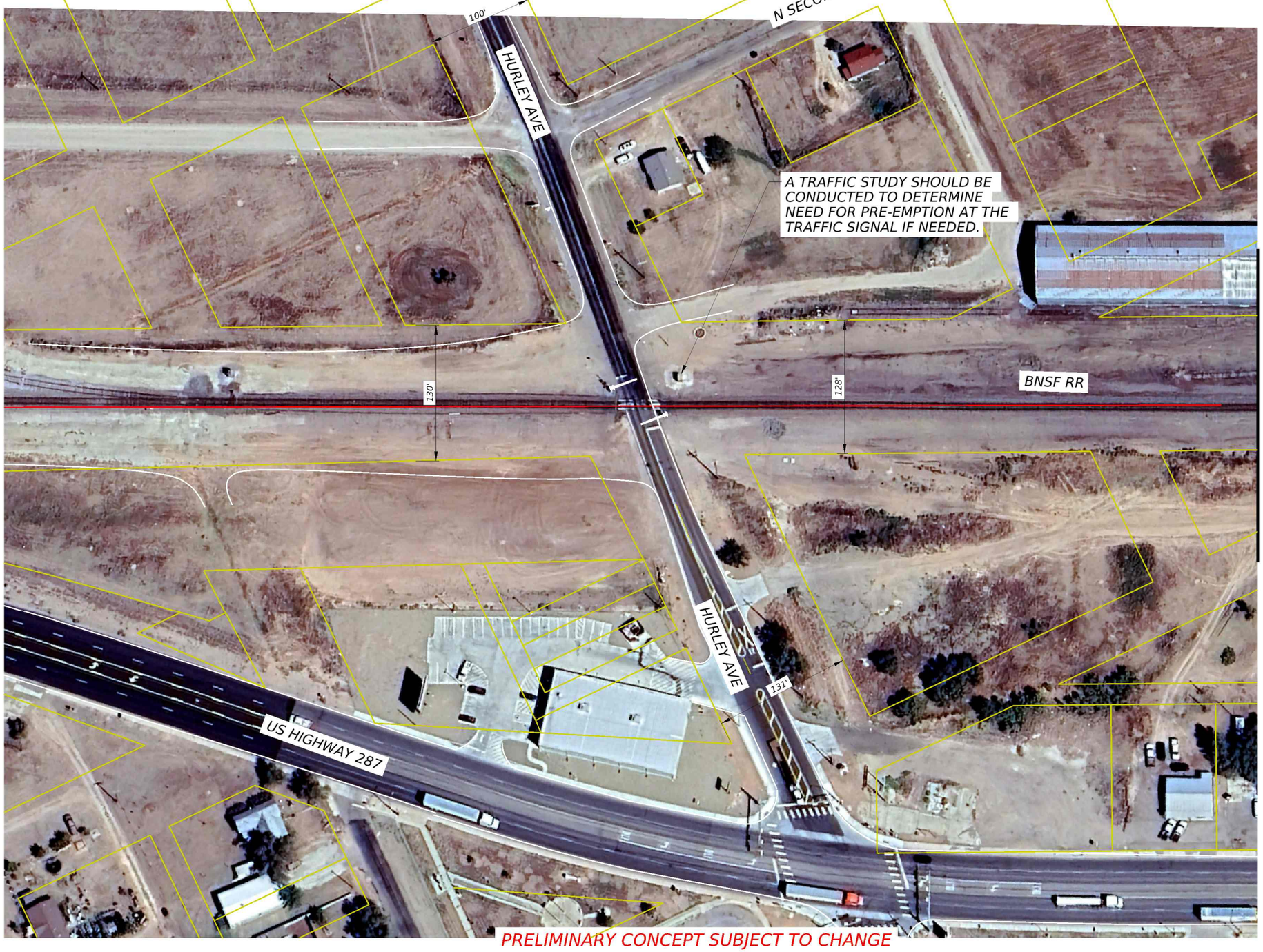


TRANSYSTEMS
2777 ALLEN PARKWAY, SUITE 500
HOUSTON, TX 77019
(713) 807-0600

*TXDOT RAILROAD CROSSING STUDY*
*AMARILLO DIST.*
*CROSSING ID 014549X, RRMP 500.84*

| | |
|---|---|
| DIST. | AMA |
| COUNTY | GRAY |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 2 OF 2 |
| REVISION NO. | |

Hurley Ave




0 50' 100' 200'

SCALE: 1" = 100'

PRELIMINARY CONCEPT SUBJECT TO CHANGE

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LEGEND

- RETAINING WALL
- EXISTING ROW
- PROPOSED ROW
- PAVEMENT
- CURB & GUTTER
- PARCELS
- MEDIAN
- SIDEWALK

Texas Department of Transportation



TRANSYSTEMS
2777 ALLEN PARKWAY, SUITE 500
HOUSTON, TX 77019
(713) 807-0600

TXDOT RAILROAD CROSSING STUDY
AMARILLO DIST.
CROSSING ID #275237J, RRMP 308.2

| | |
|---|---|
| DIST. | AMA |
| COUNTY | ARMSTRONG |
| CONTRACT NO. | |
| DRAWING NO. | |
| SHEET NO. | 1 OF 1 |
| REVISION NO. | |

DATE: $DATE$ $TIME$
FILE: $FILE$

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014693P-E 46TH ST — TxDOT Amarillo District
**Prepared by:** Civil Corp
**Date:** April 4, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | CY | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | $2,040,534.920 | $ 2,040,534.92 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 97,290.00 | $ 97,290.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | $1,730,951.334 | $ 1,730,951.33 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 48,645.00 | $ 48,645.00 | |
| 40.5 | Embankment | | 15,884 | CY | $ 68.89 | $ 1,094,248.76 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/dm | 1 | LS | $ 952,023.23 | $ 952,023.23 | |
| | | | | | | | |
| 40.8 | Concrete Paving | E 46th St | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 2112 | LF | $ 137.42 | $ 290,231.04 | |
| | | Bridge approach slabs | 77 | CY | $ 1,011.30 | $ 77,870.10 | |
| | | Curb & Gutter | 4,486 | LF | $ 26.66 | $ 119,596.76 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 5787 | SY | $ 109.62 | $ 634,370.94 | |
| | | Riprap | 77 | CY | $ 1,114.04 | $ 85,781.08 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | E 46 th st | 5,895 | SY | $ 58.41 | $ 344,326.95 | |
| | | Frontage Road | 7,040 | SY | $ 58.41 | $ 411,206.40 | |
| | | Driveway (ACP) | 391 | SY | $ 81.77 | $ 31,972.07 | |
| 41.0 | Pavement Removal | | | | | | |
| | | E 46th St | 14,461 | SY | $ 21.25 | $ 307,296.25 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | E 46th St | 1 | LS | $66,953.89 | $ 66,953.89 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | E 46 th st | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | ___ Rd | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | E 46 th st | 42,294 | SF | $ 248.00 | $ 10,488,912.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | E 46 th st | 30,022 | SF | $ 100.00 | $ 3,002,200.00 | |

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014693P-E 46TH ST — TxDOT Amarillo District
**Prepared by: Civil Corp**
**Date:** April 4, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Crash Wall @ 2 Bridge bents | 59 | CY | $ 1,501.90 | $ 88,612.10 | |
| | | Subtotal without mob | | | | | $ 19,992,487.90 |
| | Miscellaneous: | 30% | | | | | $ 5,997,746.37 |
| | | 40 Subtotal | | | | | $ 28,030,769.19 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP 556.281 Location | 1 | LS | $ 100,000.00 | $ 100,000.00 | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal at DOT#014693P | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | EA | $ 11,640.00 | $ - | |
| | 3 | | 0 | EA | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | E 46 th St | 1 | LS | $292,861.30 | $ 292,861.30 | |
| | | Subtotal | | | | | $ 412,861.30 |
| | Miscellaneous: | 30% | | | | | $ 123,858.39 |
| | | 50 Subtotal | | | | | $ 536,719.69 |
| | | Construction subtotal without mob or misc | | | | | $ 20,405,349.20 |
| | | Construction Subtotal (10-50) | | | | | $ 28,567,488.88 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 1 | LS | $ 67,206.33 | $ 67,206.33 | |
| | Low Impact (Minimum to No damage) | | 1 | LS | $ 163,645.07 | $ 163,645.07 | |
| | Medium Impact ( Moderate damages) | | 1 | LS | $ 101,811.57 | $ 101,811.57 | |
| | High Impcat ( Significant Damages) | | 1 | LS | $ 1,479,934.97 | $ 1,479,934.97 | |
| | | Subtotal | | | | | $ 1,812,597.94 |
| | Miscellaneous: | 30% | | | | | $ 543,779.38 |
| | | 60 Subtotal | | | | | $ 2,356,377.32 |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 28,567,488.88 | $ 1,428,400.00 | |
| 80.2 | Final Design | | 8% | LS | $ 28,567,488.88 | $ 2,285,400.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 28,567,488.88 | $ 2,571,100.00 | |
| 80.4 | Insurance | | 2% | LS | $ 28,567,488.88 | $ 571,300.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 28,567,488.88 | $ 857,000.00 | |
| | | 80 Subtotal | | | | | $ 7,713,200.00 |
| | | Subtotal (10-80) | | | | | $ 38,637,066.20 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 38,637,066.20 | $ 5,795,600.00 | |
| | | 90 Subtotal | | | | | $ 5,795,600.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 44,432,666.20** |

1.Remove exising Traffic Signal — Unit cost based on TxDOT average low-bid unit prices for 2023-2024
2. Upgrade Traffic Signal — 3. Construct new traffic signal
4. Reconfigure and Restripe Intersection
5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts.

**Engineer's Opinion of Probable Cost**

**Name:** US DOT# 014695D-Farmers Ave — TxDOT Amarillo District

**Prepared by: Civil Corp**

**Date:** April 4, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 1739651.486 | $ 1,739,651.49 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 90,000.00 | $ 90,000.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 1464491.65 | $ 1,464,491.65 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 45,000.00 | $ 45,000.00 | |
| 40.5 | Embankment | | 12,634 | CY | $ 68.89 | $ 870,356.26 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 805,470.41 | $ 805,470.41 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Famers Ave | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 2240 | SY | $ 137.42 | $ 307,820.80 | |
| | | Bridge approach slabs | 57 | CY | $ 1,011.30 | $ 57,644.10 | |
| | | Curb & Gutter | 7,938 | LF | $ 26.66 | $ 211,627.08 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 129 | CY | $ 1,114.04 | $ 143,711.16 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Farmers Ave | 5,676 | SY | $ 58.41 | $ 331,535.16 | |
| | | Frontage Road | 7,710 | SY | $ 58.41 | $ 450,341.10 | |
| | | Driveway (ACP) | 391 | SY | $ 81.77 | $ 31,972.07 | |
| 41.0 | Pavement Removal | | | | | | |
| | | Farmers Ave | 13,069 | SY | $ 21.25 | $ 277,716.25 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Framers Ave | 1 | LS | $66,700.52 | $ 66,700.52 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | Farmers Ave | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | ___ Rd | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |

**Engineer's Opinion of Probable Cost**

**Name:** US DOT# 014695D-Farmers Ave — TxDOT Amarillo District

**Prepared by: Civil Corp**

**Date:** April 4, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Farmers Ave | 37,067 | SF | $ 248.00 | $ 9,192,616.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Farmers Ave | 23,878 | SF | $ 100.00 | $ 2,387,800.00 | |
| | | Crash Wall @ 2 Bridge bents | 40 | CY | $ 1,501.90 | $ 60,076.00 | |
| | | Subtotal without mob | | | | | $ 16,914,878.56 |
| | Miscellaneous: | 30% | | | | | $ 5,074,463.57 |
| | | 40 Subtotal | | | | | $ 23,728,993.62 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP 558.36 Location | 1 | LS | $ 100,000.00 | $ 100,000.00 | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal at DOT#014695D | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | Farmers Ave | 1 | LS | $361,636.30 | $ 361,636.30 | |
| | | Subtotal | | | | | $ 481,636.30 |
| | Miscellaneous: | 30% | | | | | $ 144,490.89 |
| | | 50 Subtotal | | | | | $ 626,127.19 |
| | | Construction subtotal without mob or misc | | | | | $ 17,396,514.86 |
| | | Construction Subtotal (10-50) | | | | | $ 24,355,120.81 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ 248,222.58 | $ - | |
| | Medium Impact ( Moderate damages) | | 1 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 24,355,120.81 | $ 1,217,800.00 | |
| 80.2 | Final Design | | 8% | LS | $ 24,355,120.81 | $ 1,948,400.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 24,355,120.81 | $ 2,192,000.00 | |
| 80.4 | Insurance | | 2% | LS | $ 24,355,120.81 | $ 487,100.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 24,355,120.81 | $ 730,700.00 | |
| | | 80 Subtotal | | | | | $ 6,576,000.00 |
| | | Subtotal (10-80) | | | | | $ 30,931,120.81 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 30,931,120.81 | $ 4,639,700.00 | |
| | | 90 Subtotal | | | | | $ 4,639,700.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 35,570,820.81** |

1.Remove exising Traffic Signal — Unit cost based on TxDOT average low-bid unit prices for 2023-2024

2. Upgrade Traffic Signal — 3. Construct new traffic signal

4. Reconfigure and Restripe Intersection

5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts.

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014695D-Farmers Ave - ped bridge — **TxDOT Amarillo District**
**Prepared by: Civil Corp**
**Date:** April 4, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | $1,253,425.058 | $ 1,253,425.06 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 90,000.00 | $ 90,000.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | $1,064,004.379 | $ 1,064,004.38 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 45,000.00 | $ 45,000.00 | |
| 40.5 | Embankment | | 3,842 | CY | $ 68.89 | $ 264,675.38 | |
| 40.6 | Excavation | | 3842 | CY | $ 46.44 | $ 178,422.48 | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 585,202.41 | $ 585,202.41 | |
| | | | | | | | |
| 40.8 | Concrete | Famers Ave | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 2180 | LF | $259.99 | $ 566,778.20 | |
| | | Hand Rail over Ramps | 2346 | LF | $196.74 | $ 461,552.04 | |
| | | Curb & Gutter | 0 | LF | $ 26.66 | $ - | |
| | | Median | 669 | LF | $ 225.86 | $ 151,100.34 | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Farmers Ave | 0 | SY | $ 58.41 | $ - | |
| | | Frontage Road | 0 | SY | $ 58.41 | $ - | |
| | | Driveway (ACP) | 0 | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | Farmers Ave | 2,144 | SY | $ 21.25 | $ 45,560.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Farmers Ave | 1 | LS | $33,613.55 | $ 33,613.55 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | Farmers Ave | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | ___ Rd | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Pedestrian Bridge W/Ramps | | | | | | |
| | | Farmers Ave | 2,264 | LF | $ 3,500.00 | $ 7,924,000.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Farmers Ave | 7,263 | SF | $ 100.00 | $ 726,300.00 | |

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014695D-Farmers Ave - ped bridge — **TxDOT Amarillo District**
**Prepared by: Civil Corp**
**Date:** April 4, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Crash Wall @ 2 Bridge bents | 22 | CY | $ 1,501.90 | $ 33,041.80 | |
| | | Subtotal without mob | | | | | $ 12,289,250.58 |
| | Miscellaneous: | 30% | | | | | $ 3,686,775.17 |
| | | 40 Subtotal | | | | | $ 17,229,450.81 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP 558.36 Location | 1 | LS | $ 100,000.00 | $ 100,000.00 | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal at DOT#014695D | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | Farmers Ave | 1 | LS | $ 125,000.00 | $ 125,000.00 | |
| | | Subtotal | | | | | $ 245,000.00 |
| | Miscellaneous: | 30% | | | | | $ 73,500.00 |
| | | 50 Subtotal | | | | | $ 318,500.00 |
| | | Construction subtotal without mob or misc | | | | | $ 12,534,250.58 |
| | | Construction Subtotal (10-50) | | | | | $ 17,547,950.81 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Low Impact (Minimum to No damage) | | 1 | LS | $ 72,165.60 | $ 72,165.60 | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ 72,165.60 |
| | Miscellaneous: | 30% | | | | | $ 21,649.68 |
| | | 60 Subtotal | | | | | $ 93,815.28 |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 17,547,950.81 | $ 877,400.00 | |
| 80.2 | Final Design | | 8% | LS | $ 17,547,950.81 | $ 1,403,800.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 17,547,950.81 | $ 1,579,300.00 | |
| 80.4 | Insurance | | 2% | LS | $ 17,547,950.81 | $ 351,000.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 17,547,950.81 | $ 526,400.00 | |
| | | 80 Subtotal | | | | | $ 4,737,900.00 |
| | | Subtotal (10-80) | | | | | $ 22,379,666.09 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 22,379,666.09 | $ 3,356,900.00 | |
| | | 90 Subtotal | | | | | $ 3,356,900.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 25,736,566.09** |

1.Remove exising Traffic Signal — Unit cost based on TxDOT average low-bid unit prices for 2023-2024
2. Upgrade Traffic Signal — 3. Construct new traffic signal
4. Reconfigure and Restripe Intersection
5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts.

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014700X-Mc Cormick Rd — TxDOT Amarillo District
**Prepared by: Civil Corp**
**Date:** April 4, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 1301548.361 | $ 1,301,548.36 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 81,780.00 | $ 81,780.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 1091081.585 | $ 1,091,081.59 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 40,890.00 | $ 40,890.00 | |
| 40.5 | Embankment | | 10,796 | CY | $ 68.89 | $ 743,736.44 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 600,094.87 | $ 600,094.87 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Mc Cormick Rd | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1246 | LF | $ 137.42 | $ 171,225.32 | |
| | | Bridge approach slabs | 71 | CY | $ 1,011.30 | $ 71,802.30 | |
| | | Curb & Gutter | 5,832 | LF | $ 26.66 | $ 155,481.12 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 110 | CY | $ 1,114.04 | $ 122,544.40 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Mc Cormick Rd | 5,915 | SY | $ 58.41 | $ 345,495.15 | |
| | | Frontage Road | 8,218 | SY | $ 58.41 | $ 480,013.38 | |
| | | Driveway (ACP) | 928 | SY | $ 81.77 | $ 75,882.56 | |
| 41.0 | Pavement Removal | | | | | | |
| | | Mc Cormick Rd | 7,163 | SY | $ 21.25 | $ 152,213.75 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Mc Cormick Rd | 1 | LS | $56,356.23 | $ 56,356.23 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | Mc Cormick Rd | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | ___ Rd | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Mc Cormick Rd | 24,923 | SF | $ 248.00 | $ 6,180,904.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Mc Cormick Rd | 20,404 | SF | $ 100.00 | $ 2,040,400.00 | |

**Engineer's Opinion of Probable Cost**

**Name:** US DOT# 014700X-Mc Cormick Rd — TxDOT Amarillo District

**Prepared by: Civil Corp**

**Date:** April 4, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Crash Wall @ 2 Bridge bents | 48 | CY | $ 1,501.90 | $ 72,091.20 | |
| | | Subtotal without mob | | | | | $ 12,601,992.31 |
| | Miscellaneous: | 30% | | | | | $ 3,780,597.69 |
| | | 40 Subtotal | | | | | $ 17,684,138.36 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP 562.87 Location | 1 | LS | $ 100,000.00 | $ 100,000.00 | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal at DOT#014700X | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | Mc Cormick Rd | 1 | LS | $293,491.30 | $ 293,491.30 | |
| | | Subtotal | | | | | $ 413,491.30 |
| | Miscellaneous: | 30% | | | | | $ 124,047.39 |
| | | 50 Subtotal | | | | | $ 537,538.69 |
| | | Construction subtotal without mob or misc | | | | | $ 13,015,483.61 |
| | | Construction Subtotal (10-50) | | | | | $ 18,221,677.05 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 1 | LS | $ 60,038.21 | $ 60,038.21 | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ 60,038.21 |
| | Miscellaneous: | 30% | | | | | $ 18,011.46 |
| | | 60 Subtotal | | | | | $ 78,049.67 |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 18,221,677.05 | $ 911,100.00 | |
| 80.2 | Final Design | | 8% | LS | $ 18,221,677.05 | $ 1,457,700.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 18,221,677.05 | $ 1,640,000.00 | |
| 80.4 | Insurance | | 2% | LS | $ 18,221,677.05 | $ 364,400.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 18,221,677.05 | $ 546,700.00 | |
| | | 80 Subtotal | | | | | $ 4,919,900.00 |
| | | Subtotal (10-80) | | | | | $ 23,219,626.72 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 23,219,626.72 | $ 3,482,900.00 | |
| | | 90 Subtotal | | | | | $ 3,482,900.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 26,702,526.72** |

1.Remove exising Traffic Signal — Unit cost based on TxDOT average low-bid unit prices for 2023-2024

2. Upgrade Traffic Signal — 3. Construct new traffic signal

4. Reconfigure and Restripe Intersection

5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts.

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014701E- Rockwell Rd — TxDOT Amarillo District
**Prepared by:** Civil Corp
**Date:** April 4, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 936681.988 | $ 936,681.99 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 77,730.00 | $ 77,730.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 777566.327 | $ 777,566.33 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 38,865.00 | $ 38,865.00 | |
| 40.5 | Embankment | | 7,043 | CY | $ 68.89 | $ 485,192.27 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 427,661.48 | $ 427,661.48 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Rockwell Rd | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1092 | SY | $ 137.42 | $ 150,062.64 | |
| | | Bridge approach slabs | 57 | CY | $ 1,011.30 | $ 57,644.10 | |
| | | Curb & Gutter | 4,993 | LF | $ 26.66 | $ 133,113.38 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 88 | CY | $ 1,114.04 | $ 98,035.52 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Rockwell Rd | 4,302 | SY | $ 58.41 | $ 251,279.82 | |
| | | Frontage Road | 7,231 | SY | $ 58.41 | $ 422,362.71 | |
| | | Driveway (ACP) | 407 | SY | $ 81.77 | $ 33,280.39 | |
| 41.0 | Pavement Removal | | | | | | |
| | | Rockwell Rd | 5,216 | SY | $ 21.25 | $ 110,840.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Rockwell Rd | 1 | LS | $54,525.44 | $ 54,525.44 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | Rockwell Rd | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | ___ Rd | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Rockwell Rd | 17,547 | SF | $ 248.00 | $ 4,351,656.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Rockwell Rd | 13,310 | SF | $ 100.00 | $ 1,331,000.00 | |

**Engineer's Opinion of Probable Cost**
**Name:** US DOT# 014701E- Rockwell Rd — TxDOT Amarillo District
**Prepared by: Civil Corp**
**Date:** April 4, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Crash Wall @ 2 Bridge bents | 40 | CY | $ 1,501.90 | $ 60,076.00 | |
| | | Subtotal without mob | | | | | $ 8,980,891.08 |
| | Miscellaneous: | 30% | | | | | $ 2,694,267.32 |
| | | 40 Subtotal | | | | | $ 12,611,840.39 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP 565.06 Location | 1 | LS | $ 100,000.00 | $ 100,000.00 | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal at DOT#014701E | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | Rockwell Rd | 1 | LS | $265,928.80 | $ 265,928.80 | |
| | | Subtotal | | | | | $ 385,928.80 |
| | Miscellaneous: | 30% | | | | | $ 115,778.64 |
| | | 50 Subtotal | | | | | $ 501,707.44 |
| | | Construction subtotal without mob or misc | | | | | $ 9,366,819.88 |
| | | Construction Subtotal (10-50) | | | | | $ 13,113,547.83 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ 241,678.03 | $ - | |
| | Medium Impact ( Moderate damages) | | 1 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 13,113,547.83 | $ 655,700.00 | |
| 80.2 | Final Design | | 8% | LS | $ 13,113,547.83 | $ 1,049,100.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 13,113,547.83 | $ 1,180,200.00 | |
| 80.4 | Insurance | | 2% | LS | $ 13,113,547.83 | $ 262,300.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 13,113,547.83 | $ 393,400.00 | |
| | | 80 Subtotal | | | | | $ 3,540,700.00 |
| | | Subtotal (10-80) | | | | | $ 16,654,247.83 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 16,654,247.83 | $ 2,498,100.00 | |
| | | 90 Subtotal | | | | | $ 2,498,100.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 19,152,347.83** |

1.Remove exising Traffic Signal — Unit cost based on TxDOT average low-bid unit prices for 2023-2024
2. Upgrade Traffic Signal — 3. Construct new traffic signal
4. Reconfigure and Restripe Intersection
5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts.

**Engineer's Opinion of Probable Cost**

**Name:** Georgia Street — TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | CY | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 1538207.218 | $ 1,538,207.22 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 95,820.00 | $ 95,820.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 1312907.219 | $ 1,312,907.22 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 41,310.00 | $ 41,310.00 | |
| 40.5 | Embankment | | 17,712 | CY | $ 68.89 | $ 1,220,179.68 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 722,098.97 | $ 722,098.97 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Georgia Street | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1964 | LF | $ 137.42 | $ 269,892.88 | |
| | | Bridge approach slabs | 47 | CY | $ 1,011.30 | $ 47,531.10 | |
| | | Curb & Gutter | 6,756 | LF | $ 26.66 | $ 180,114.96 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 21 | CY | $ 1,114.04 | $ 23,394.84 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Georgia Street | 3,840 | SY | $ 58.41 | $ 224,294.40 | |
| | | Frontage Roads/U-Turns/Driveways | 6,084 | SY | $ 58.41 | $ 355,366.44 | |
| | | | | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | Georgia Street | 6,134 | SY | $ 21.25 | $ 130,347.50 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**
**Name:** Georgia Street — TxDOT Amarillo District
**Prepared by: BS, TranSystems**
**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Georgia Street | 1 | LS | $66,953.89 | $ 66,953.89 | |
| | | | | | | | |
| 41.2 | Traffic Control | | | | | | |
| | | Georgia Street | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | | | | | | |
| 41.3 | Intersection Upgrade | | | | | | |
| | | | 0 | EA | $ - | $ - | |
| | | | | | | | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Georgia Street | 25,328 | SF | $ 258.00 | $ 6,534,624.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Georgia Street | 37,066 | SF | $ 100.00 | $ 3,706,600.00 | |
| | | Crash Wall @ 2 Bridge bents | 75 | CY | $ 1,501.90 | $ 112,642.50 | |
| | | Subtotal without mob | | | | | $ 15,164,078.38 |
| | Miscellaneous: | 30% | | | | | $ 4,549,223.51 |
| | | 40 Subtotal | | | | | $ 21,251,509.11 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | | | 0 | EA | $ 11,640.00 | $ - | |
| | | | | | | | |
| 50.4 | Lighting | | | | | | |
| | | Georgia Street | 1 | LS | $197,993.80 | $ 197,993.80 | |
| | | Subtotal | | | | | $ 217,993.80 |
| | Miscellaneous: | 30% | | | | | $ 65,398.14 |
| | | 50 Subtotal | | | | | $ 283,391.94 |
| | | Construction subtotal without mob or misc | | | | | $ 15,382,072.18 |
| | | Construction Subtotal (10-50) | | | | | $ 21,534,901.05 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ 67,206.33 | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ 163,645.07 | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ 101,811.57 | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ 1,479,934.97 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 21,534,901.05 | $ 1,076,700.00 | |
| 80.2 | Final Design | | 8% | LS | $ 21,534,901.05 | $ 1,722,800.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 21,534,901.05 | $ 1,938,100.00 | |
| 80.4 | Insurance | | 2% | LS | $ 21,534,901.05 | $ 430,700.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 21,534,901.05 | $ 646,000.00 | |
| | | 80 Subtotal | | | | | $ 5,814,300.00 |
| | | Subtotal (10-80) | | | | | $ 27,349,201.05 |

**Engineer's Opinion of Probable Cost**

**Name:** Georgia Street — TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 27,349,201.05 | $ 4,102,400.00 | |
| | 90 Subtotal | | | | | | $ 4,102,400.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 31,451,601.05** |
| | 1.Remove exising Traffic Signal | | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | |
| | 2. Upgrade Traffic Signal | 3. Construct new traffic signal | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** Georgia Street - Opt 2 TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | CY | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 1637621.477 | $ 1,637,621.48 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 95,820.00 | $ 95,820.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 1398980.171 | $ 1,398,980.17 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 41,310.00 | $ 41,310.00 | |
| 40.5 | Embankment | | 25,302 | CY | $ 68.89 | $ 1,743,054.78 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 769,439.09 | $ 769,439.09 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Georgia Street | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1964 | LF | $ 137.42 | $ 269,892.88 | |
| | | Bridge approach slabs | 47 | CY | $ 1,011.30 | $ 47,531.10 | |
| | | Curb & Gutter | 6,756 | LF | $ 26.66 | $ 180,114.96 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 1767 | SY | $ 109.62 | $ 193,698.54 | |
| | | Riprap | 21 | CY | $ 1,114.04 | $ 23,394.84 | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Georgia Street | 3,840 | SY | $ 58.41 | $ 224,294.40 | |
| | | Frontage Roads/U-Turns/Driveways | 8,552 | SY | $ 58.41 | $ 499,522.32 | |
| | | | | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | Georgia Street | 6,134 | SY | $ 21.25 | $ 130,347.50 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**

**Name:** Georgia Street - Opt 2 TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Georgia Street | 1 | LS | $66,953.89 | $ 66,953.89 | |
| | | | | | | | |
| 41.2 | Traffic Control | | | | | | |
| | | Georgia Street | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | | | | | | |
| 41.3 | Intersection Upgrade | | | | | | |
| | | | 0 | EA | $ - | $ - | |
| | | | | | | | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Georgia Street | 25,328 | SF | $ 258.00 | $ 6,534,624.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Georgia Street | 37,066 | SF | $ 100.00 | $ 3,706,600.00 | |
| | | Crash Wall @ 2 Bridge bents | 75 | CY | $ 1,501.90 | $ 112,642.50 | |
| | | Subtotal without mob | | | | | $ 16,158,220.97 |
| | Miscellaneous: | 30% | | | | | $ 4,847,466.29 |
| | | 40 Subtotal | | | | | $ 22,643,308.74 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | | | 0 | EA | $ 11,640.00 | $ - | |
| | | | | | | | |
| 50.4 | Lighting | | | | | | |
| | | Georgia Street | 1 | LS | $197,993.80 | $ 197,993.80 | |
| | | Subtotal | | | | | $ 217,993.80 |
| | Miscellaneous: | 30% | | | | | $ 65,398.14 |
| | | 50 Subtotal | | | | | $ 283,391.94 |
| | | Construction subtotal without mob or misc | | | | | $ 16,376,214.77 |
| | | Construction Subtotal (10-50) | | | | | $ 22,926,700.68 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ 67,206.33 | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ 163,645.07 | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ 101,811.57 | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ 1,479,934.97 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 22,926,700.68 | $ 1,146,300.00 | |
| 80.2 | Final Design | | 8% | LS | $ 22,926,700.68 | $ 1,834,100.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 22,926,700.68 | $ 2,063,400.00 | |
| 80.4 | Insurance | | 2% | LS | $ 22,926,700.68 | $ 458,500.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 22,926,700.68 | $ 687,800.00 | |
| | | 80 Subtotal | | | | | $ 6,190,100.00 |
| | | Subtotal (10-80) | | | | | $ 29,116,800.68 |

**Engineer's Opinion of Probable Cost**

**Name:** Georgia Street - Opt 2 TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | 15.0% | LS | $ | 29,116,800.68 | $ 4,367,500.00 | |
| | 90 Subtotal | | | | | | $ 4,367,500.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | 0 | LS | $ | - | $ - | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 33,484,300.68** |
| | 1.Remove exising Traffic Signal | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | | |
| | 2. Upgrade Traffic Signal 3. Construct new traffic signal | | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** Northeastern Street — TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | CY | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 2417634.918 | $ 2,417,634.92 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 93,480.00 | $ 93,480.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | $ 2,982,714.95 | $ 2,982,714.95 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 40,140.00 | $ 40,140.00 | |
| 40.5 | Embankment | | 40,709 | CY | $ 68.89 | $ 2,804,443.01 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 1,143,374.07 | $ 1,143,374.07 | |
| | | | | | | | |
| 40.8 | Concrete Paving | E 46th St | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1526 | LF | $ 137.42 | $ 209,702.92 | |
| | | Bridge approach slabs | 87 | CY | $ 1,011.30 | $ 87,983.10 | |
| | | Curb & Gutter | 4,310 | LF | $ 26.66 | $ 114,904.60 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 1304 | SY | $ 109.62 | $ 142,944.48 | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 3 | EA | $ 2,815.65 | $ 8,446.95 | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Northeastern Street | 10,887 | SY | $ 58.41 | $ 635,909.67 | |
| | | Frontage Roads/U-Turns/Driveways | 3,364 | SY | $ 58.41 | $ 196,491.24 | |
| | | | | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | Northeastern Street | 15,024 | SY | $ 21.25 | $ 319,260.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 5,344 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**
**Name:** Northeastern Street — TxDOT Amarillo District
**Prepared by: BS, TranSystems**
**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Northeastern Street | 1 | LS | $66,953.89 | $ 66,953.89 | |
| | | | | | | | |
| 41.2 | Traffic Control | | | | | | |
| | | Northeastern Street | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | | | | | | |
| 41.3 | Intersection Upgrade | | | | | | |
| | | | 0 | EA | $ - | $ - | |
| | | | | | | | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Northeastern Street | 38,675 | SF | $ 258.00 | $ 9,978,150.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Northeastern Street | 48,632 | SF | $ 100.00 | $ 4,863,200.00 | |
| | | Crash Wall @ 2 Bridge bents | 135 | CY | $ 1,501.90 | $ 202,756.50 | |
| | | Subtotal without mob | | | | | $ 24,010,855.38 |
| | Miscellaneous: | 30% | | | | | $ 7,203,256.61 |
| | | 40 Subtotal | | | | | $ 33,631,746.91 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | | | 0 | EA | $ 11,640.00 | $ - | |
| | | | | | | | |
| 50.4 | Lighting | | | | | | |
| | | Northeastern Street | 1 | LS | $145,493.80 | $ 145,493.80 | |
| | | Subtotal | | | | | $ 165,493.80 |
| | Miscellaneous: | 30% | | | | | $ 49,648.14 |
| | | 50 Subtotal | | | | | $ 215,141.94 |
| | | Construction subtotal without mob or misc | | | | | $ 24,176,349.18 |
| | | Construction Subtotal (10-50) | | | | | $ 33,846,888.85 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 1 | LS | $ 67,206.33 | $ 67,206.33 | |
| | Low Impact (Minimum to No damage) | | 5 | LS | $ 163,645.07 | $ 818,225.35 | |
| | Medium Impact ( Moderate damages) | | 3 | LS | $ 101,811.57 | $ 305,434.71 | |
| | High Impcat ( Significant Damages) | | 1 | LS | $ 1,479,934.97 | $ 1,479,934.97 | |
| | | Subtotal | | | | | $ 2,670,801.36 |
| | Miscellaneous: | 30% | | | | | $ 801,240.41 |
| | | 60 Subtotal | | | | | $ 3,472,041.77 |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 33,846,888.85 | $ 1,692,300.00 | |
| 80.2 | Final Design | | 8% | LS | $ 33,846,888.85 | $ 2,707,800.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 33,846,888.85 | $ 3,046,200.00 | |
| 80.4 | Insurance | | 2% | LS | $ 33,846,888.85 | $ 676,900.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 33,846,888.85 | $ 1,015,400.00 | |
| | | 80 Subtotal | | | | | $ 9,138,600.00 |
| | | Subtotal (10-80) | | | | | $ 46,457,530.62 |

**Engineer's Opinion of Probable Cost**

**Name:** Northeastern Street — TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 46,457,530.62 | $ 6,968,600.00 | |
| | 90 Subtotal | | | | | | $ 6,968,600.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 53,426,130.62** |
| | 1.Remove exising Traffic Signal | | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | |
| | 2. Upgrade Traffic Signal | 3. Construct new traffic signal | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** Northeastern Street - Opt 2 TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 0 | TF | $ 600.00 | $ - | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | CY | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 10 Subtotal | | | | | $ - |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 2560459.279 | $ 2,560,459.28 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 93,480.00 | $ 93,480.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | $ 3,160,136.52 | $ 3,160,136.52 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 40,140.00 | $ 40,140.00 | |
| 40.5 | Embankment | | 52,108 | CY | $ 68.89 | $ 3,589,720.12 | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 1,211,385.67 | $ 1,211,385.67 | |
| | | | | | | | |
| 40.8 | Concrete Paving | Northeastern | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 1526 | LF | $ 137.42 | $ 209,702.92 | |
| | | Bridge approach slabs | 87 | CY | $ 1,011.30 | $ 87,983.10 | |
| | | Curb & Gutter | 4,310 | LF | $ 26.66 | $ 114,904.60 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 4412 | SY | $ 109.62 | $ 483,643.44 | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 8 | EA | $ 2,815.65 | $ 22,525.20 | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | Northeastern Street | 11,063 | SY | $ 58.41 | $ 646,189.83 | |
| | | Frontage Roads/U-Turns/Driveways | 3,920 | SY | $ 58.41 | $ 228,967.20 | |
| | | | | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | Northeastern Street | 15,024 | SY | $ 21.25 | $ 319,260.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 5,344 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**
**Name:** Northeastern Street - Opt 2 TxDOT Amarillo District
**Prepared by: BS, TranSystems**
**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | Northeastern Street | 1 | LS | $66,953.89 | $ 66,953.89 | |
| | | | | | | | |
| 41.2 | Traffic Control | | | | | | |
| | | Northeastern Street | 1 | LS | $ 120,000.00 | $ 120,000.00 | |
| | | | | | | | |
| 41.3 | Intersection Upgrade | | | | | | |
| | | | 0 | EA | $ - | $ - | |
| | | | | | | | |
| 41.4 | Roadway Bridges | | | | | | |
| | | Northeastern Street | 38,675 | SF | $ 258.00 | $ 9,978,150.00 | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | Northeastern Street | 48,632 | SF | $ 100.00 | $ 4,863,200.00 | |
| | | Crash Wall @ 2 Bridge bents | 135 | CY | $ 1,501.90 | $ 202,756.50 | |
| | | Subtotal without mob | | | | | $ 25,439,098.99 |
| | Miscellaneous: | 30% | | | | | $ 7,631,729.70 |
| | | 40 Subtotal | | | | | $ 35,631,287.97 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | MP Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal | 1 | EA | $ 20,000.00 | $ 20,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | | | 0 | EA | $ 11,640.00 | $ - | |
| | | | | | | | |
| 50.4 | Lighting | | | | | | |
| | | Northeastern Street | 1 | LS | $145,493.80 | $ 145,493.80 | |
| | | Subtotal | | | | | $ 165,493.80 |
| | Miscellaneous: | 30% | | | | | $ 49,648.14 |
| | | 50 Subtotal | | | | | $ 215,141.94 |
| | | Construction subtotal without mob or misc | | | | | $ 25,604,592.79 |
| | | Construction Subtotal (10-50) | | | | | $ 35,846,429.91 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 1 | LS | $ 67,206.33 | $ 67,206.33 | |
| | Low Impact (Minimum to No damage) | | 5 | LS | $ 163,645.07 | $ 818,225.35 | |
| | Medium Impact ( Moderate damages) | | 3 | LS | $ 101,811.57 | $ 305,434.71 | |
| | High Impcat ( Significant Damages) | | 5 | LS | $ 1,479,934.97 | $ 7,399,674.85 | |
| | | Subtotal | | | | | $ 8,590,541.24 |
| | Miscellaneous: | 30% | | | | | $ 2,577,162.37 |
| | | 60 Subtotal | | | | | $ 11,167,703.61 |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 35,846,429.91 | $ 1,792,300.00 | |
| 80.2 | Final Design | | 8% | LS | $ 35,846,429.91 | $ 2,867,700.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 35,846,429.91 | $ 3,226,200.00 | |
| 80.4 | Insurance | | 2% | LS | $ 35,846,429.91 | $ 716,900.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 35,846,429.91 | $ 1,075,400.00 | |
| | | 80 Subtotal | | | | | $ 9,678,500.00 |
| | | Subtotal (10-80) | | | | | $ 56,692,633.52 |

**Engineer's Opinion of Probable Cost**

**Name:** Northeastern Street - Opt 2 TxDOT Amarillo District

**Prepared by: BS, TranSystems**

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | 15.0% | LS | $ | 56,692,633.52 | $ 8,503,900.00 | |
| | 90 Subtotal | | | | | | $ 8,503,900.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | 0 | LS | $ | - | $ - | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 65,196,533.52** |
| | 1.Remove exising Traffic Signal | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | | |
| | 2. Upgrade Traffic Signal 3. Construct new traffic signal | | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** 15th Street — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 256 | TF | $ 600.00 | $ 153,600.00 | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ 153,600.00 |
| | Miscellaneous: | 30% | | | | | $ 46,080.00 |
| | | 10 Subtotal | | | | | $ 199,700.00 |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 47062.691 | $ 47,062.69 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 10,500.00 | $ 10,500.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 26046.806 | $ 26,046.81 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 5,250.00 | $ 5,250.00 | |
| 40.5 | Embankment | | 300 | CY | $ 68.89 | $ 20,667.00 | |
| 40.6 | Excavation | | 100 | CY | $ 46.44 | $ 4,644.00 | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 14,325.74 | $ 14,325.74 | |
| | | | | | | | |
| 40.8 | Concrete Paving | 15th Street | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 0 | LF | $ 137.42 | $ - | |
| | | Bridge approach slabs | 0 | CY | $ 1,011.30 | $ - | |
| | | Curb & Gutter | 470 | LF | $ 26.66 | $ 12,530.20 | |
| | | Mono Curb | 365 | LF | $ 18.96 | $ 6,920.40 | |
| | | Sidewalk | 450 | SY | $ 109.62 | $ 49,329.00 | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 1 | EA | $ 2,815.65 | $ 2,815.65 | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | 15th Street | 1,500 | SY | $ 58.41 | $ 87,615.00 | |
| | | Frontage Roads | 0 | SY | $ 58.41 | $ - | |
| | | Driveway (ACP) | 0 | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | 15th Street | 1,500 | SY | $ 21.25 | $ 31,875.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 60 | SY | $ 61.79 | $ 3,707.40 | |
| | | Curb & Gutter | 0 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**
**Name:** 15th Street — TxDOT Tyler District
**Prepared** BS TranSystems
**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | 15th Street | 1 | LS | $4,614.41 | $ 4,614.41 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | 15th Street | 1 | LS | $ 20,000.00 | $ 20,000.00 | |
| | | | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | | 0 | SF | $ 258.00 | $ - | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | | 0 | SF | $ 100.00 | $ - | |
| | | | 0 | CY | $ 1,501.90 | $ - | |
| | | Subtotal without mob | | | | | $ 300,840.61 |
| | Miscellaneous: | 30% | | | | | $ 90,252.18 |
| | | 40 Subtotal | | | | | $ 438,155.48 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Removal | 0 | EA | $ 20,000.00 | $ - | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | 15th Street | 1 | LS | $16,186.30 | $ 16,186.30 | |
| | | Subtotal | | | | | $ 16,186.30 |
| | Miscellaneous: | 30% | | | | | $ 4,855.89 |
| | | 50 Subtotal | | | | | $ 21,042.19 |
| | | Construction subtotal without mob or misc | | | | | $ 470,626.91 |
| | | Construction Subtotal (10-50) | | | | | $ 658,897.67 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ 60,038.21 | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 658,897.67 | $ 32,900.00 | |
| 80.2 | Final Design | | 8% | LS | $ 658,897.67 | $ 52,700.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 658,897.67 | $ 59,300.00 | |
| 80.4 | Insurance | | 2% | LS | $ 658,897.67 | $ 13,200.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 658,897.67 | $ 19,800.00 | |
| | | 80 Subtotal | | | | | $ 177,900.00 |
| | | Subtotal (10-80) | | | | | $ 836,797.67 |
| **90.0** | **Unallocated Contingency** | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** 15th Street — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item | | | | Unit | Total | |
|---|---|---|---|---|---|---|
| 90.1 | Unallocated | 15.0% | LS | $ 836,797.67 | $ 125,500.00 | |
| | 90 Subtotal | | | | | $ 125,500.00 |
| **100.0** | **Finance Charges** | | | | | |
| 100.1 | Finance Charges | 0 | LS | $ - | $ - | |
| | 100 Subtotal | | | | | $ - |
| | Total Project Costs (10-100) | | | | | **$ 962,297.67** |
| | | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | |
| | 1. Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 807 — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 112 | TF | $ 600.00 | $ 67,200.00 | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ 67,200.00 |
| | Miscellaneous: | 30% | | | | | $ 20,160.00 |
| | | 10 Subtotal | | | | | $ 87,400.00 |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 54659.957 | $ 54,659.96 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 7,500.00 | $ 7,500.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 11203.426 | $ 11,203.43 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 3,750.00 | $ 3,750.00 | |
| 40.5 | Embankment | | 0 | CY | $ 68.89 | $ - | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 6,161.88 | $ 6,161.88 | |
| | | | | | | | |
| 40.8 | Concrete Paving | FM 802 | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 0 | LF | $ 137.42 | $ - | |
| | | Bridge approach slabs | 0 | CY | $ 1,011.30 | $ - | |
| | | Curb & Gutter | 367 | LF | $ 26.66 | $ 9,784.22 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 0 | SY | $ 109.62 | $ - | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 0 | EA | $ 2,815.65 | $ - | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | FM 802 | 806 | SY | $ 58.41 | $ 47,078.46 | |
| | | Frontage Roads | 0 | SY | $ 58.41 | $ - | |
| | | Driveway (ACP) | 0 | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | FM 802 | 806 | SY | $ 21.25 | $ 17,127.50 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 0 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 807 — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | FM 802 | 1 | LS | $6,794.08 | $ 6,794.08 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | FM 802 | 1 | LS | $ 20,000.00 | $ 20,000.00 | |
| | | | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | [4] | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | | 0 | SF | $ 258.00 | $ - | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | | 0 | SF | $ 100.00 | $ - | |
| | | | 0 | CY | $ 1,501.90 | $ - | |
| | | Subtotal without mob | | | | | $ 129,399.57 |
| | Miscellaneous: | 30% | | | | | $ 38,819.87 |
| | | 40 Subtotal | | | | | $ 222,879.40 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrade | | | | | | |
| | | Relocate Cantilevers, Install Gates | 1 | EA | $ 350,000.00 | $ 350,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | FM 802 | 0 | LS | $21,961.30 | $ - | |
| | | Subtotal | | | | | $ 350,000.00 |
| | Miscellaneous: | 30% | | | | | $ 105,000.00 |
| | | 50 Subtotal | | | | | $ 455,000.00 |
| | | Construction subtotal without mob or misc | | | | | $ 546,599.57 |
| | | Construction Subtotal (10-50) | | | | | $ 765,279.40 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ 60,038.21 | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 765,279.40 | $ 38,300.00 | |
| 80.2 | Final Design | | 8% | LS | $ 765,279.40 | $ 61,200.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 765,279.40 | $ 68,900.00 | |
| 80.4 | Insurance | | 2% | LS | $ 765,279.40 | $ 15,300.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 765,279.40 | $ 23,000.00 | |
| | | 80 Subtotal | | | | | $ 206,700.00 |
| | | Subtotal (10-80) | | | | | $ 971,979.40 |
| **90.0** | **Unallocated Contingency** | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 807 — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| 90.1 | Unallocated | | 15.0% | LS | $ 971,979.40 | $ 145,800.00 | |
| | 90 Subtotal | | | | | | $ 145,800.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | | 0 | LS | $ - | $ - | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 1,117,779.40** |
| | 1.Remove exising Traffic Signal | | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | |
| | 2. Upgrade Traffic Signal | 3. Construct new traffic signal | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 282 S Price Street — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item No. | Item Description | | Quantity | Unit | Unit Cost | Total Cost | Subtotal |
|---|---|---|---|---|---|---|---|
| **10.0** | **Guideway & Track Elements** | | | | | | |
| 10.1 | Grading | | 0 | CY | $ 15.00 | $ - | |
| 10.2 | Subgrade Improvements | | 0 | LS | $ 1.00 | $ - | |
| 10.3 | 12" Subballast | | 0 | CY | $ 65.00 | $ - | |
| 10.4 | New Track | | 0 | TF | $ 215.00 | $ - | |
| 10.5 | Shift Track | | 0 | TF | $ 35.00 | $ - | |
| 10.6 | Upgrade Track | | 0 | TF | $ 25.00 | $ - | |
| 10.7 | Install Power Turnout | | 0 | EA | $ 230,000.00 | $ - | |
| 10.8 | Install Hand Throw Turnout | | 0 | EA | $ 175,000.00 | $ - | |
| 10.9 | Concrete Crossing | | 304 | TF | $ 600.00 | $ 182,400.00 | |
| 10.10 | Railroad Bridge | Location/Description | 0 | TF | $ 16,000.00 | $ - | |
| 10.11 | Shoofly Railroad Bridge | Location/Description | 0 | TF | $ 10,000.00 | $ - | |
| 10.12 | Trackside Retaining Walls/Crash Walls | Location/Description | 0 | SF | $ 100.00 | $ - | |
| 10.13 | Existing Track Removal | | 0 | TF | $ 50.00 | $ - | |
| 10.14 | Existing Turnout Removal | | 0 | EA | $ 8,000.00 | $ - | |
| | | Subtotal | | | | | $ 182,400.00 |
| | Miscellaneous: | 30% | | | | | $ 54,720.00 |
| | | 10 Subtotal | | | | | $ 237,200.00 |
| **20.0** | **Stations, Stops, Terminals** | | | | | | |
| 20.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Stations, Stops, Terminals | 30% | | | | | $ - |
| | | 20 Subtotal | | | | | $ - |
| **30.0** | **Support Facilities** | | | | | | |
| 30.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | 30 Subtotal | | | | | | $ - |
| **40.0** | **Sitework & Special Conditions** | | | | | | |
| 40.1 | Mobilization | 10% subtotal 10-50 wout mob/misc | 1 | LS | 116140.191 | $ 116,140.19 | |
| 40.2 | Demolition, Clearing | $3000/Sta | 1 | LS | $ 12,000.00 | $ 12,000.00 | |
| 40.3 | Site Utilities, Utility Relocation Unspecified | | 1 | LS | 45801.031 | $ 45,801.03 | |
| 40.4 | Environmental Mitigation (Erosion control, seeding, other) $15000/1000LF | | 1 | LS | $ 6,000.00 | $ 6,000.00 | |
| 40.5 | Embankment | | 0 | CY | $ 68.89 | $ - | |
| 40.6 | Excavation | | 0 | CY | $ 46.44 | $ - | |
| 40.7 | Drainage | 5% wout mob/drn | 1 | LS | $ 25,190.57 | $ 25,190.57 | |
| | | | | | | | |
| 40.8 | Concrete Paving | FM 282 S Price St | 0 | SY | $ 126.57 | $ - | |
| | | Bridge Rail | 0 | LF | $ 137.42 | $ - | |
| | | Bridge approach slabs | 0 | CY | $ 1,011.30 | $ - | |
| | | Curb & Gutter | 866 | LF | $ 26.66 | $ 23,087.56 | |
| | | Mono Curb | 0 | LF | $ 18.96 | $ - | |
| | | Sidewalk | 455 | SY | $ 109.62 | $ 49,877.10 | |
| | | Riprap | 0 | CY | $ 1,114.04 | $ - | |
| | | Curb Ramps | 3 | EA | $ 2,815.65 | $ 8,446.95 | |
| | | | | | | | |
| 40.9 | Asphalt Paving | | | | | | |
| | | FM 282 S Price St | 3,976 | SY | $ 58.41 | $ 232,238.16 | |
| | | Frontage Roads | 0 | SY | $ 58.41 | $ - | |
| | | Driveway (ACP) | 0 | SY | $ 81.77 | $ - | |
| 41.0 | Pavement Removal | | | | | | |
| | | FM 282 S Price St | 3,976 | SY | $ 21.25 | $ 84,490.00 | |
| | | Frontage Road | 0 | SY | | $ - | |
| | | Sidewallk & Ramp | 0 | SY | | $ - | |
| | | Riprap | 0 | SY | | $ - | |
| | | Median | 0 | SY | | $ - | |
| | | Curb & Gutter | 866 | LF | | $ - | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 282 S Price Street — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | | Mono Curb | 0 | LF | | $ - | |
| | | | | | | | |
| 41.1 | Signing/Marking | | | | | | |
| | | FM 282 S Price St | 1 | LS | $11,870.54 | $ 11,870.54 | |
| | | | 0 | LS | $ - | $ - | |
| 41.2 | Traffic Control | | | | | | |
| | | FM 282 S Price St | 1 | LS | $ 30,000.00 | $ 30,000.00 | |
| | | | 0 | LS | $ - | $ - | |
| 41.3 | Intersection Upgrade | | | | | | |
| | 4 | | 0 | EA | $ 138,656.18 | $ - | |
| | | | 0 | EA | $ 6,000.00 | $ - | |
| 41.4 | Roadway Bridges | | | | | | |
| | | | 0 | SF | $ 258.00 | $ - | |
| 41.5 | Roadway Retaining Walls/Crash Walls | | | | | | |
| | | | 0 | SF | $ 100.00 | $ - | |
| | | | 0 | CY | $ 1,501.90 | $ - | |
| | | Subtotal without mob | | | | | $ 529,001.91 |
| | Miscellaneous: | 30% | | | | | $ 158,700.57 |
| | | 40 Subtotal | | | | | $ 803,842.67 |
| **50.0** | **Systems** | | | | | | |
| 50.1 | Railroad Control Point | | | | | | |
| | | Location | 0 | LS | $ 100,000.00 | $ - | |
| | | Various Grade Crossings | 0 | LS | $ - | $ - | |
| 50.2 | Grade Crossing Warning Device Upgrades Crossing #014549X | | | | | | |
| | | Remove Exist Gates, Install New Gates | 1 | EA | $ 450,000.00 | $ 450,000.00 | |
| 50.3 | Traffic Signal | | | | | | |
| | 1 | | 0 | LS | $ 11,640.00 | $ - | |
| | 3 | | 0 | LS | $ 470,000.00 | $ - | |
| 50.4 | Lighting | | | | | | |
| | | FM 282 S Price St | 0 | LS | $53,461.30 | $ - | |
| | | Subtotal | | | | | $ 450,000.00 |
| | Miscellaneous: | 30% | | | | | $ 135,000.00 |
| | | 50 Subtotal | | | | | $ 585,000.00 |
| | | Construction subtotal without mob or misc | | | | | $ 1,161,401.91 |
| | | Construction Subtotal (10-50) | | | | | $ 1,626,042.67 |
| **60.0** | **ROW, Land, Existing Improvements** | | | | | | |
| 60.1 | Bypass (Minimum to No damage) | | 0 | LS | $ 60,038.21 | $ - | |
| | Low Impact (Minimum to No damage) | | 0 | LS | $ - | $ - | |
| | Medium Impact ( Moderate damages) | | 0 | LS | $ - | $ - | |
| | High Impcat ( Significant Damages) | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 60 Subtotal | | | | | $ - |
| **70.0** | **Vehicles** | | | | | | |
| 70.1 | N/A | | 0 | LS | $ - | $ - | |
| | | Subtotal | | | | | $ - |
| | Miscellaneous: | 30% | | | | | $ - |
| | | 70 Subtotal | | | | | $ - |
| **80.0** | **Professional Services** | | | | | | |
| 80.1 | Preliminary Engineering | | 5% | LS | $ 1,626,042.67 | $ 81,300.00 | |
| 80.2 | Final Design | | 8% | LS | $ 1,626,042.67 | $ 130,100.00 | |
| 80.3 | Construction Administration and Management | | 9% | LS | $ 1,626,042.67 | $ 146,300.00 | |
| 80.4 | Insurance | | 2% | LS | $ 1,626,042.67 | $ 32,500.00 | |
| 80.5 | Surveys, Testing, Investigation, Inspection | | 3% | LS | $ 1,626,042.67 | $ 48,800.00 | |
| | | 80 Subtotal | | | | | $ 439,000.00 |
| | | Subtotal (10-80) | | | | | $ 2,065,042.67 |
| **90.0** | **Unallocated Contingency** | | | | | | |
| 90.1 | Unallocated | | 15.0% | LS | $ 2,065,042.67 | $ 309,800.00 | |

**Engineer's Opinion of Probable Cost**

**Name:** FM 282 S Price Street — TxDOT Tyler District

**Prepared** BS TranSystems

**Date:** April 9, 2025

| Item | | | | | Unit | Total | |
|---|---|---|---|---|---|---|---|
| | 90 Subtotal | | | | | | $ 309,800.00 |
| **100.0** | **Finance Charges** | | | | | | |
| 100.1 | Finance Charges | 0 | LS | $ - | $ - | | |
| | 100 Subtotal | | | | | | $ - |
| | Total Project Costs (10-100) | | | | | | **$ 2,374,842.67** |
| | 1.Remove exising Traffic Signal | Unit cost based on TxDOT average low-bid unit prices for 2023-2024 | | | | | |
| | 2. Upgrade Traffic Signal 3. Construct new traffic signal | | | | | | |
| | 4. Reconfigure and Restripe Intersection | | | | | | |
| | 5 Potential for higher unit price than estimated if Hazardous material is discovered with in ROW. Preliminary Engineering Cost increased to account for additional efforts. | | | | | | |

# Appendix D:

# Benefit-Cost Analysis Technical Memorandum

# Amarillo District Highway-Rail Grade Crossing Study

## Technical Memorandum – Benefit-Cost Analysis

February 2025

Texas Department of Transportation

# Table of Contents



# List of Figures



# List of Tables

# Lists of Acronyms

| | |
|---|---|
| AADT | Average annual daily traffic |
| BCA | Benefit-cost analysis |
| BCR | Benefit-cost ratio |
| BNSF | Burlington Northern Santa Fe |
| CAGR | Compound annual growth rate |
| FRA | Federal Railroad Administration |
| GXAPS | Grade Crossing Accident Prediction System |
| IRR | Internal rate of return |
| MP | Mile post (per railroad designation) |
| MPH | Miles per hour |
| NPV | Net present value |
| O&M | Operations and maintenance |
| OMB | Office of Management and Budget |
| P/E | Planning and engineering design |
| ROW | Right of way |
| RRD | TxDOT Rail Division |
| TDM | Travel demand model(ing) |
| TxDOT | Texas Department of Transportation |
| VHT | Vehicle-hours travelled |
| VOC | Vehicle operating costs |

# Introduction

The purpose of the benefit-cost analysis (BCA) for Amarillo District Highway-Rail Grade Crossing Study is to improve mobility and reduce vehicular delays associated with highway-rail grade crossings on the freight rail system in Dallam, Sherman, Hansford, Hartley, Moore, Hutchinson, Oldham, Potter, Carson, Deaf Smith, Randall, Armstrong, Ochiltree, Roberts, Gray, Lipscomb, and Hemphill Counties in Texas. The work evaluates study area highway-rail grade crossing plans, conceptual engineering, BNSF train operations, cost estimates, and project implementation. Up to six (6) highway-railroad grade separations are considered.

## Study Area

The study area consists of approximately 710 miles of existing freight rail systems operated by BNSF, UP, PNR, and TXNW. In the Amarillo District, the six grade separation project locations across BNSF's two Subdivisions are shown in **Figure 1**. One project is in Potter County and five are in Randall.

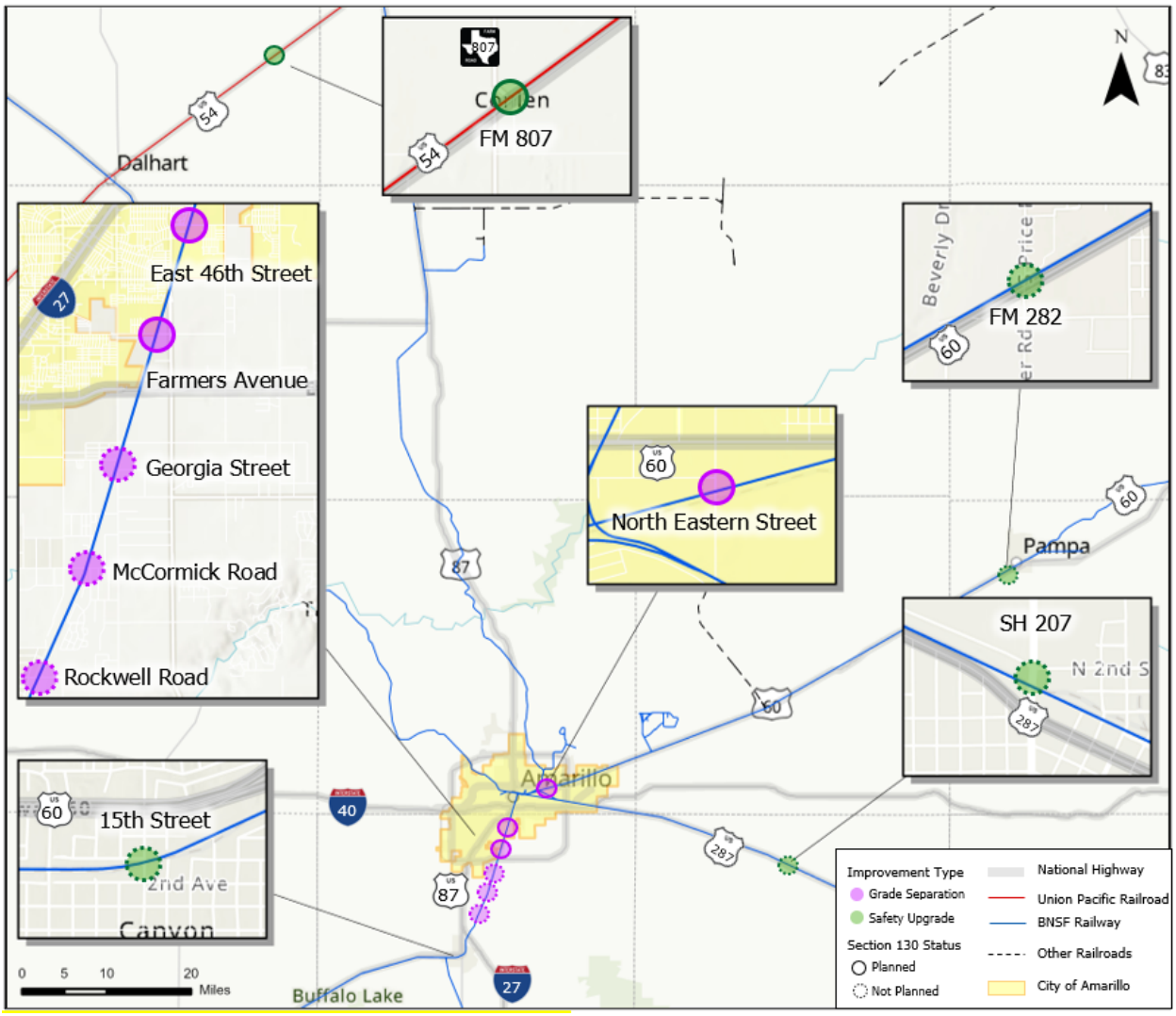



*Figure 1. Grade Separation Project Crossing Locations*

## BCA Section Outline

This BCA quantifies the economic feasibility of replacing the highway-rail grade crossings for each of the six rail projects with grade separated crossings. It comprises the following sections:

- **Approach**: The alternatives, methodology, and assumption.
- **Findings**: Benefit-cost analysis results by project and sensitivities.
- **Appendix**: Annual costs, benefits, and economic feasibility metrics by project.

# Approach

Annual costs and benefits for all six highway-rail grade crossing improvement projects are individually compared to the baseline scenario. The baseline existing plus committed scenario (e.g., the No-Build alternative) assumes no new rail crossing infrastructure and continuation of current railroad and roadway operating characteristics. This BCA compares estimated highway-rail grade crossing improvement costs (e.g., Build alternatives) to projected monetized societal benefits for each project. Costs and benefits are compared in net-present, real (constant) 2024 dollars.

- **Improvement costs**: Include planning and engineering design (P/E), right-of-way (ROW), and construction.
- **Societal benefits**: Comprise travel efficiencies associated with travel time, vehicle operating cost, accidents, and emissions. Pedestrian time savings and railroad operating costs were not considered due to data limitations and study area irrelevance.

Comparing discounted annual monetized benefits to costs in a BCA framework yields three standardized metrics of economic feasibility: benefit-cost ratio (BCR); net present value (NPV); and internal rate of return (IRR). Highway-rail grade crossing improvements under each project, BCA methodology, cost assumptions, and benefit assumptions are defined below.

## Highway-Rail Grade Crossing Improvement Projects

Baseline railroad operating characteristics and highway average annual daily traffic (AADT) volumes draw upon data provided by, and discussed, with TranSystems.

- **Project Location Detail**: Highway-rail grade crossing identification codes, street name, rail operator, county, land use, and milepost data are summarized in **Table 1**. Land use summary indicates the rural, undeveloped use; four of the six locations are classified as "Open Space" versus "Commercial" and "Industrial" for the other two, Notably, no residential, retail, or other urban oriented use currently exists in any of the six crossing locations.
- **Rail Characteristics**: Current BNSF operating characteristics includes daily train counts, average train speeds (mph), and length (feet), as shown in **Table 2**. The six locations accommodate many daily trains (72 to 90) moving relatively quickly (35 to 45 mph), which reflect the undeveloped land-use. Gate downtime associated with lowering/rising is estimated at 1.0 minute per train. Combined with train transit-time through the grade crossings (function of train length and speed), average total gate downtime delay per train ranges between 2.8 to

3.3 minutes. Annual train growth is forecast at 2.0% annually over the 2024 volumes[1] for both the No-Build and Build alternatives, while train length and speeds are assumed constant over the analysis period.

- **Road Characteristics**: Affected roadway volume and accident characteristics are summarized in **Table 3**. Year 2019 AADT ranges from extremely low (under 600 at Rockwell Road to relatively low (over 4,300 at North Eastern Street), which aligns with the undeveloped land use (per above). Similarly, truck volumes are assumed at 3%, with modest compound annual growth rate (CAGR) of 2.0% through horizon-year 2060 (30-year lifecycle after construction).

*Table 1. Project Location Characteristics*

| # | Crossing ID | Street/Road | RR Ops. | County | Land Use | Milepost |
|---|---|---|---|---|---|---|
| 1 | 014602G | North Eastern Street | BNSF | Potter | Open Space | 550.19 |
| 2 | 014693P | East 46th Sixth Street | BNSF | Randall | Commercial | 556.28 |
| 3 | 014695D | Farmers Avenue | BNSF | Randall | Industrial | 558.36 |
| 4 | 014698Y | Georgia Street | BNSF | Randall | Open Space | 560.86 |
| 5 | 014700X | McCormick Road | BNSF | Randall | Open Space | 562.87 |
| 6 | 014701E | Rockwell Road | BNSF | Randall | Open Space | 565.06 |

*Source: TranSystems*

*Table 2. Grade Separation Rail Characteristics*

| # | Street/Road | Count/Day (2024) | Train Speed (mph) | Train Length (feet) | Count Growth | Gate Time (min.) | Avg. Train Delay (min.) |
|---|---|---|---|---|---|---|---|
| 1 | North Eastern Street | 72 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |
| 2 | East 46th Street | 90 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |
| 3 | Farmers Avenue | 90 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| 4 | Georgia Street | 90 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| 5 | McCormick Road | 86 | 35 | 7,156 | 2.0% | 1.0 | 3.3 |
| 6 | Rockwell Road | 86 | 45 | 7,156 | 2.0% | 1.0 | 2.8 |

*Source: TranSystems*

[1] With the same absolute growth each year thereafter; reflects a linear extrapolation, not compounding

*Table 3. Grade Separation Rail Characteristics*

| | Volume Characteristics | | | | | | Accident Characteristics | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Street/Road | AADT 2019 | CAGR | Truck % | AADT 2031 | AADT 2060 | Pred. Rate | Fatalities | Injuries | PDO | Total |
| 1 | North Eastern Street | 4,314 | 2.0% | 3.0% | 5,471 | 9,716 | 0.23 | 1 | 1 | 3 | 5 |
| 2 | East 46th Street | 3,268 | 2.0% | 3.0% | 4,145 | 7,360 | 0.23 | 0 | 1 | 4 | 5 |
| 3 | Farmers Avenue | 2,866 | 2.0% | 3.0% | 3,635 | 6,455 | 0.01 | 0 | 1 | 0 | 1 |
| 4 | Georgia Street | 1,314 | 2.0% | 3.0% | 1,666 | 2,959 | 0.01 | 0 | 0 | 0 | 0 |
| 5 | McCormick Road | 2,665 | 2.0% | 3.0% | 3,380 | 6,002 | 0.11 | 0 | 0 | 2 | 2 |
| 6 | Rockwell Road | 593 | 2.0% | 3.0% | 752 | 1,336 | 0.00 | 0 | 0 | 0 | 0 |

*Source: TxDOT, TranSystems, and GXAPS: Grade Crossing Accident Prediction System*

Regarding accidents, data from the *Highway-Rail Grade Crossing Accident Prediction System* (GXAPS) compiled by the U.S. Department of Transportation's Federal Railroad Administration (USDOT-FRA) was used to summarize grade-crossing roadway accidents by study location and severity. Thirteen total accidents occurred across the six study locations over the most recent five years (2019-2023), comprising one fatality (North Eastern Street), three injuries, and nine property-damage-only (PDO). Based on these and other characteristics, the GXAPS annual accident prediction rate ranges from effectively nothing (0.00 at Rockwell Road) to 0.23 at the two locations with five accidents (North Eastern Street and East 46th Street).

## Benefic-Cost Analysis Methodology

Benefits associated with the six improvement projects are compared to the improvement costs to ascertain if society is "better-off" economically with the proposed infrastructure. Conceptually, the improvement cost and benefit types are illustrated in **Figure 2**. The following discussion defines the types of costs and benefits, and how they are evaluated.

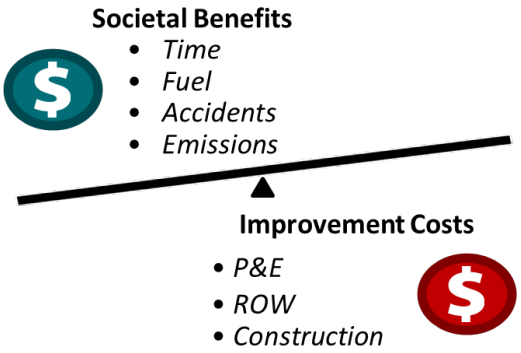



*Figure 2. Improvement Costs and Societal Benefits*

- **Cost Types**: Reflect public sector expenditures to improve vehicle traffic flows in Potter and Randall counties. Improvement costs derived by TranSystems include design (planning and engineering), rights-of-way (ROW), and construction (including inspection and contingency). All costs are presented in constant 2024 dollars.
- **Benefit Types**: Reflect savings related to vehicle travel time, operating costs, accidents, and emissions associated with avoiding gate downtime delay. Quantification is based on BNSF operating characteristics (per **Table 2**), AADT volumes (per **Table 3**), and travel characteristics (discussed in following subsection). The four benefit types:
    - *Travel Time Cost-Savings*: Monetization of decreased vehicle-hours traveled (VHT) reflect avoided delay time from passing trains, AADT volume and growth, percent trucks, vehicle occupancy, and time-values. Time savings occur by decreasing the delays associated with gate downtime incidences and duration via grade separation.
    - *Fuel Cost-Savings (VOC)*: Monetization of decreased fuel consumption costs reflect reduced idling time while trains pass, idling fuel consumption rates, fuel efficiency improvements, and fuel price.
    - *Accident Cost-Savings*: Monetization of decreased accidents from grade separations reflect accident rates per crossing, accident severity, and costs by severity. The FRA's GXAPS provide historical accident incidence and severity data by crossing location.
    - *Emission Cost-Savings*: Monetization of decreased emissions resulting from fuel consumption savings reflect reduced idling time while trains pass, emission rates, and emission costs.

- **Project Evaluation**: Annual benefits and costs compared over the project lifecycle are discounted to the current year and evaluated in standard metric terms. The timing, discounting, evaluation metrices, and sensitivity steps are discussed below.
    - *Timing*: All improvement phase costs (e.g., P/E, ROW, and construction, etc.) for each project are assumed to occur over six years (2025 to 2030), with benefits beginning in the following year (2031). All benefits are extended through a 30-year horizon with time and fuel/emissions savings annually escalated from annual increases in traffic volume (AADT) and train counts.
    - *Discounting*: After tabulating costs and benefits in constant dollars (excluding inflation), a real discount rate adjustment is made to account for timing differences. Discounted future values reflect the principle that benefits and costs occurring sooner are more highly valued than those occurring later, and that an opportunity cost is associated with diverting investment funding from other productive uses. This process, known as discounting, expresses future streams of benefits and costs in constant present value terms. A real discount rate (i.e., net of the inflation rate) of 3.1 percent per year is applied to benefit and cost estimates, per Office of Management and Budget (OMB) Circular A-94[2] and current USDOT guidance.
    - *Benefit Cost Evaluation Metrics*: Discounted project benefits are compared with discounted project costs over the multi-year analysis period from three perspectives. While each perspective indicates the same feasibility finding (yes or no), they provide different perspectives as to the dollar magnitude, relativity, and robustness:
        - *Net Present Value (NPV)* – discounted benefits less discounted costs; a positive monetary value indicates the investment is economically feasible.
        - *Benefit-Cost Ratio (BCR)* – discounted benefits divided by discounted costs; a ratio greater than 1.0 indicates the project is economically feasible.
        - *Internal Rate of Return (IRR)* – discount rate at which the present-value of the benefits is equal to the present-value of the costs; an IRR greater than the threshold discount rate (3.1%) indicates the project is economically feasible.
    - *Sensitivity Analyses* – A simple breakeven analysis provides an order-of-magnitude estimate of average annual benefits required to make infeasible projects feasible (i.e., NPV = 0, BCR = 1.0, IRR = discount rate). The results were used to identify the increase in benefits and/or decrease in costs required for each project to breakeven. For example, requisite benefits reflect additional time, fuel, and or accident cost-savings, while requisite costs reflect construction cost reduction needs.

[2] OMB Circular A-94

## Cost Assumptions

**Table 4** summarizes project improvement costs by type and year, based on TranSystems estimates. P&E (design) is assumed to occur in years 2025 to 2027, ROW in 2026, and construction from 2028 to 2030. Total costs average $35.2m, ranging from a low of $19.5m (Rockwell Road) to a high of $51.3m (North Eastern Street).

*Table 4. Improvement Type Costs (2024 Dollars in Millions)*

| # | Street/Road | P&E (2025-27) | ROW (2026) | Construction (2028-30) | Total |
|---|---|---|---|---|---|
| 1 | North Eastern Street | $6.0 | $4.0 | $41.3 | $51.3 |
| 2 | East 46th Street | $5.4 | $2.7 | $37.3 | $45.4 |
| 3 | Farmers Avenue | $4.6 | $0.0 | $31.8 | $36.4 |
| 4 | Georgia Street | $4.0 | $0.0 | $27.5 | $31.5 |
| 5 | McCormick Road | $3.4 | $0.1 | $23.7 | $27.3 |
| 6 | Rockwell Road | $2.5 | $0.0 | $17.1 | $19.5 |

*Source: TranSystems*

## Benefit Assumptions

Benefit assumptions focus on vehicular traffic since no pedestrian or railroad operating data were available, and no such benefit such categories were identified (e.g., no notable pedestrians or train operation changes). AADT count data by railroad crossing were used (see **Table 2**), to estimate reductions in travel time, operating cost, accidents, and emissions from avoided gate-down times.[3] Travel characteristic changes are monetized based on monetization factors and other assumptions, yielding estimates of net travel time, vehicle operating, accident, and emission cost (dis)savings. Such assumptions concern vehicle occupancy rates, values-of-time, fuel consumption (idling rates and costs), idling emissions values, and accidents (rates, severity, and costs), as shown in **Table 5**. All monetized factors are in 2024$.

[3] Travel demand modeling (TDM) was unavailable/impractical for this micro analysis.

**Table 5. Benefit Assumptions**

| Assumptions | Factor | Source |
|---|---|---|
| *Travel Time Characteristics* | | |
| Vehicle Occupancy (Persons/Vehicle) | | |
| Passenger Car (PC) | 1.52 | USDOT |
| Commercial Vehicle (CV) | 1.00 | USDOT |
| Value of Travel Time Savings ($/person-hour) | | |
| Passenger Car (PC) | $21.72 | USDOT and BLS |
| Commercial Vehicle (CV) | $36.75 | USDOT and BLS |
| *Fuel Consumption Characteristics* | | |
| Gallons/Idling Vehicle-Hour | | |
| Passenger Car (PC) - Gasoline 2024 | 0.24 | US Dept. of Energy and CBO |
| Commercial Vehicle (CV) - Deisel 2024 | 0.40 | US Dept. of Energy and CBO |
| Annual Fuel Efficiency Growth (CAGR) | 1.5% | CAFÉ standards |
| Fuel Costs (2024$/Gallon) | | |
| Passenger Car (PC) - Gasoline | $2.98 | EIA |
| Commercial Vehicle (CV) - Deisel | $3.46 | EIA |
| *Accident Characteristics* | | |
| Annual Prediction Rates | % - 22.7% | GXAPS |
| Likely Accident Severity | varies | GXAPS |
| Accident Costs (2024$/accident type) | | |
| Property Damage Only | $9,781 | USDOT and BLS |
| Injuries | $339,237 | USDOT and BLS |
| Fatalities | $15,243,540 | USDOT and BLS |

*Source: ??? (BLS), ??? (CBO), ??? (EIA)*

# Findings

Project findings comprise three subsections. The first summarizes BCA metrics for all six projects. The second charts annual costs and benefits for each project. The third uses sensitivity analysis to identify the magnitude of increased benefits and/or decreased costs required for each project to breakeven.

## Summary BCA Results

Economic feasibility metrics (NPV, BCR, and IRR) are summarized for all six projects in **Table 6** under the 3.1% real discount rate. The red font highlights the infeasible economic metrics[4] for all projects, with BCR ranging from an extremely low 0.07 (Rockwell Road) to a medium-low of 0.40 (North Eastern Street).

*Table 6. BCA Metrics*

| # | Street/Road | BCR | NPV (2024$m) | IRR |
|---|---|---|---|---|
| 1 | North Eastern Street | 0.40 | -$27.5 | -2.0% |
| 2 | East 46th Street | 0.17 | -$34.0 | -5.6% |
| 3 | Farmers Avenue | 0.25 | -$24.5 | -3.9% |
| 4 | Georgia Street | 0.13 | -$24.5 | -6.6% |
| 5 | McCormick Road | 0.30 | -$17.2 | -3.2% |
| 6 | Rockwell Road | 0.07 | -$16.4 | -9.3% |

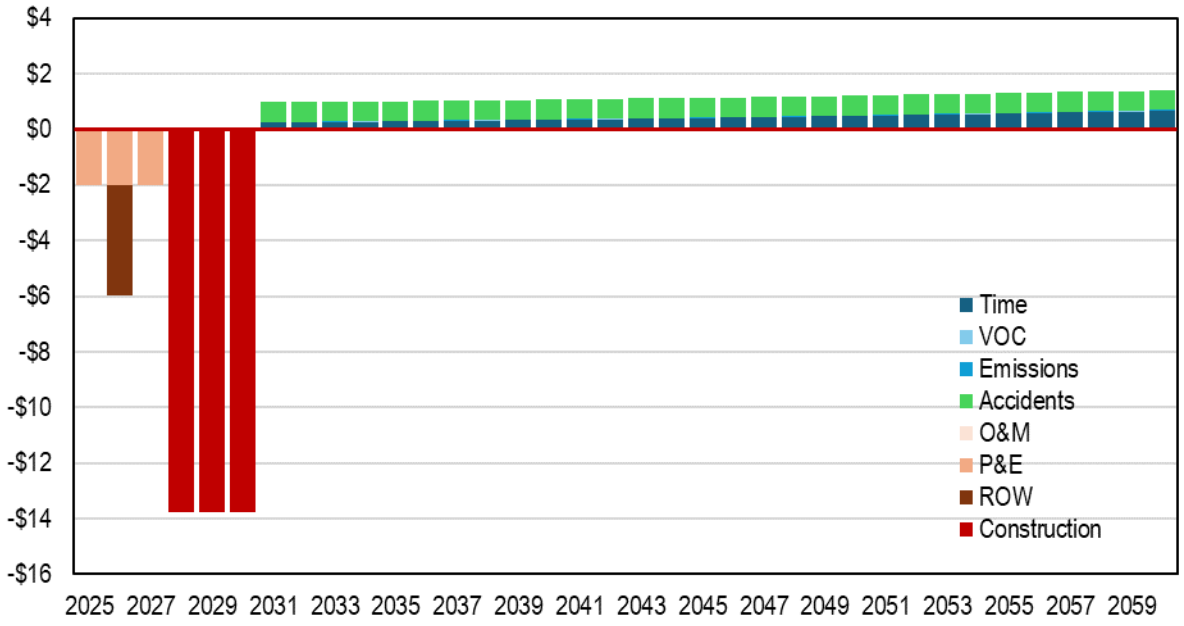
## Annual Costs and Benefits by Project

The following six figures (**Figure 3** through **Figure 8**) illustrate the economic infeasibility by project. They detail annual improvement costs, subsequent annual benefits, and cumulative NPV by year. Each figure comprises two charts for each project – effectively showing the same patterns for all projects.

- **Annual Benefits and Costs by Type (Undiscounted 2024$m)**: The top chart details *undiscounted* annual improvement costs and benefits by type. It highlights the relatively high construction costs in years 2028-2030, while the benefits are typically led by time-savings. However, the North Eastern Street benefits are led by accident benefits, due to one historical fatality, whereas all others have none.
- **Cumulative Annual Benefits and Costs (Discounted 2024$m)**: The second chart summarizes total *discounted* annual costs and benefits and provides a cumulative annual NPV. Note the cumulative NPV rises annually since the annual benefits are positive post-improvement; the breakeven point occurs when the cumulative NPV reaches zero – which does not happen for any of the six projects.

Annual Benefits and Costs by Type (Undiscounted)

[4] e.g., NPV < 0, BCR < 1.0, IRR < discount rate




Cumulative Annual Benefits and Costs (Discounted)

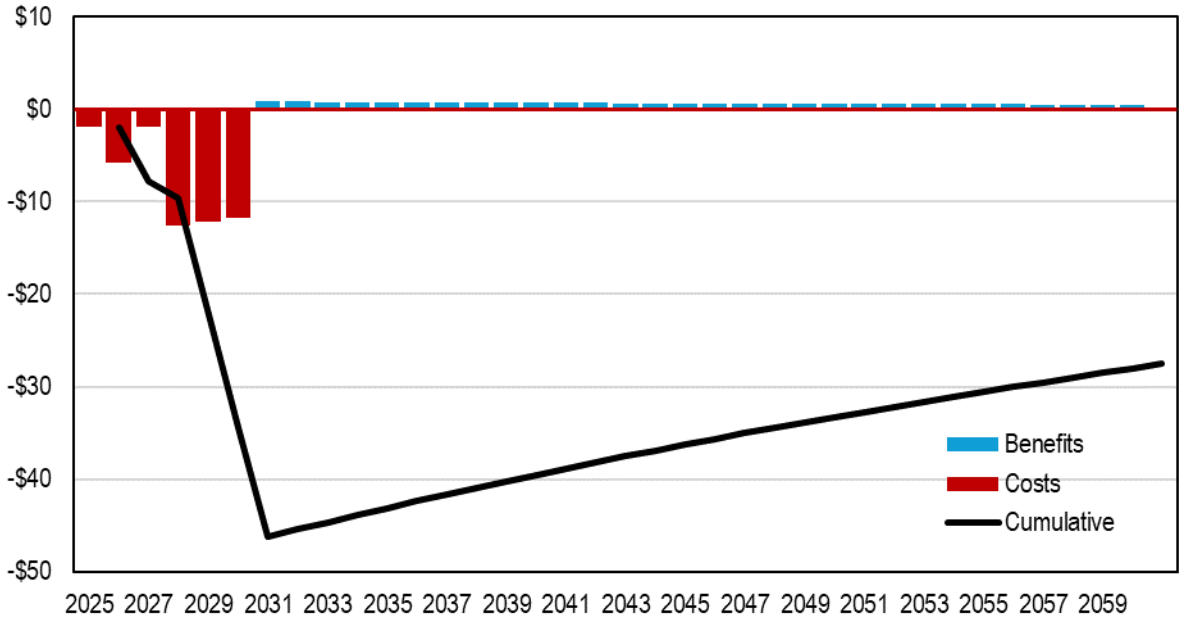
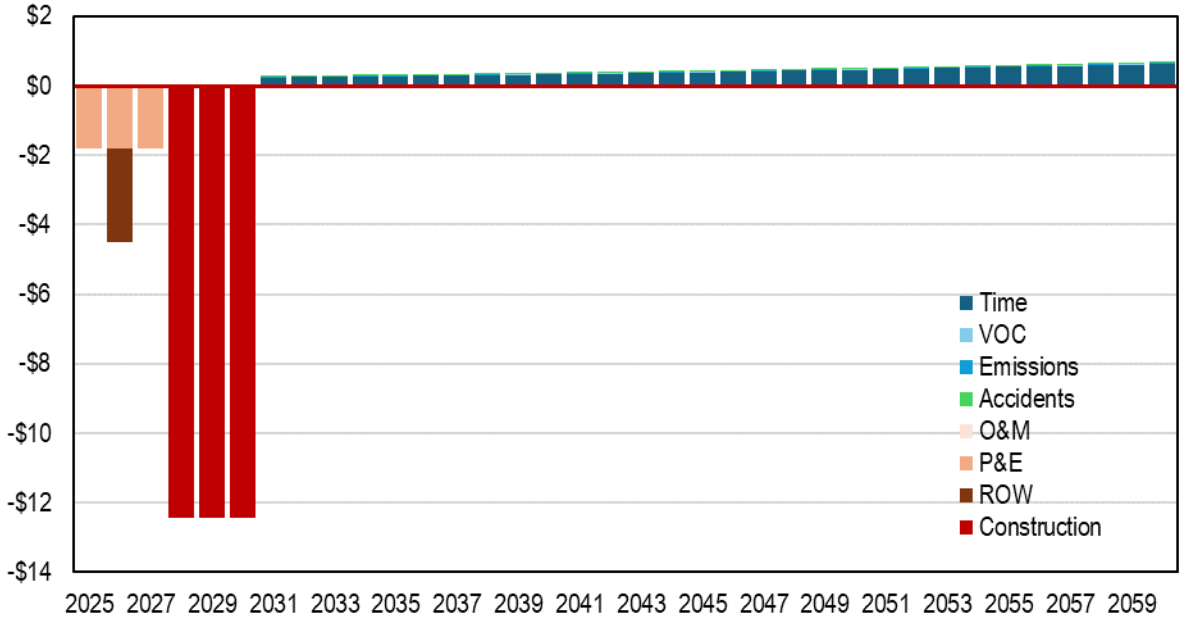



*Figure 3. Annual Benefits and Costs – North Eastern Street (2024 Dollars in Millions)*

Annual Benefits and Costs by Type (Undiscounted)




Cumulative Annual Benefits and Costs (Discounted)

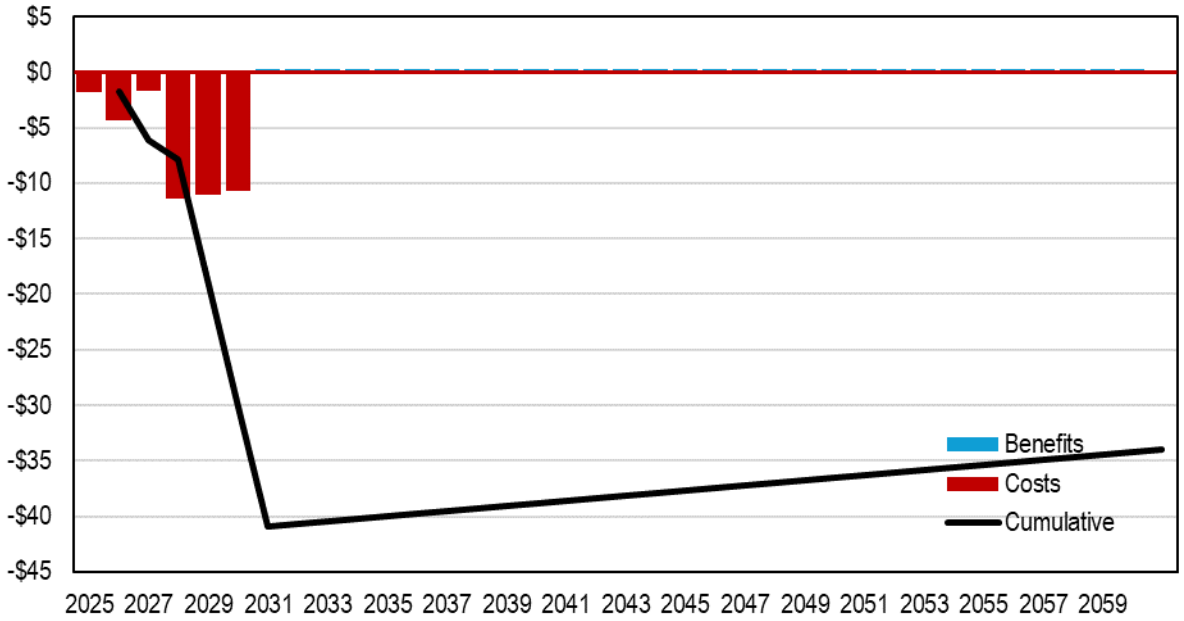
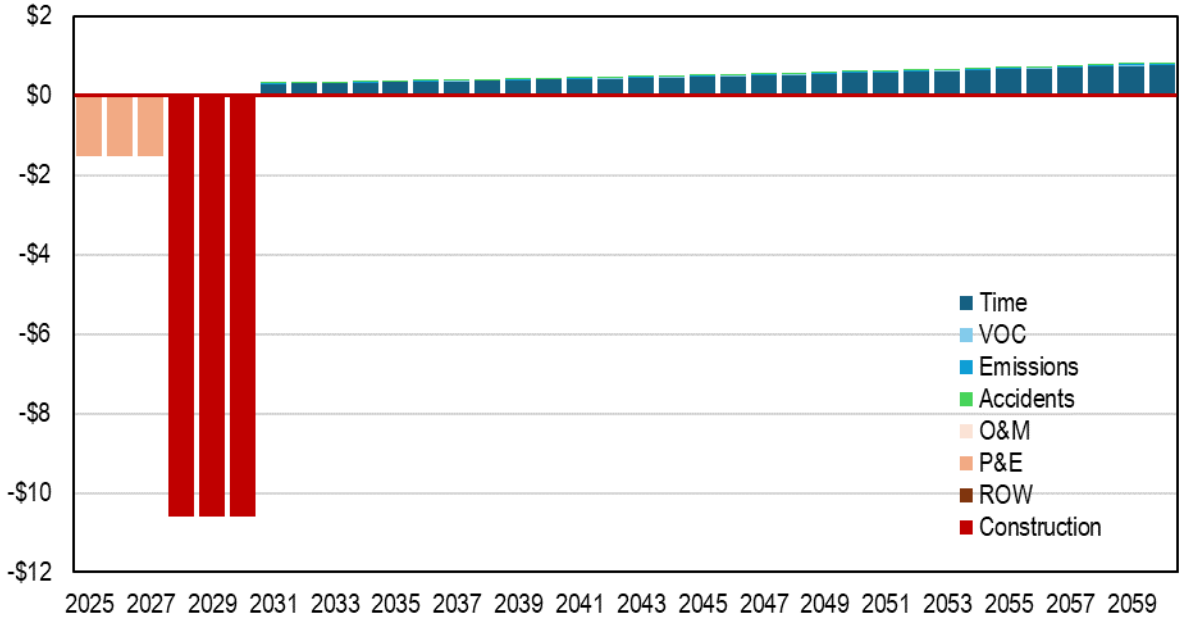



*Figure 4. Annual Benefits and Costs – East 46th Street (2024 Dollars in Millions)*

Annual Benefits and Costs by Type (Undiscounted)




Cumulative Annual Benefits and Costs (Discounted)

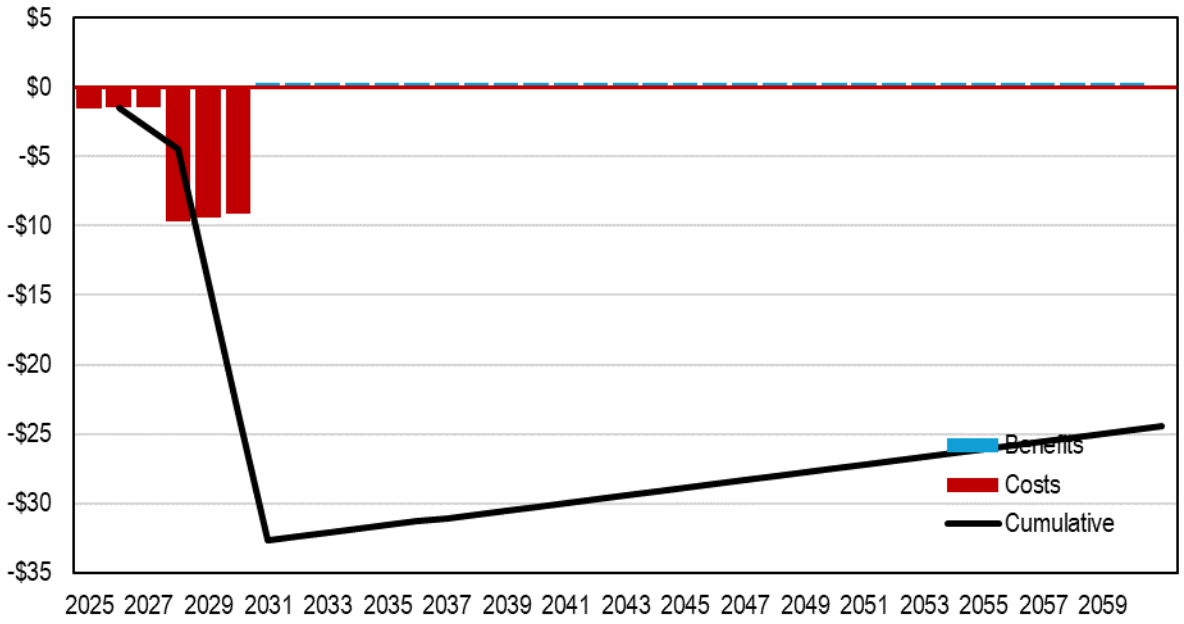
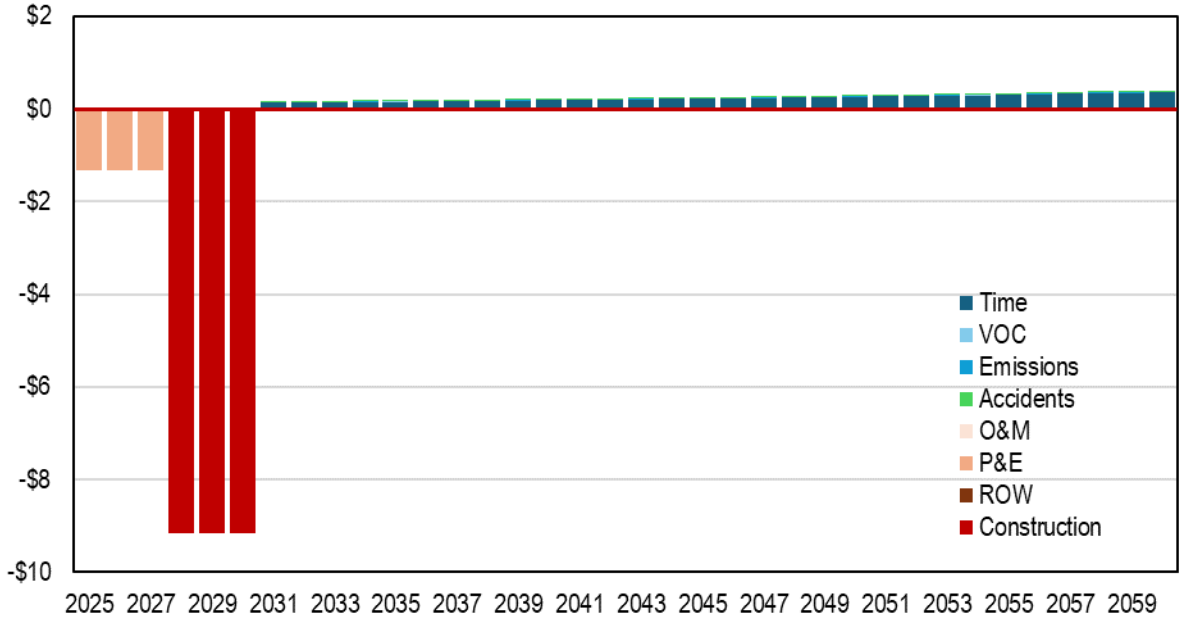



*Figure 5. Annual Benefits and Costs – Farmers Avenue (2024 Dollars in Millions)*

Annual Benefits and Costs by Type (Undiscounted)




Cumulative Annual Benefits and Costs (Discounted)

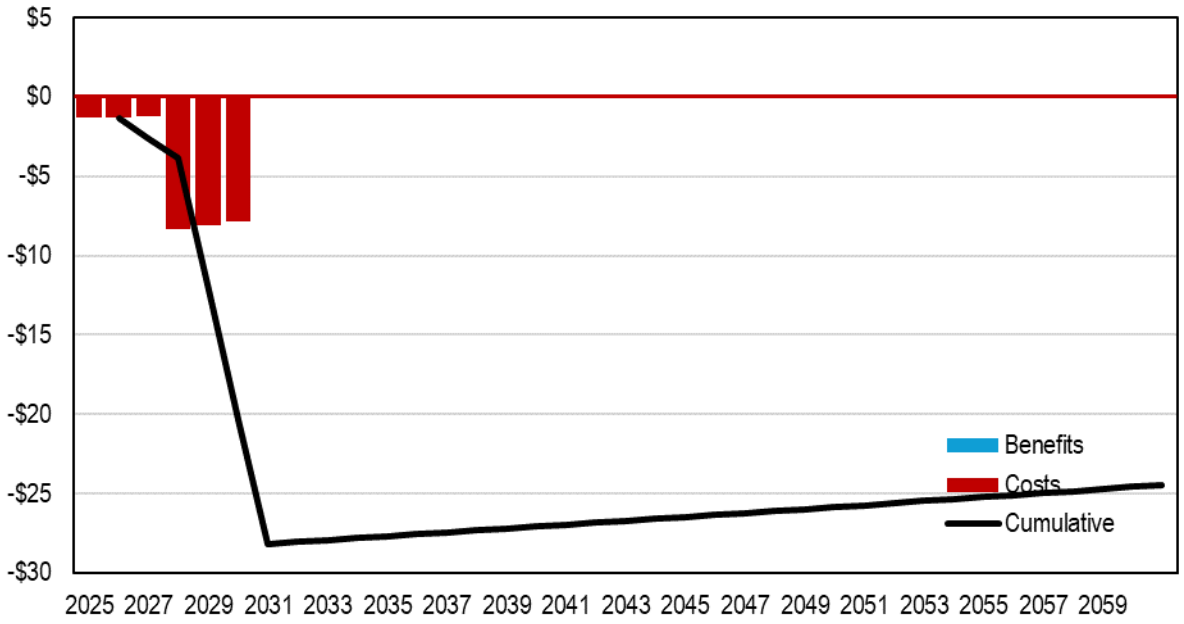
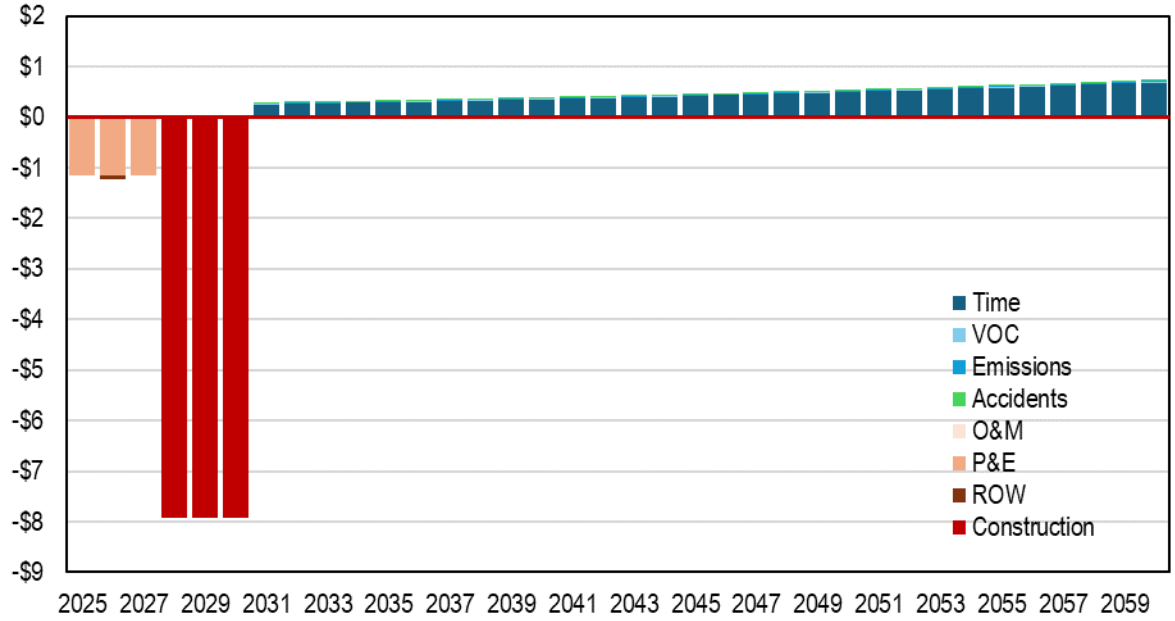



*Figure 6. Annual Benefits and Costs – Georgia Street (2024 Dollars in Millions)*

Annual Benefits and Costs by Type (Undiscounted)




Cumulative Annual Benefits and Costs (Discounted)

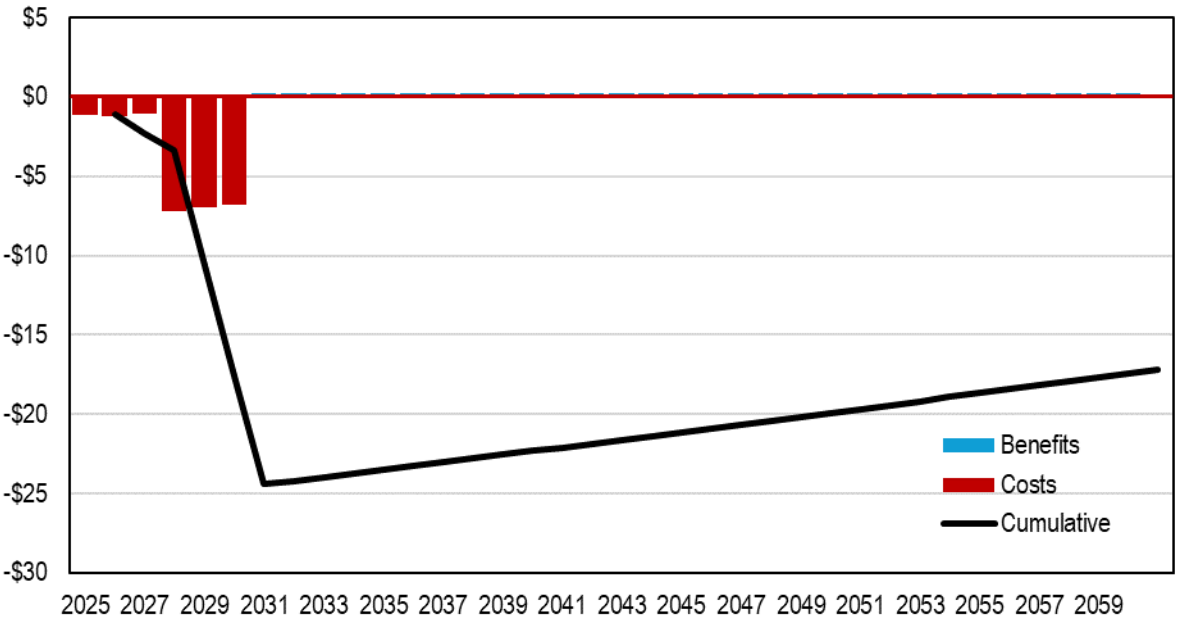
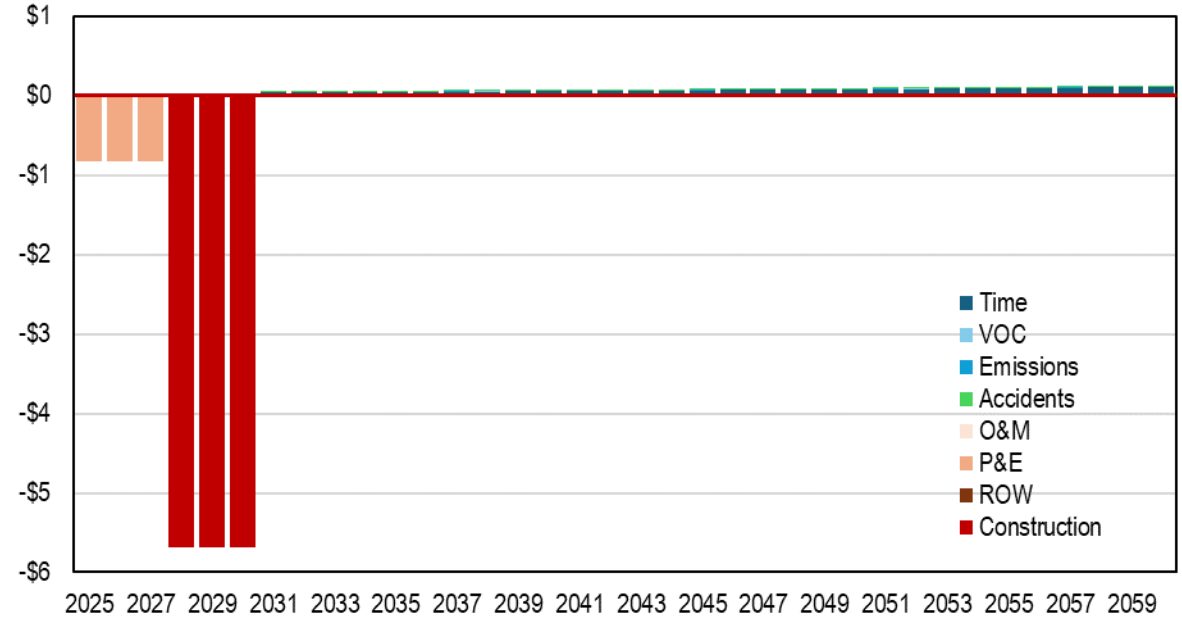



*Figure 7. Annual Benefits and Costs – McCormick Road (2024 Dollars in Millions)*

Annual Benefits and Costs by Type (Undiscounted)




Cumulative Annual Benefits and Costs (Discounted)

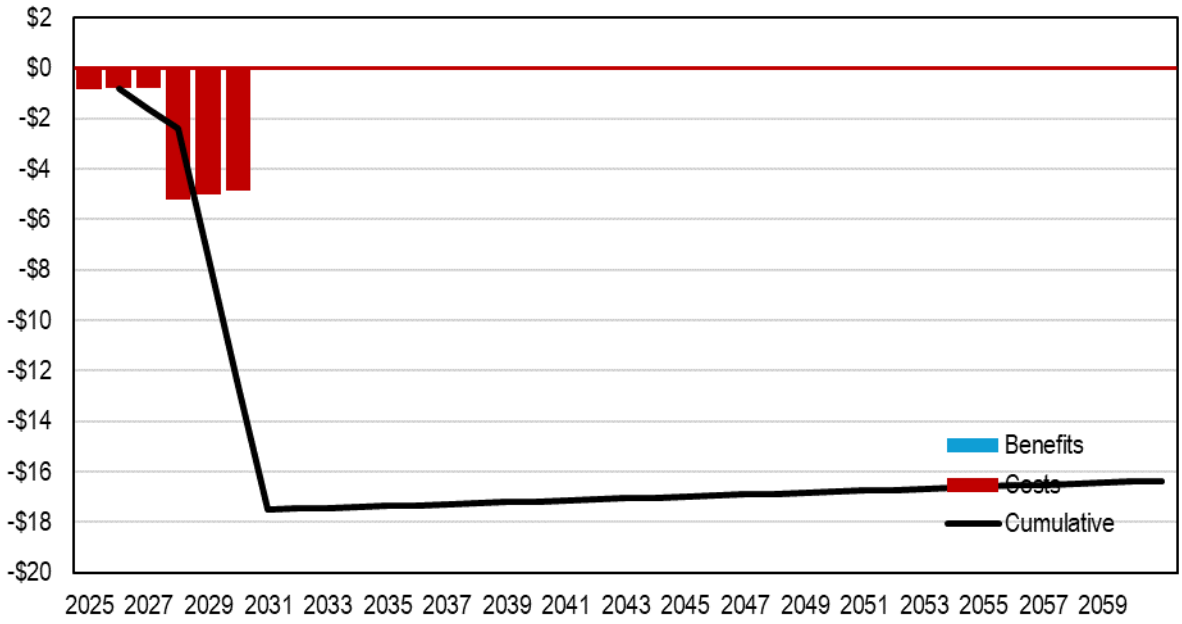



*Figure 8. Annual Benefits and Costs – Rockwell Road (2024 Dollars in Millions)*

## Breakeven Sensitivity Analysis

Lastly, a sensitivity analysis helps explain project feasibility under different scenarios/ assumptions. Two simple scenarios quantify the increased benefits or decreased costs required for each project to breakeven over the project life. Total benefit or cost value change (discounted 2024$) and percents are shown by project in **Table 7**, holding the other constant.[5] Graphically, the magnitude of additional benefits relative to those assessed are shown by project in **Figure 9**. Similarly, the magnitude of reduced costs are shown in **Figure 10**.

- **Value (NPV)**: Requisite benefit increase and/or cost decrease ranges from a low of $16.4m at Rockwell Road to a high of $34.0m at East 46th Street.
- **Robustness (BCR)**: The most robust project, North Eastern Street, requires a 147% benefit increase or a 60% cost decrease ($27.5m net change). Comparatively, the least robust project, Rockwell Road, requires a 1429% benefit increase or a 93% cost decrease ($16.4m net change) to breakeven.

## Conclusion

Six proposed grade-separation projects were evaluated for economic feasibility, based on available assumptions. Key takeaways include:

- Vehicular benefits from the grade separations, mostly in terms of travel time and accident savings, are insufficient to surpass the improvement costs.
- Relatively low traffic-user benefits compared to costs stem from multiple factors affecting estimated gate downtime (VHT delay), including assumed AADT, train speeds, train length, staging, etc.
- Generally, too few trains, traveling too quickly, and/or interfacing with relatively low AADT volumes generate insubstantial travel delay benefits to economically justify the comparatively high improvement costs.
- Additionally, accident prediction rates are relatively low with only one fatality for all crossings in the last year. Consequently, accident monetization is relatively minor, especially compared to $35.2m (on average) implementation costs.

The BCA conducted is one of several areas of 'feasibility' assessed for the six grade separation projects. Others include, engineering, environmental, funding, etc. While the BCA does not provide strong economic feasibility metrics, the project may warrant development for other reasons. Rather, the BCA results illustrate how traffic volume assumptions affect economic feasibility, key variables that affect benefits, and how the projects compare to one another.

[5] Reflects the required benefit increase if costs remained as estimated, or the required cost decrease if benefits remained as estimated. Both a benefit increase and a cost reduction could occur concurrently, with infinite combinations. Adjusting one while holding the other constant is done for illustrative purposes.

**Table 7. BCA Sensitivity – Additional Benefits or Reduced Costs (2024$m)**

| # | Street/Road | Additional Benefits | | Reduced Costs | |
|---|---|---|---|---|---|
| | | Amount | Percent | Amount | Percent |
| 1 | North Eastern Street | $27.5 | +147% | -$27.5 | -60% |
| 2 | East 46th Street | $34.0 | +494% | -$34.0 | -83% |
| 3 | Farmers Avenue | $24.5 | +300% | -$24.5 | -75% |
| 4 | Georgia Street | $24.5 | +658% | -$24.5 | -87% |
| 5 | McCormick Road | $17.2 | +238% | -$17.2 | -70% |
| 6 | Rockwell Road | $16.4 | +1429% | -$16.4 | -93% |

**Figure 9. Breakeven Analysis – Additional Benefit Requirements (2024$m)**

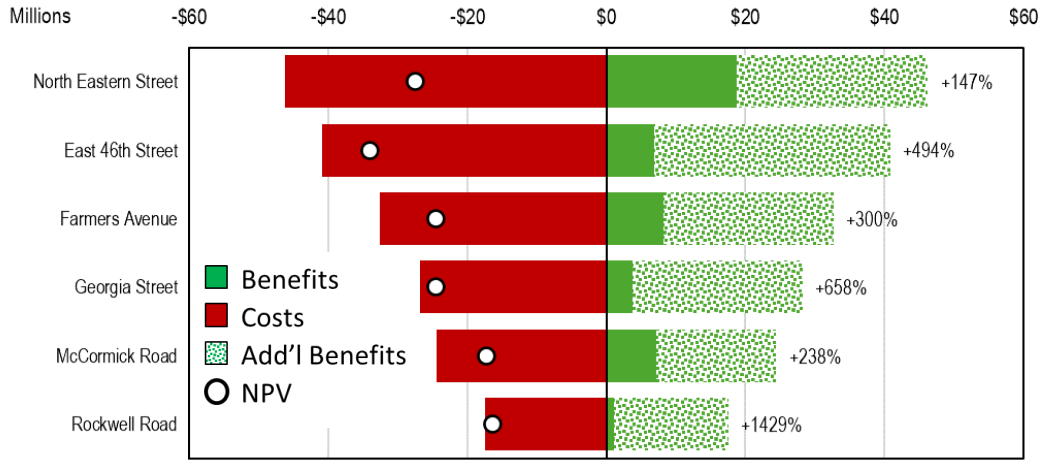



**Figure 10. Breakeven Analysis – Cost Reduction Requirements (2024$m)**