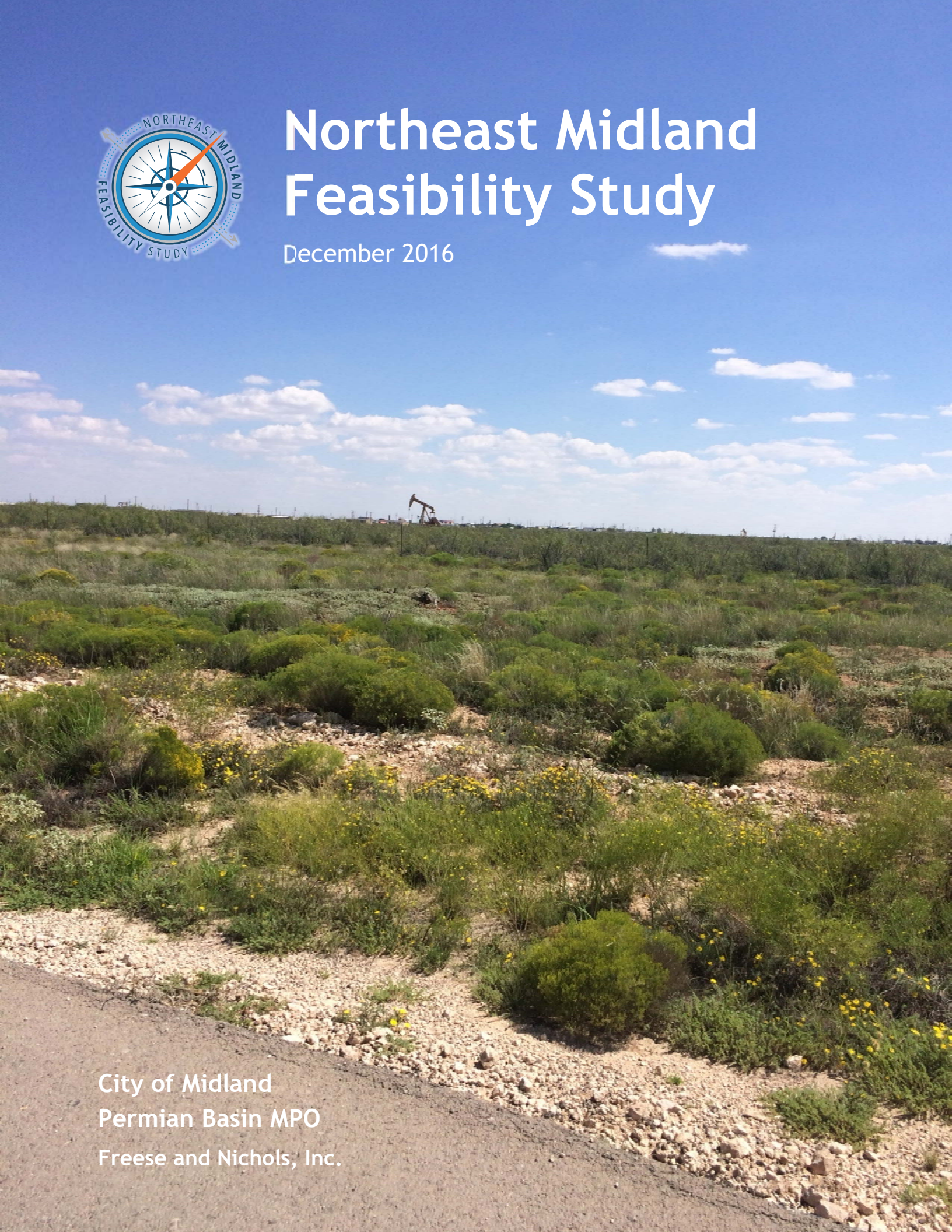

Northeast Midland Feasibility Study

December 2016

City of Midland
Permian Basin MPO
Freese and Nichols, Inc.

ACKNOWLEDGEMENTS

Many individuals provided knowledge, assistance, and insight throughout the process of developing this plan. The contributions of the following people are appreciated and helped to make this planning process and document possible:

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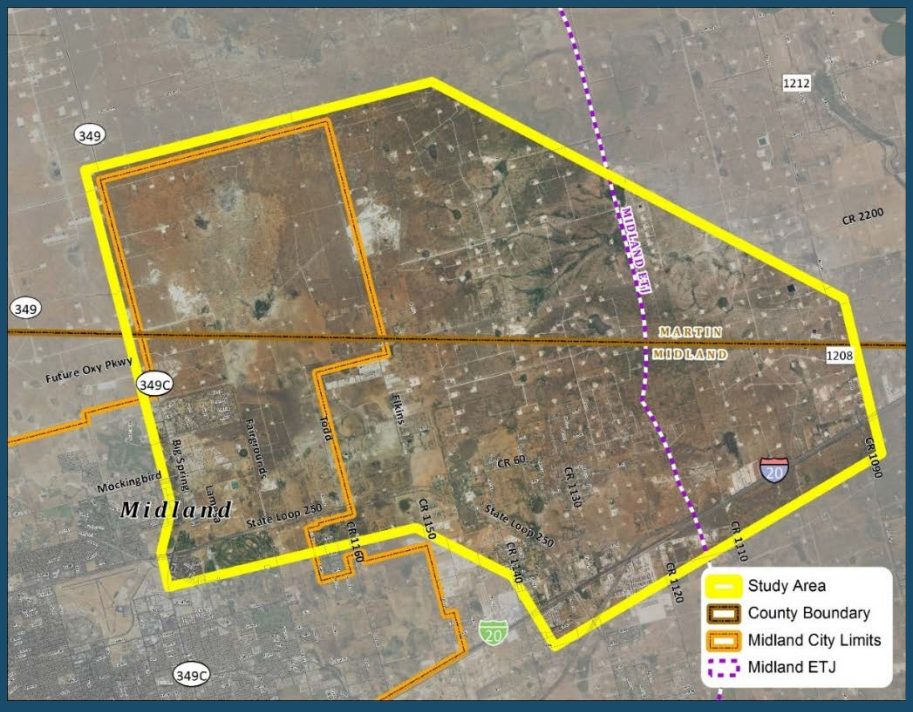
EXECUTIVE SUMMARY

Rapid growth in Midland and the Permian Basin region has caused the need for advanced planning of transportation in order to help define, protect, coordinate, and promote development in the most opportunistic areas. The Northeast Midland Feasibility Study was executed by the City of Midland and Permian Basin MPO to define both the local and regional transportation needs of Northeast Midland, identify environmental resources in the area that need protected, and create a common vision among the various stakeholders in the area. Using a collaborative and integrated approach to the planning process, environmental concerns and community and economic goals were identified to support transportation network development. Such a process helps to minimize social and environmental issues associated with the roadway network, enhances local agency and public support, and expedites the environmental review processes, which is often an ensuing critical path element for the development and implementation of major transportation investments.

Study Area and Context

The study area, as depicted below, for analyzing and identifying a transportation framework for the growth and development of Northeast Midland spans the City of Midland, Midland's extraterritorial jurisdiction (ETJ), Midland County, and Martin County. The area is generally bound by the Midland city limits and County Road (CR) 2600/Lazy Rand Road on the north, Farm-to-Market Road (FM) 1208 on the east, Interstate Highway (IH) 20, Business Interstate (BI) 20 and NE Loop 250 on the south, and State Highway (SH) 349/Big Spring Street on the west. Along the south, the study area extends an additional one-half mile to integrate the plan with existing plans for the roadway network within the city. A similar study area was taken along I-20 to consider appropriate network needs and connections for areas south of the BNSF railroad. This location's array of governmental jurisdiction reveals the need for coordination among the agencies and consideration of each entity to develop a common vision. The study area includes



the following: Midland city limits and ETJ; Midland and Martin Counties; Permian Basin MPO; Midland County Utility District; Texas Department of Transportation (TxDOT); and Midland, Martin, and Greenwood ISDs.

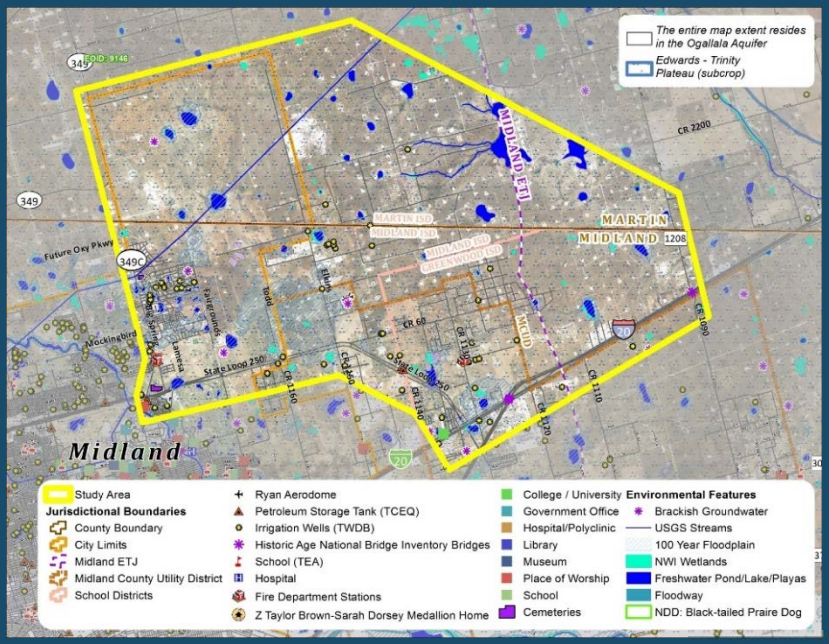
Major Influences in Study Area

- Regional Corridor Growth and Development (Loop 250, I-20, Ports to Plains/SH 349)
- Truck traffic and safety issues along Loop 250 and Big Spring Street
- Underdeveloped roadway network with connectivity and continuity gaps
- Railroad crossings in and near Midland
- Playas/open space, floodplains, drainage ways, and other potential environmentally sensitive areas
- Existing oil drilling and new Wolfcamp Shale exploration
- Utility and pipeline easements
- Caliche excavation operations
- Lack of water for land development
- Unregulated land use development in the county (outside City Limits)

Planning initiatives from these agencies all contribute to the context of Northeast Midland. Midland's Tall City Tomorrow comprehensive plan heavily influenced the land use and transportation planning process in the western sector of the study area due to the overlapping study extents. Regionally, the Permian Basin's Vision 2040 Metropolitan Transportation Plan and TxDOT's Transportation Improvement Program (TIP) were used to identify major transportation investments planned in the area. The federally significant Ports to Plains Corridor and La Entrada al Pacifico Corridor were other regional considerations influencing the transportation needs in Northeast Midland.

Study Area Conditions and Influences

A cursory assessment of the study area was conducted to gain an understanding of the issues and needs of the Northeast Midland study area. The physical constraints, including environmental resources, existing development, and existing infrastructure, combine with the political priorities of the area to impact the path toward continued development and implementation of a transportation network in Northeast Midland. A desire from both stakeholders and the public to complete existing regional assets, such as Loop 250, impacts the progress toward filling in connectivity gaps in the study area in addition to the limited funding availability for transportation infrastructure.



Project Visioning

A series of meetings were held throughout the study process to gain insight and input from stakeholders and the public. This included individual stakeholder interviews and a Town Hall meeting for initial input, a follow-up Town Hall meeting, and three Study Oversight Committee meetings schedule intermittently throughout the study. This engagement process led the project visioning to form a recommended need and purpose statement for further studies in the area as well as identify mobility goals and a vision statement.

Need and Purpose

Northeast Midland is currently experiencing substantial growth due to the proximity to amenities within the City of Midland but lacks the necessary internal and external transportation access to support continued development. The purpose of the project is to define a local roadway network and potential regional/freight corridors from the subarea network for future evaluation which will serve to support the development of a safe, effective, and efficient transportation system for all users. This system would serve to improve safety by routing trucks off of local serving roadways and onto a major mobility corridor and would provide a framework and unified vision for future development in the area.

Mobility Goals

- Transportation Mobility
- Improved Connectivity
- Land Use Compatibililty
- Environmental Resilience
- Economic Development
- Encourage Quality Development

Vision

The definition and implementation of a transportation network that will preserve the community character and support orderly growth of high quality development while providing for the safe and efficient travel of all users through a highly connected network of streets and roads.

Land Use and Transportation Planning

To identify the potential transportation needs of the area, conceptual land planning was conducted to assist in defining a possible scenario of future land uses. This concept is intended as a guide for transportation planning rather than as an official Future Land Use Plan, like that of a comprehensive plan. Using existing conditions, past planning efforts, and a visioning process that involves city staff and stakeholders, a land use concept was selected as the anticipated future conditions of the area.

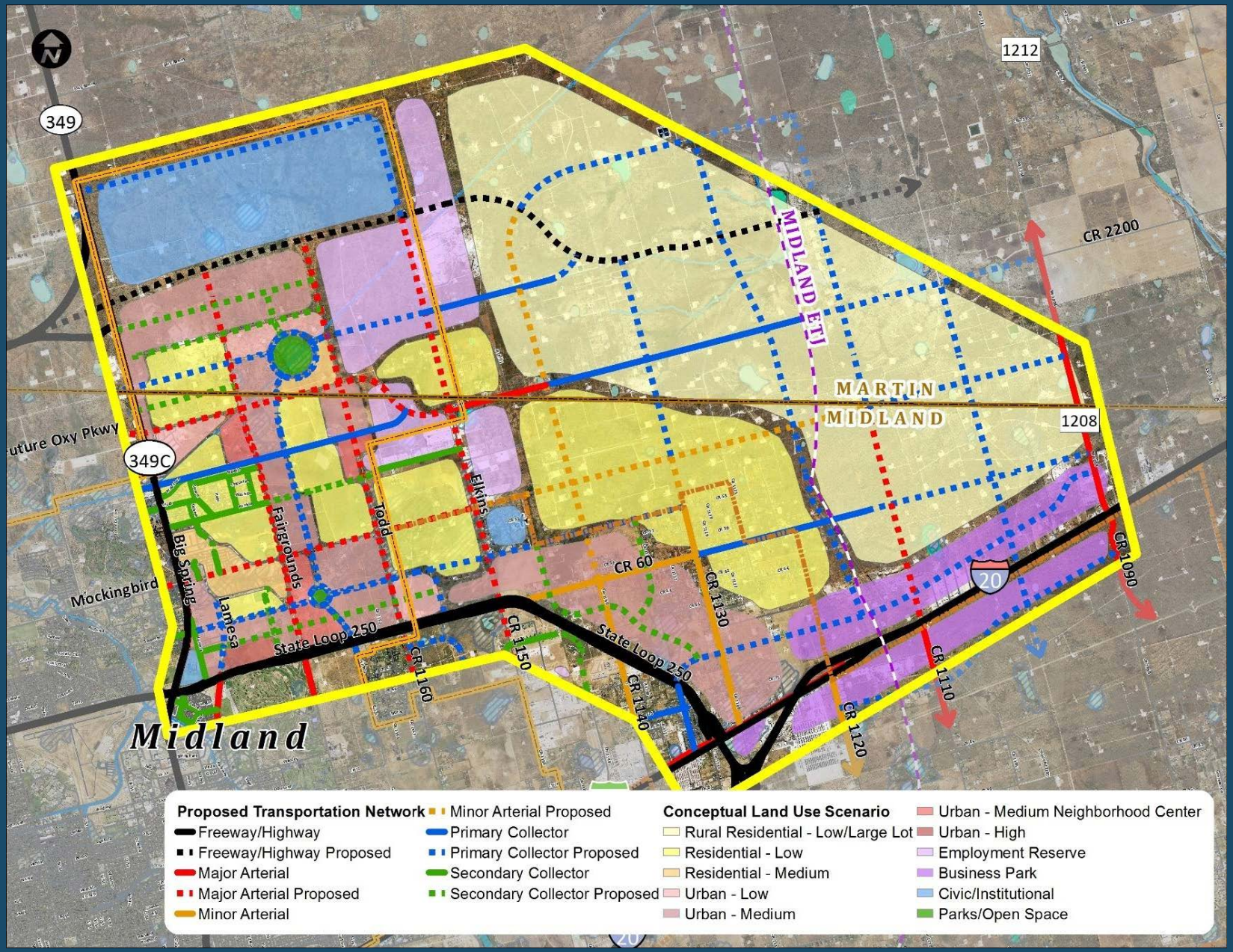
Using this land use concept, a support transportation network was developed consisting of collector, arterial, and highway facilities. The Tall City Tomorrow Plan provided the foundation for defining this network which was extended into Midland's ETJ and Midland and Martin Counties. A network of arterials and collectors decreasing in intensity away from Loop 250 mimicking the corresponding land use intensity

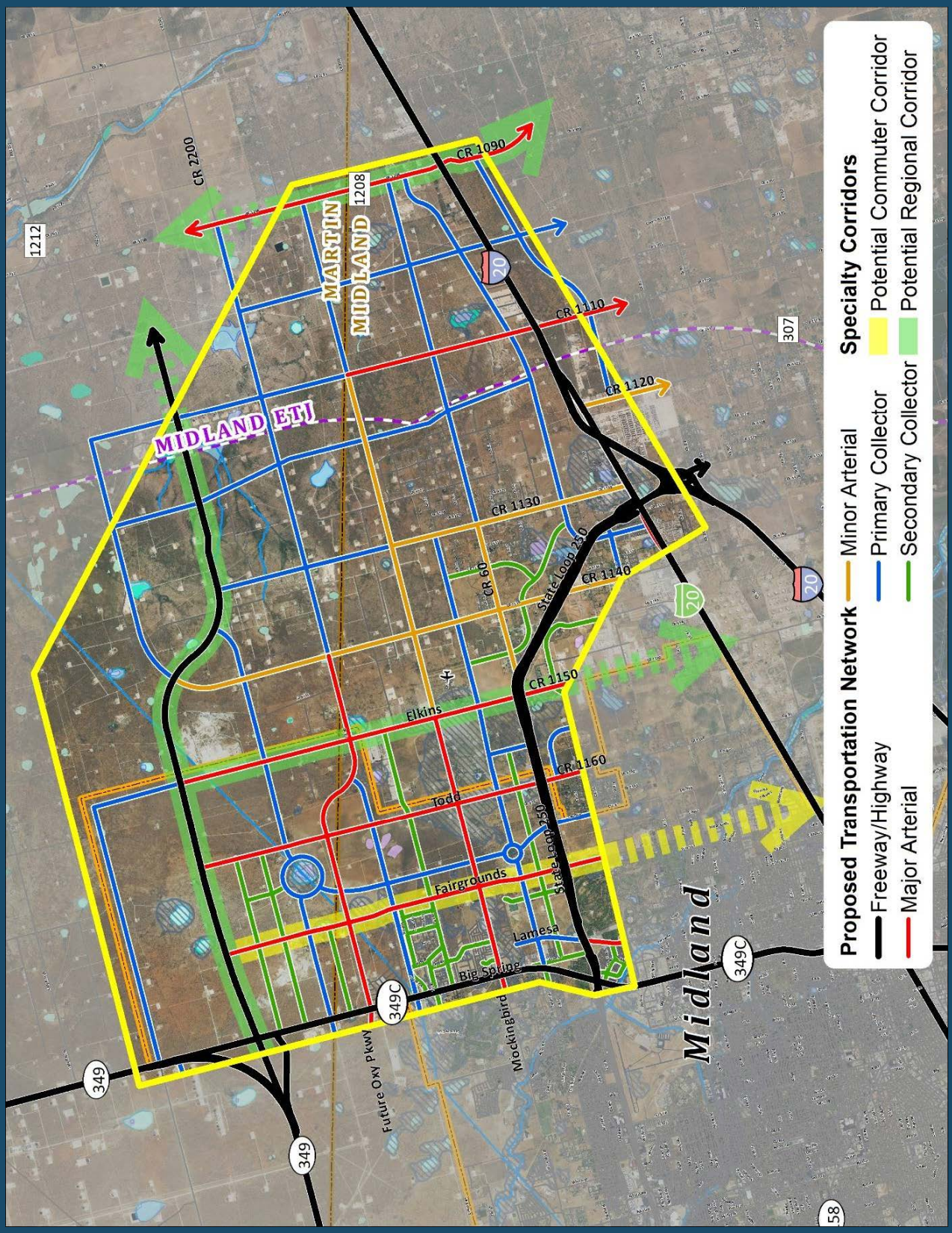
as the landscape becomes more rural, and is expected to remain similarly rural in the future, further away from Loop 250 and into Martin County.

Regional needs of the area were also considered in this process to help provide relief routes to the existing regional facilities in the area. Two specialty corridor types were created to identify corridors with the potential to serve a greater purpose.

- Commuter Corridor: Intended to serve vehicular mobility in addition to accommodations for other non-motorized transportation modes to create transportation choice and connections to area neighborhoods.
- Regional Corridor: Intended to support the larger regional movement and potential trucking travel patterns in Northeast Midland.

The land use concept, transportation network, and multimodal specialty corridors are shown in the maps on the following pages.


1212
349
CR 2200
MIDLAND ETJ
MARTIN
MIDLAND
1208
uture Oxy Pkwy
349C
Elkins
Fairgrounds
Todd
Big Spring
Lamesa
Mockingbird
CR 60
CR 1130
CR1090
20
State Loop 250
CR 1150
CR 1160
CR 1140
CR 1110
CR 1120
Midland
Proposed Transportation Network
Freeway/Highway
Freeway/Highway Proposed
Major Arterial
Major Arterial Proposed
Minor Arterial
Minor Arterial Proposed
Primary Collector
Primary Collector Proposed
Secondary Collector
Secondary Collector Proposed
Conceptual Land Use Scenario
Rural Residential - Low/Large Lot
Residential - Low
Residential - Medium
Urban - Low
Urban - Medium
Urban - Medium Neighborhood Center
Urban - High
Employment Reserve
Business Park
Civic/Institutional
Parks/Open Space


Proposed Transportation Network
Freeway/Highway
Major Arterial
Minor Arterial
Primary Collector
Secondary Collector
Specialty Corridors
Potential Commuter Corridor
Potential Regional Corridor
MIDLAND ETJ
MARTIN
MIDLAND
CR 1090
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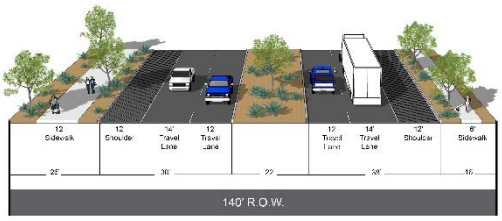
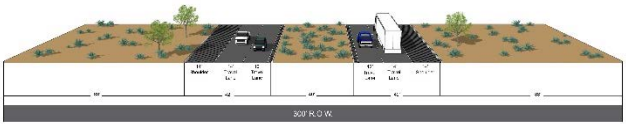
CR 1120
CR 1130
CR 1140
CR 1150
CR 1160
CR 2200
1212
1208
307
CR 60
State Loop 250
Elkins
Todd
Fairgrounds
Lamesa
Big Spring
Mockingbird
Future Oxy Pkwy
Midland
349
349C
20
58

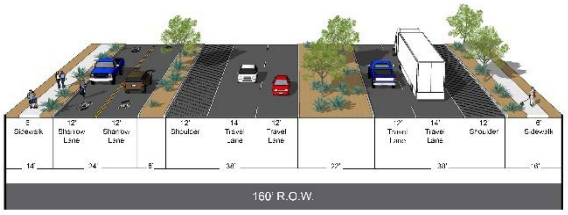
Within these multimodal specialty corridors, potential roadway sections were developed accentuating the main purpose of the corridors. These sections, shown below, provide a general right-of-way envelope for future studies and discussion of dedications as the area continues to develop.

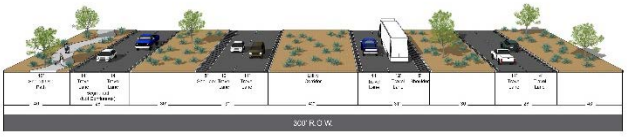
General approval was received on the land use concept, transportation network, and specialty corridor designations and sections from the Study Oversight Committee and the Public at a Town Hall Meeting held in October 2016.

REGIONAL CORRIDOR

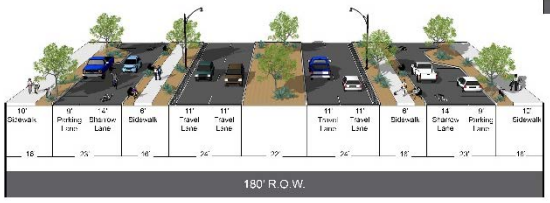


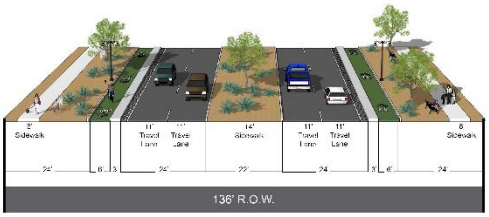


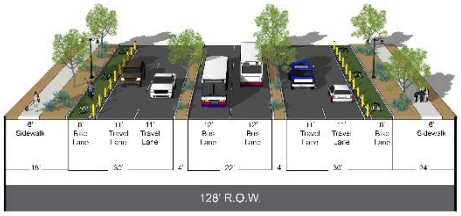




COMMUTER CORRIDOR







Implementation Strategies

The development of the transportation network in Northeast Midland will require coordination of activities from a variety of agencies with an eye towards achieving the described long-range vision. Coordinated planning at the city, county, and regional levels will be key to sequentially implementing local and regional segments of the system. With implementation likely occurring over a lengthy timeframe, decision-making regarding transportation will need to be at the forefront in addition to other considerations involving land use and development. Corridor and access management will be key to preserving/promoting mobility, safety, and land access of the thoroughfare network. Transportation investments that are operationally well managed will also leverage economic and community benefit.

Most of the corridors defined in the transportation network will be implemented through the subdivision process as administered by the City and Midland and Martin Counties and may require independent or coordinated action between agencies or others, including TxDOT or the Permian Basin MPO. In any effect, coordinated agency action will leverage network implementation from both a time and cost savings perspective.

Next steps for projects identified as part of this study include classification for environmental documentation and movement into the NEPA process for those projects with any state or federal funding. The environmental documentation, public engagement, and visioning process of this study support the continued development of these projects in addition to the guidance on navigating these regulatory tools for implementing projects contained herein.

Contents

CHAPTER 1: INTRODUCTION

Rapid growth in Midland and the Permian Basin region as a whole necessitates advanced planning of transportation in order to help define, protect, coordinate, and promote development in the most opportunistic areas. As growth and development move outward toward northeast Midland, the City of Midland and Permian Basin Metropolitan Planning Organization (MPO), that is responsible for long-range regional transportation planning, determined that a corridor planning approach for the northeastern sector of Midland was needed to help define transportation needs, protect environmental resources, and create a common vision among the various stakeholders of the area. With the ongoing investment and opportunity in oil and gas, the Midland economy is bustling with activity and this region is emerging as a key area for growth and development. As this area continues to grow, it will be necessary to ensure that development be coordinated, compatible and ultimately in the best interest of all parties, including residents, future residents, commercial interests, developers, and land owners. This can be best achieved by creating a unified vision of what growth should look like and what local and regional transportation needs will be needed to successfully guide future development of the area.

The Northeast Midland Feasibility Study uses a collaborative and integrated approach to the planning process for considering both locally and regionally important transportation initiatives. Planning and environmental linkages are identified early in the transportation planning process, when decision-makers consider environmental concerns as well as community and economic goals and carry them forward through thoroughfare network development processes. Such a process minimizes social and environmental issues associated with the roadway network, enhances local agency and public support, and expedites the environmental review processes, which is often an ensuing critical path element for major transportation investments.

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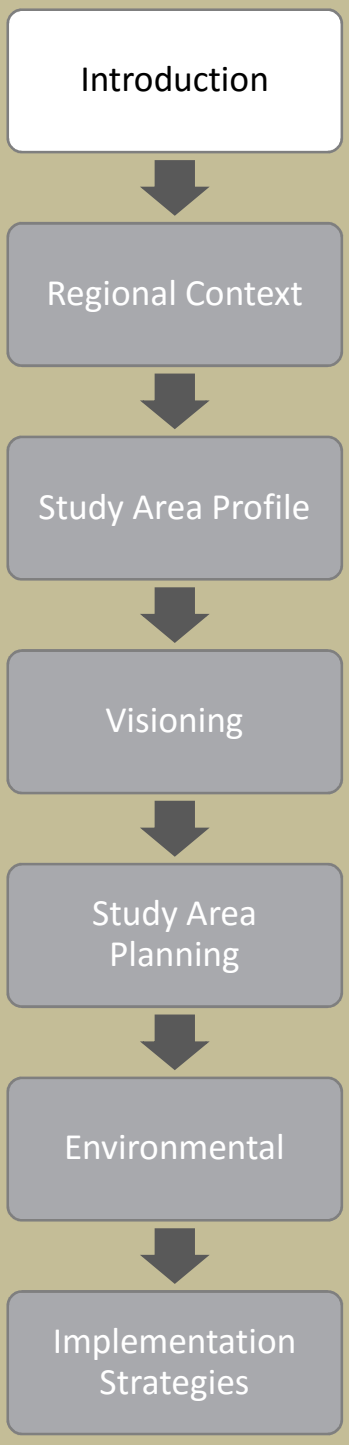

In the past, transportation system planning and environmental analysis activities were often carried out independently. This resulted in many of the steps carried out in the planning process being repeated during development of environmental documentation leading to the development of transportation facilities that were not always the best fit for the communities of which they were a part. The utilization of collaborative planning with an eye toward environmental implications enables major transportation projects to be delivered more efficiently, by improving inter-agency communication, and to be more effective in serving the community's transportation needs.

This feasibility study is aimed at determining high level transportation needs for the local study area with an eye toward potential regional considerations. A public input process, which supported study team and stakeholder input, dictated that local area transportation and circulation was equally critical to defining a roadway network that would effectively serve this emerging area of the city.

Study Area

The study area, as depicted in **Figure 1**, for analyzing and identifying a transportation framework for the future in Northeast Midland spans the City of Midland, Midland's extraterritorial jurisdiction (ETJ), Midland County, and Martin County. The area is generally bound by the Midland city limits and County Road (CR) 2600/Lazy Rand Road on the north, Farm-to-Market Road (FM) 1208 on the east, Interstate

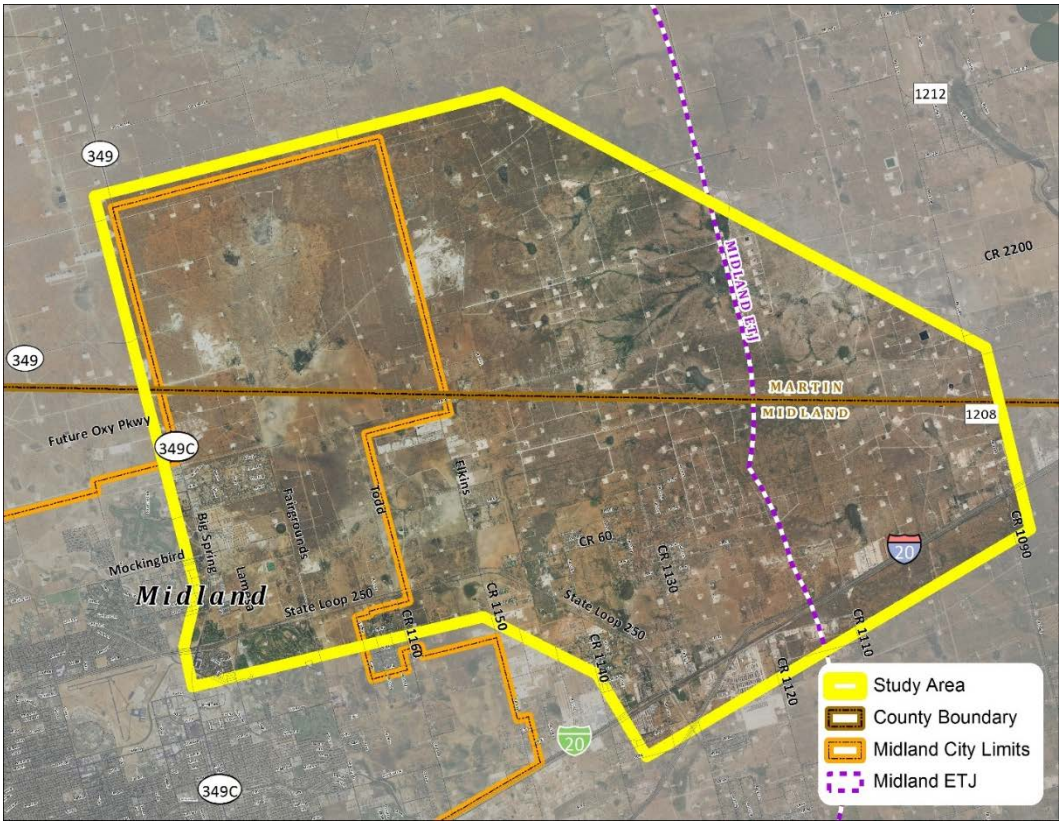

Figure 1: Study Area

Highway (IH) 20, Business Interstate (BI) 20 and NE Loop 250 on the south, and State Highway (SH) 349/Big Spring Street on the west. Along the south, the study area extends an additional one-half mile in order to integrate the plan with existing plans for the roadway network within the city. A similar study area was taken along I-20 in order to consider appropriate network needs and connections for areas south of the BNSF railroad. The study area is largely rural with disconnected roadways tying into NE Loop 250. Recent residential development has been occurring adjacent to Big Spring Street and Loop 250 while industrial development has been occurring along Elkins Road. Outside of these defined corridors, development becomes more rural with scattered residential developments and dwelling units. The study area consists of approximately 33,700 acres (52.6 square miles), broken out by jurisdiction below that, based on citywide growth projections, is anticipated to experience significant growth in coming years.

Entity	**Acreage**	**Percentage**
City of Midland	10,100	30.0%
Midland ETJ	17,000	50.4%
Midland County	9,300	--
Martin County	7,700	--
Outside ETJ	6,600	19.6%
Midland County	4,100	--
Martin County	2,500	--
Total	**33,700**	**100.0%**

Within the study area, the planning process examined existing land use, existing and planned developments, environmental constraints that might be present, and thoroughfare and highway plans from the Texas Department of Transportation (TxDOT), the Permian Basin MPO, the City of Midland, Midland and Martin Counties. Information with regard to documented environmental constraints was obtained from published agency databases and resources. Different land use and thoroughfare scenarios were developed as part of the planning process. Study Oversight Committee (SOC) input assisted the planning team in defining a recommended scenario for further study and analysis. Recommended land uses for the study area were generalized in nature, therefore requiring additional studies in the future as development continues. Additionally, the planning of transportation corridors in this study are an initial step in directing the implementation of the needed infrastructure, but more detailed planning and programming of the transportation corridors will also be required.

CHAPTER 2: REGIONAL CONTEXT

The study area's geographical location across multiple governmental jurisdictions necessitates the coordination and consideration of each entity. This includes the City of Midland, Midland and Martin County, the Permian Basin MPO, and TxDOT. The planning, funding, and implementation of various projects by these entities impacts the future development of Northeast Midland. This overlap of jurisdictions should also be utilized to help implement vital infrastructure by combining and leveraging resources.

In addition to the governmental overlap of Northeast Midland, the study area serves a regional significance in providing movement between the major oil and gas fields in the Permian Basin. Multiple regional corridors also impact the development and economic vitality of Northeast Midland, including SH 349, Loop 250, and I-20.

These corridors and the plans of associated governmental entities must be considered in the planning for development and infrastructure in the future of Northeast Midland.

Relevant Planning Studies

Tall City Tomorrow

The City of Midland adopted a new comprehensive plan, Tall City Tomorrow, in July 2016. With an eye toward a shared vision for the City, future land use decisions, and the future transportation system, Tall City Tomorrow incorporated the input of the City's citizens and community leaders. This planning effort encompassed the city limits of Midland with land use and transportation planning extending to Elkins Road on the east and an extension of Craddick Highway on the north.

Tall City Tomorrow's land use planning was driven by nine land use and development principle s that were used for land use decision making, including:

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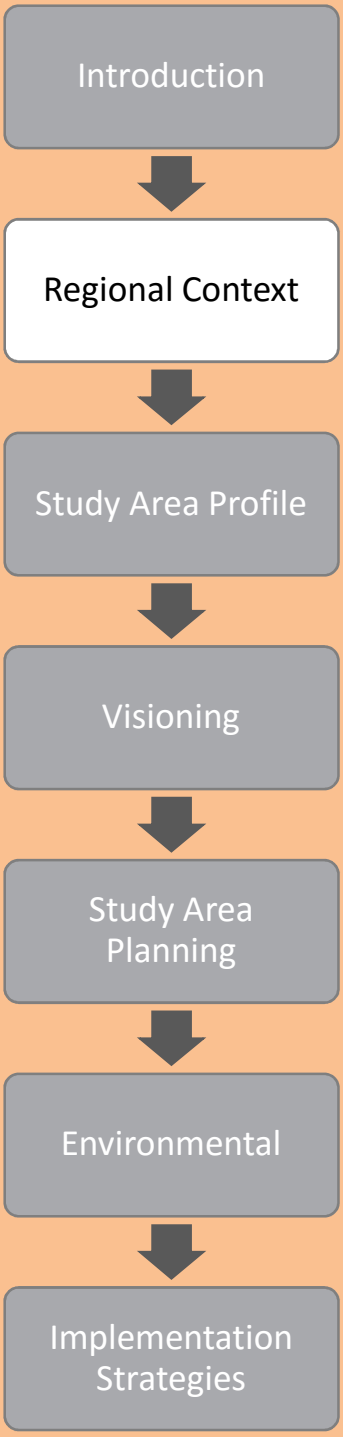


1. Development should be contiguous and fiscally responsible.
2. Policies and decisions should support appropriate infill development.
3. Development will preserve draws and flood zones.
4. Land use policies and regulations should support diverse housing choices.
5. Plan for community amenities such as parks and schools.
6. Development and redevelopment should be built around a continuous transportation system that incorporates all types of transportation.
7. Land use decisions should not detract from public safety and should minimize hazards.
8. Land use policies and regulations should create and support balanced neighborhoods.
9. Make decisions in a transparent and collaborative manner.

Using these principles, a future land use plan and future land needs for the City were determined, as seen in the following figure and table.

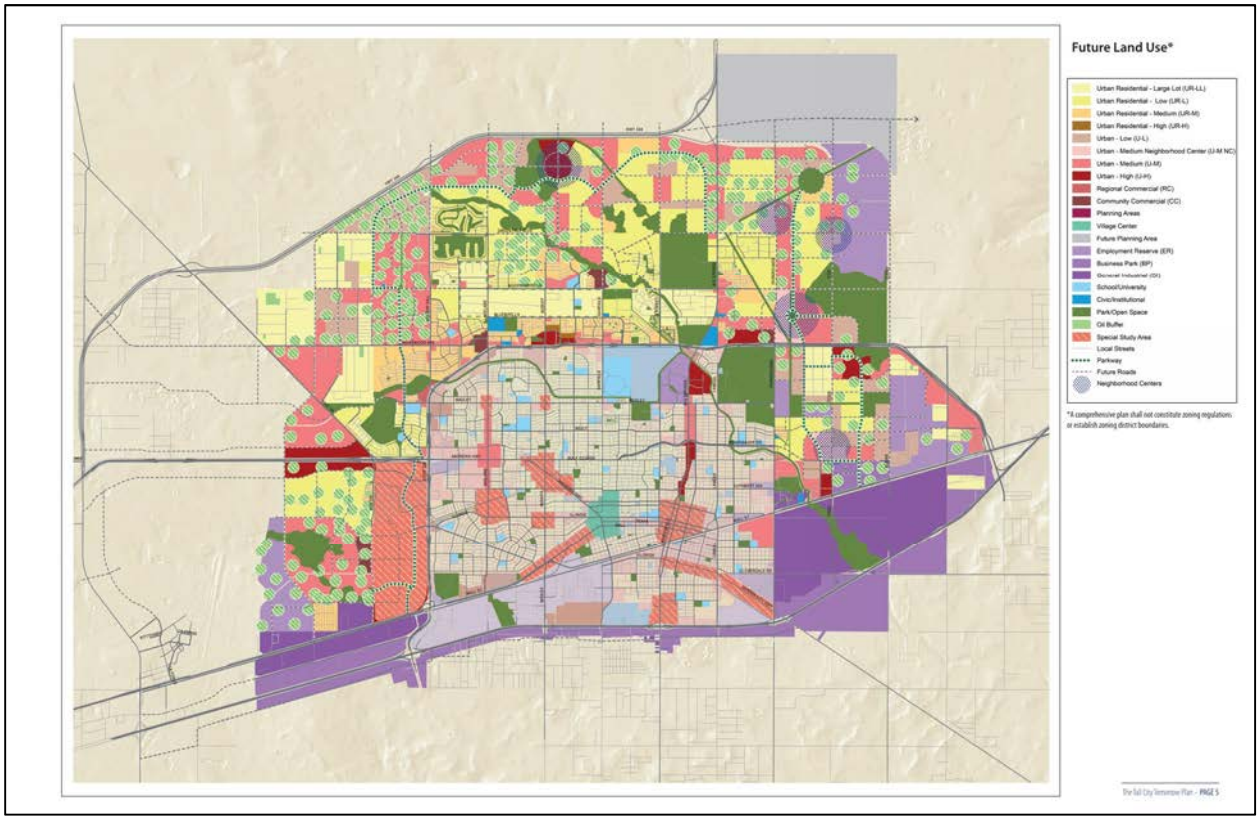
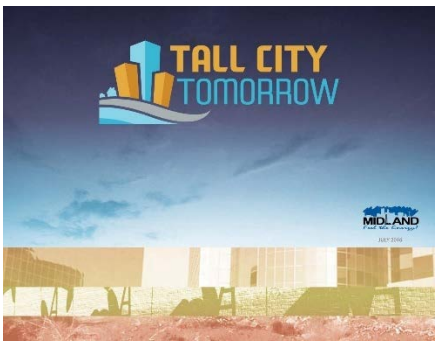


Figure 2: Tall City Tomorrow Future Land Use Plan

Table 1: Future Land Needs: 2015-2035

Land Use Type	Projected Need (Acres)	Acres Designated for Planning Purposes
Residential	2,700	5,400
Commercial	425-450	640-675
Industrial	270-285	810-855



Tall City Tomorrow's transportation planning effort was integrated with land use planning to produce a cohesive plan for the entire city. Within the study area, the area west of Elkins and south of a Craddick Highway extension were included in the City's planning study. The transportation piece of the comprehensive plan was guided by the following goals:

1. Develop a future transportation network that will support desirable patterns of community development.
2. Provide a transportation system that is safe, convenient, and offers a variety of interconnected modes.
3. Connect Midland's neighborhoods and community destinations with a trail system that will provide a safe and healthy transportation alternative.
4. Ensure that Midland's transportation system is adequate to meet the demands placed upon it.

This plan's multimodal approach included initiatives for the various components, including roadway thoroughfares, the bicycle and pedestrian system, and the transit system. A map of the future roadways is shown below.

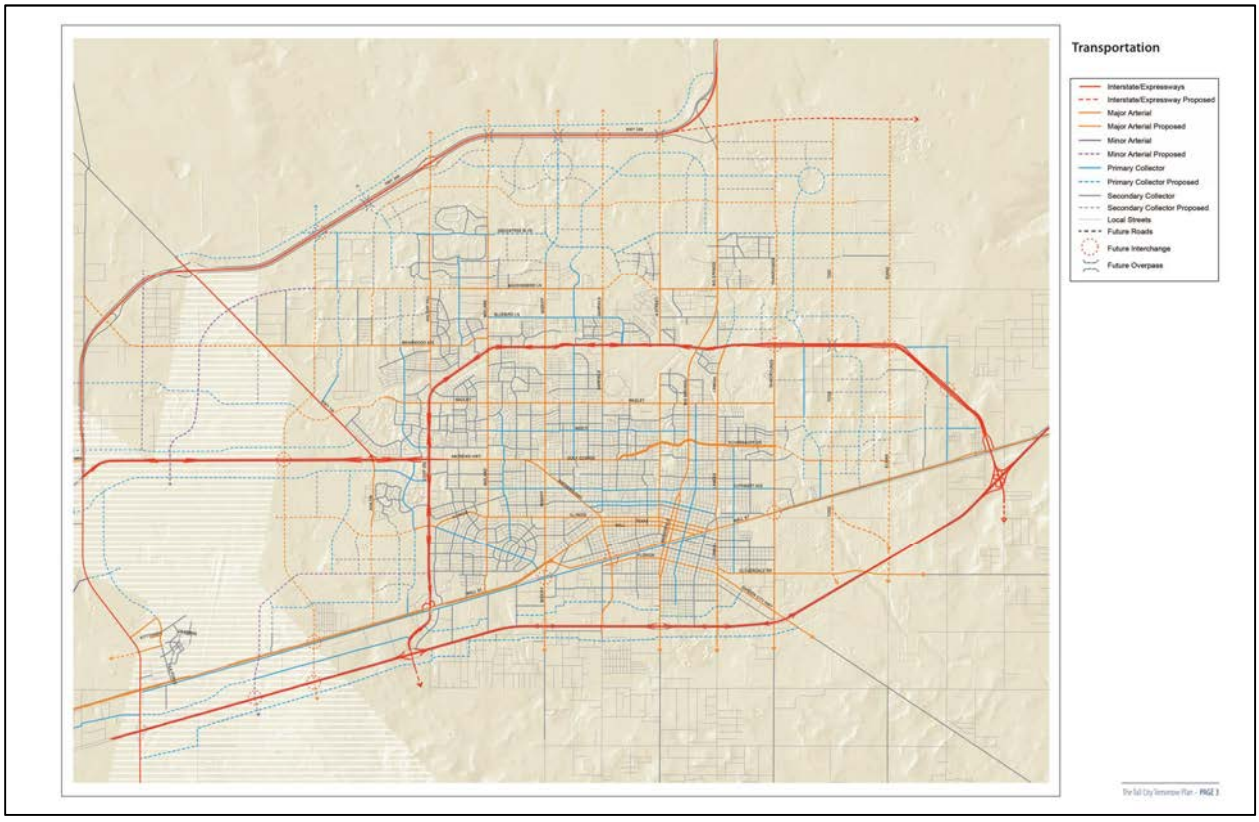
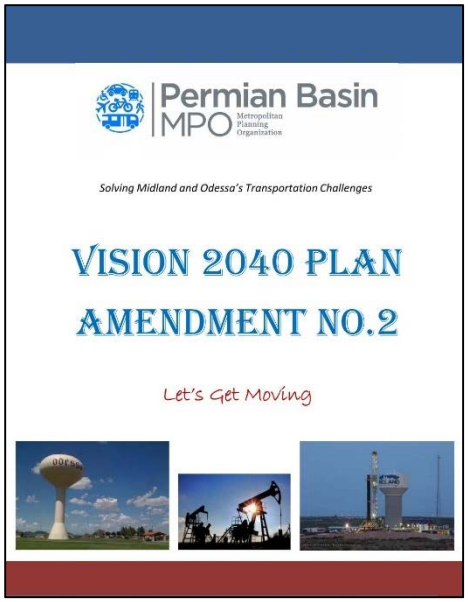


Figure 3: Tall City Tomorrow Future Roads Map

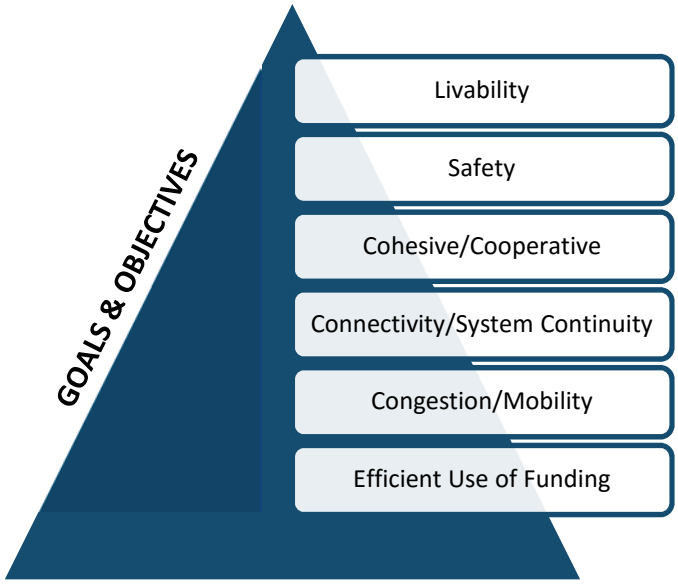


Permian Basin Vision 2040: Metropolitan Transportation Plan

The Permian Basin MPO serves the Midland-Odessa region as a federally mandated, quasi-governmental agency responsible for coordination transportation planning, establishing planning policies, and programming approved construction funding in urbanized areas with populations over 50,000, all within a defined urban boundary. As the region's planning organization, the Vision 2040 Plan: Metropolitan Transportation Plan (MTP) Update, originally adopted in November 2014 with amendments in 2015, identifies policies, programs, and projects for each mode of transportation that will be necessary to meet the region's transportation needs through 2040. It is the guide for major transportation improvements and investments in the Midland-Odessa region for the next 25 years, including a prioritization of future transportation programs and projects as well as available funding resources and funds.

"To develop a sustainable multimodal transportation system that meets the future needs of all users."
– Vision 2040 Vision Statement

The Vision 2040 Plan outlines the historical, demographics, employment and transportation context in the region leading to development scenarios which inform the planning and transportation decision-making process. The following entities participated and ensured the effectiveness of the Vision 2040 Plan: the City of Midland, City of Odessa, Midland, Martin, and Ector Counties, TxDOT – Odessa District, and Midland Odessa Urban Transit District (MOUTD). In addition to the background profile of the region, the key goals and objectives, as shown below, help guide the planning and programming of projects in Vision 2040 in various modes, including the road system, transit, bicycle and pedestrian, air and rail, and freight transportation. Finally, the plan outlines a financial plan with project listings for the next 25 years. These projects will be discussed further in later sections.



I-20 Permian Basin Corridor Study

In addition to the Vision 2040 Plan by the Permian Basin MPO, the I-20 Permian Basin Corridor Study is underway by the MPO evaluating the current safety and capacity needs along the approximate 40-mile stretch through the Midland-Odessa area. Included in this is the piece of I-20 within this study's area located between East Loop 250 and FM 1208.

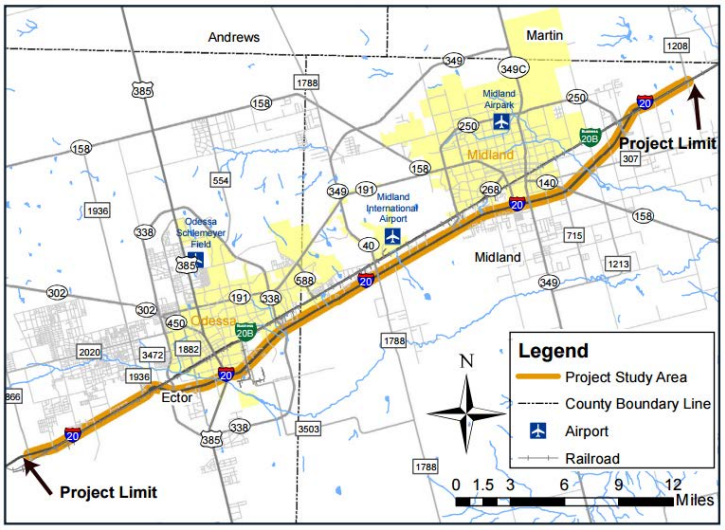


Figure 4: I-20 Corridor Study Project Limits
(Source: I-20 Study Presentation, June 2016)

This I-20 Corridor Study informs the transportation accessibility and economic opportunities Northeast Midland can see in the future along I-20. As I-20 serves as an important east-west connection for travel and trade in West Texas, transportation needs and alternatives are being assessed in this study to determine the necessary modernizations needed for the corridor. The study is considering the impacts to I-20 by the area's growth, safety issues revealed through increased crash frequency over the last few years, system connectivity and accessibility to I-20, and I-20's accommodations for the significant frequency of oversized freight vehicles. In Northeast Midland, the access points to I-20 at East Loop 250 and FM 1208 are being assessed in the I-20 Corridor Study.

> *"Develop a multimodal corridor plan that improves mobility and safety, enhances the region's economic opportunities and maintains infrastructure assets."*
> *– I-20 Corridor Study Purpose and Need*

Transportation Improvement Program

The Transportation Improvement Program (TIP), developed by the Permian Basin MPO working cooperatively with its member agencies, is a short-range planning document that will coordinate the transportation projects of the region with urban area needs. The TIP identifies improvements recommended for advancement during the four-year period and helps position the projects for Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and TxDOT funding. These projects are also identified in the MPO's MTP, Vision 2040, but are selected for near-term implementation.

The MPO's TIP is also incorporated into the TxDOT – Odessa District's Statewide Transportation Improvement Program (STIP). All of these projects in the TIP and STIP are required to have financial plans

that reflect "year of expenditure dollars" for revenue and project cost estimates to fully comply with all federal requirements included in the Moving Ahead for Progress in the 21st Century Act (MAP-21). These costs and project timelines inform near-term projects that are expected to affect Northeast Midland.

Figure 5: Ports-to-Plains Corridor

Ports to Plains / La Entrada Regional Studies

Ports-to-Plains Corridor

The Ports-to-Plains Corridor, a 2,300-plus mile highway system, stretches from Laredo through West Texas, the Panhandle, Denver, Colorado, and ultimately, to Alberta, Canada. The corridor, designated as a High Priority Corridor by Congress in 1998, facilitates efficient transportation of goods and services from Mexico through West Texas, Oklahoma, New Mexico, Colorado, and ultimately into Canada and the Pacific Northwest. As identified by TxDOT, the corridor has the potential to, reduce congestion at ports of entry along the Texas-Mexico border; provide travel alternatives to the state's most congested corridors located through major metropolitan areas; provide alternatives to other congested corridors that run through major metropolitan areas; and help to increase trade between the U.S., Mexico, and Canada.

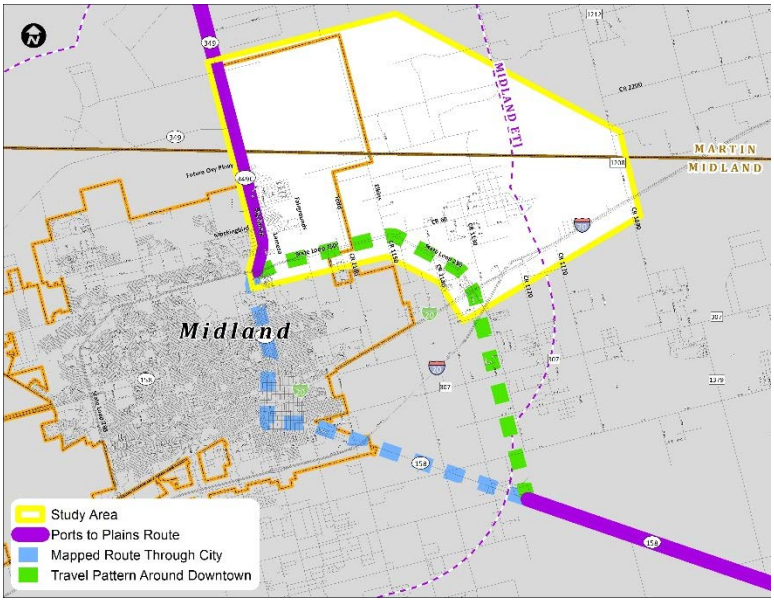


Figure 6: Ports to Plains Travel Pattern Around Downtown

In the Permian Basin region, the corridor travels from Sterling City along SH 158 into the heart of Midland and then travels north along SH 349 into Lamesa. The denser development and congestion in downtown Midland hinders travel through this area, so the more realistic travel path for freight on

Figure 7: La Entrada Corridor
(Source: Texas Observer, 2007)

this corridor bypasses the city on east following Loop 250 around to SH 349 north of Midland, as shown in Figure 6. This travel pattern and expected growth of the corridor, as identified in TxDOT's 2015 Initial Assessment Report on the Extension of I-27/Ports-to-Plains Corridor, will affect the regional transportation needs and significance of Northeast Midland. The potential extension of I-27 into Midland would also be a game-changer for the regional considerations for Northeast Midland.

La Entrada al Pacifico Corridor

The La Entrada al Pacifico Corridor, another High Priority Corridor on the National Highway System, travels from the Pacific Ocean at the port of Topolobampo in Mexico to Lamesa, north of Midland. It serves as an economic corridor, like Ports-to-Plains, connecting goods and services between the western coast of Mexico and the thriving energy industry in West Texas.

The alignment of this corridor from southwest to northeast results in minimal impact to Northeast Midland. Following I-20 in Odessa, the La Entrada Corridor then travels north on FM 1788 adjacent to the Midland International Air & Space Port, then finally following SH 349 around the northwest side of Midland and north to Lamesa. The tangential nature of this corridor to the Northeast Midland study area indicates the future development of it should be considered in planning for the needs along SH 349 and the major intersections on SH 349, but travel through Northeast Midland connected to this corridor is expected to be minimal.

SUMMARY

GOVERNMENTAL AGENCIES

City of Midland
Midland County
Martin County
Permian Basin MPO
TxDOT – Odessa District

RELEVANT PLANNING DOCUMENTS

Tall City Tomorrow
Vision 2040 MTP
I-20 Corridor Study
TIP/STIP
Ports-to-Plains Corridor
La Entrada Corridor

CHAPTER 3: STUDY AREA PROFILE

A cursory assessment of the study area was conducted to gain an initial understanding of the issues and needs of the Northeast Midland planning area. As a response to public and stakeholder input, a focus on the area west of Elkins and the area neighboring Loop 250 within the study area was determined to be the main concern for the planning process. A detailed assessment of the focused study area was conducted as a follow-up to the initial assessment to gain a better understanding of the issues and needs in this area. Items evaluated include: existing land use, demographics, influences on future development, private development initiatives, current traffic conditions, committed transportation improvements, and a cursory assessment of environmental factors within the study area.

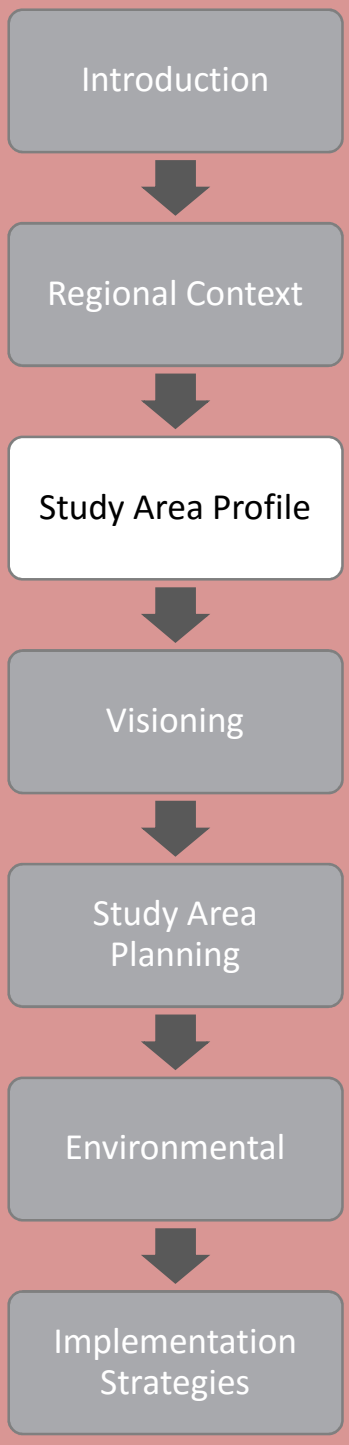
The framework for development of the majority of the focus area is established through the transportation system and policies contained in the City of Midland's Tall City Tomorrow comprehensive plan as this area lies mainly within the city limits. The remaining portion of the study area lies in Midland and Martin County and lacks a comprehensive transportation plan or policies for future growth.

Current Focus Area Conditions and Influences

A range of external factors exist that stand to influence development within the focus study area. Many of these factors are outside the immediate confines of the corridors in the study area, but they impact the way development can occur within the area which frames the mobility needs for the area. Some of these influences/issues include:

- Regional corridor growth and development;
  - Expansion of Loop 250 (safety/accidents)
  - IH 20 Improvements/Study
  - Ports to Plains Corridor
- Constraints of railroad crossings in and near Midland;

Chapter Guide



- Environmental stewardship in dealing with adjacent playas/open space, floodplains, and drainage ways;
- Oil drilling/operations and their impact on transportation and land use planning;
- Utility and pipeline easements both public and oilfield related – land not used for oil wells is still impacted by collection lines, tank batteries and injection wells, all of which impact future development;
- Caliche excavation operations;
- Provision of water for land development;
- Development in the county (outside City Limits).

Population and Employment Demographics

The study area is divided between the City of Midland, Midland extraterritorial jurisdiction (ETJ), Midland County, and Martin County. Approximately 18,200 acres of the study area are located within Midland County and 15,500 acres are located within Martin County. While the majority of the study area lies outside Midland city limits, much of the remaining area is consumed within the Midland ETJ.

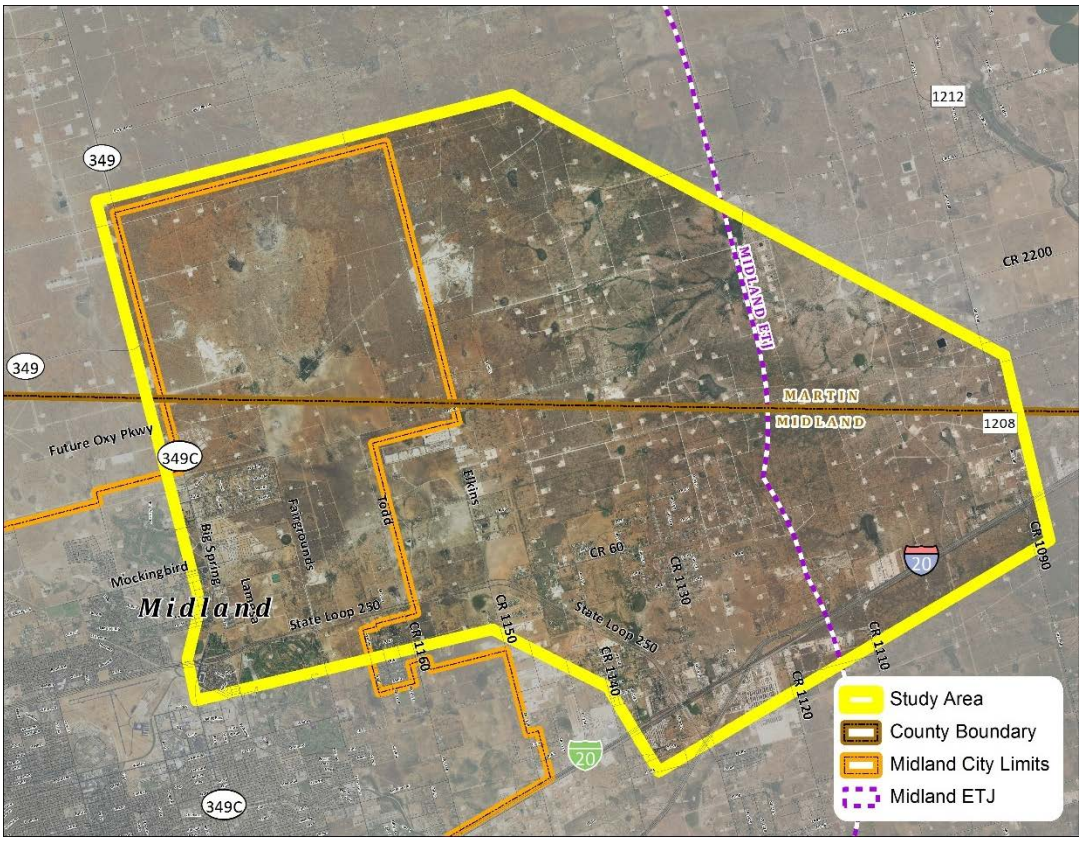


Figure 8: Jurisdictional Boundaries

The populations of the City of Midland and of Midland County have increased dramatically over the past 40 years, and this trend is expected to continue. U. S. Census Bureau (USCB) data indicate that from 1990

to 2010, the population of the City of Midland grew from 89,443 to 111,147 persons, an increase of 24.3 percent, and the population of Midland County grew from 106,611 to 136,872 persons, an increase of 28.4 percent. In addition, the population of the City of Midland is projected to increase to 153,566 persons by 2040, an increase of 38.2 percent over the 2010 population, and the population of Midland County is projected to grow to 191,665 persons, an increase of 40.0 percent (Texas Water Development Board - TWDB, 2016, 2017). Meanwhile, the population of Martin County has remained relatively stable around 4,800 to 4,900 persons with minimal net growth projected by 2040. Census data of 2010 population and population density in the study area are shown in Figure 9 and Figure 10, respectively.

Table 2: Population Demographic Trends

	Population				Compound Annual Growth Rate		
	1990[1]	**2010[1]**	**2016[2]**	**2040[3]**	**1990-2010**	**2010-2016**	**2010-2040**
City of Midland	89,443	111,147	129,841	153,566	1.1%	2.6%	1.1 %
Midland County	106,611	136,872	-	191,665	1.3%	-	1.1%
Martin County	4,956	4,799	-	6,382	-0.2%	-	1.0%

[1]Source: U.S. Census Bureau

[2]Source: Midland Economic Development Corporation, June 2016

[3]Source: Texas Water Development Board, 2016

The most recent estimates of population in the City of Midland indicate these 2040 projections from the TWDB will be exceeded if the growth rates from the past six years continue in the future. Due to the proximity of the northeast region to amenities within the City of Midland, much of this growth could be captured by the project area. Forecasted growth in the petroleum industry and the continued employment diversification in the region into other industries, including aerospace, will allow the area to maintain strong growth patterns in both the workforce and population.

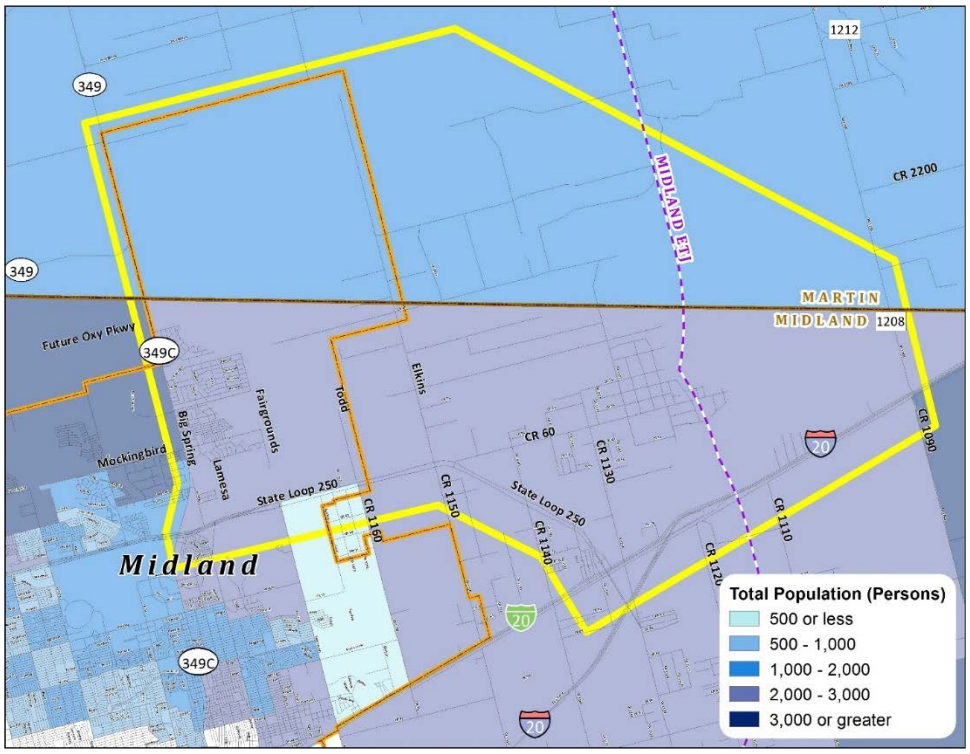


Figure 9: Total Population

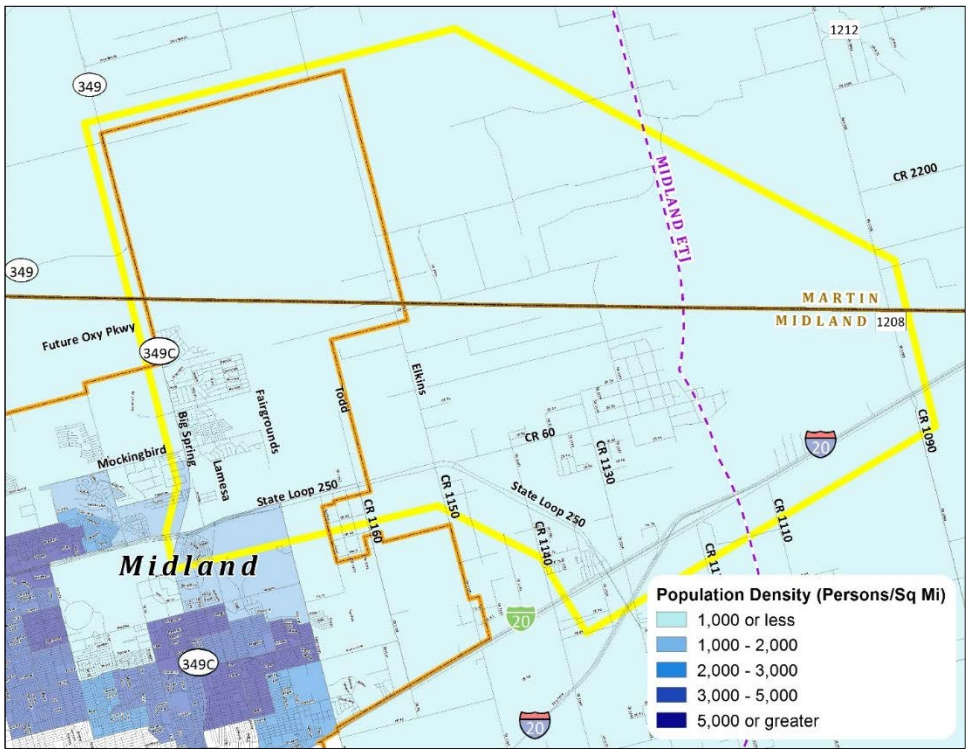


Figure 10: Population Density

The past and present population growth in the City of Midland is an indicator of economic growth as well. This growth will translate to increases in tax revenues, local income levels, local business revenues and other factors. This is indicated by the employment trends in Midland. From 2000 to 2010, employment in the City of Midland grew from 42,552 to 52,604, an increase of over 24 percent. During the same period, the number of housing units in Midland is estimated to have grown from 39,855 units to 44,708 units, an increase of 12 percent (USCB, 2000, 2010).

Since the 1920s, the City of Midland has been the influential center for the petroleum industry in the Permian Basin and in the United States. Ranching and agriculture, health care, retirement, and transportation also serve as major economic industries in Midland. In addition to these existing industries, the City also expects growth in new economically important areas, including aerospace.

Northeast Midland offers opportunity for the anticipated economic development and growth of the area. The largely undeveloped area outside of Loop 250 suffers from the lack of transportation infrastructure to support and stimulate economic growth in this area. The area also suffers from the limited availability of dedicated water sources for development. The provision of water from the City of Midland or the Midland County Utility District (MidCUD) would help stimulate this growth, but transportation mobility is still lacking in the area.

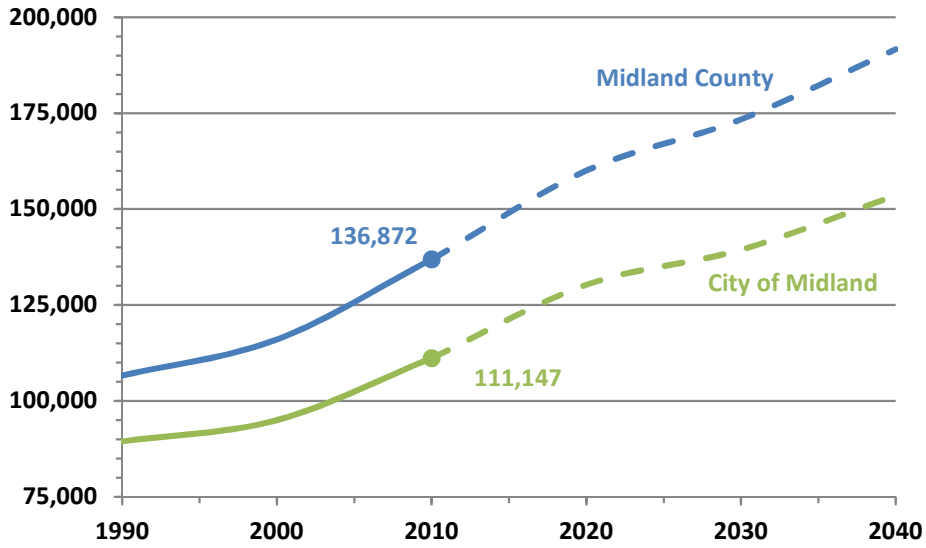


Figure 11: Historical and Projected Population

Land Use / Zoning

At the current time, zoning within the study area is minimal. The vast majority of land within the study area is currently located within the extraterritorial jurisdiction (ETJ) of Midland or in county jurisdiction. While the city has the ability to exercise certain requirements within their ETJ, such as platting, the city

does not have the authority to regulate land use within the ETJ. Land use and zoning may only be applied to areas that are within the city limits.

Within the City of Midland, the majority of land within the study area is zoned for agricultural estate signifying the rural landscape of the area. Additionally, single-family residential districts and planned districts consume much of the remaining portion along Big Spring Street and Loop 250. For the planned development districts, various development agreements have been reached between the City and developers so that the developments contain their own set of standards for development and aesthetics.

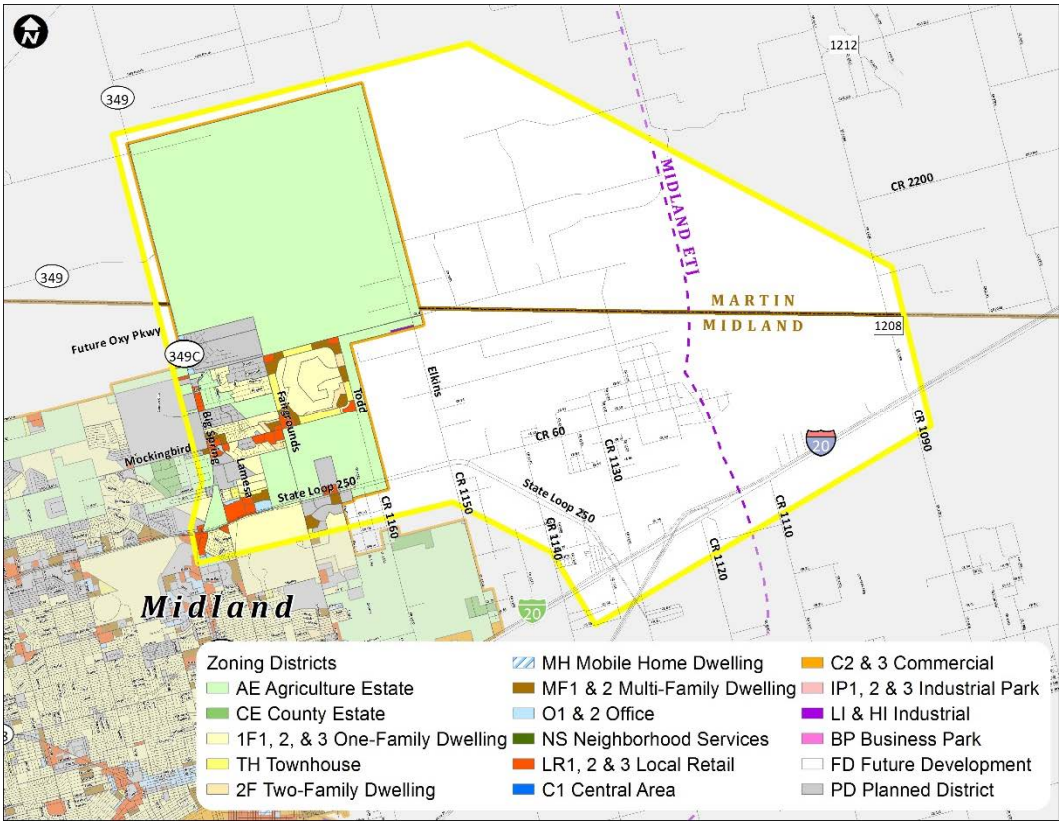


Figure 12: City of Midland Zoning

Development Influences

Development influences include: water infrastructure, electricity transmission infrastructure, the developing aerospace industry, oil/gas industry, caliche excavation, and recent development activity.

Water Infrastructure

Midland County's growth has predominantly been inside Loop 250 and north of IH-20. Speculatively, this growth can be associated with several economic and development reasons. Nevertheless, one measurable effect has been the lack of available potable water to other areas, including parts of the

project area where even individual wells are not feasible. The provision of a water source for the area from the City of Midland or Midland County Utility District (MidCUD) could change development patterns dramatically.

The City of Midland has supplied water to the recent residential developments along SH 349, but has yet to expand further into the study area. With much of this study area being outside the city limits, potential water sources are limited based on future city annexation or inclusion in MidCUD.

MidCUD was formed in early 2013 to provide a reliable water source to areas south and east of Midland city limits, as shown in Figure 13. Chromium contamination, as well as undependable private well systems, led voters to approve the formation of the Utility District and a district tax of 3 cents for every $100 of property valuation[1].

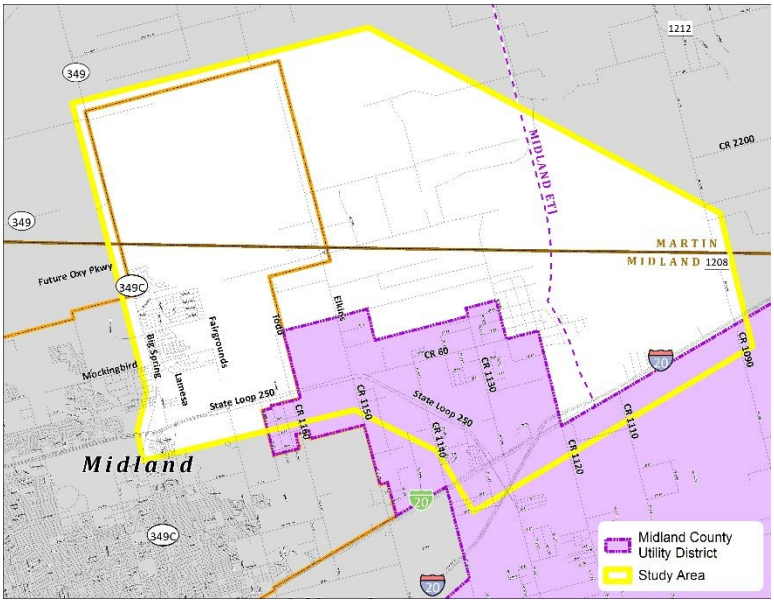


Figure 13: MidCUD Boundary

MidCUD's proposed master layout of water lines (Figure 14) and other infrastructure associated with the utility district's development shows the location of potential major water lines or water easements that could affect the development of a potential corridor. The portion of the study area included in MidCUD's boundaries is identified as being Phase 4 of the water deliver implementation by the District. It reveals a water delivery line to be located north/south along CR 1130, CR 1140, and CR 1148 and east/west along CR 60. No other major storage facilities are expected to be built within the study area. As currently planned, all proposed water lines and infrastructure are minor and do not pose constraints to the development of a transportation network or regional mobility corridor in the study area.

[1] Basco, "Midland County Utility District Formation and Tax Passes." *Midland Reporter-Telegram*.

Figure 14: MidCUD Proposed Master Layout

Electrical Infrastructure

Two major Oncor electrical transmission lines and easements traverse the study area beginning at separate electrical substations located inside Loop 250. These lines are depicted in the map to the right.

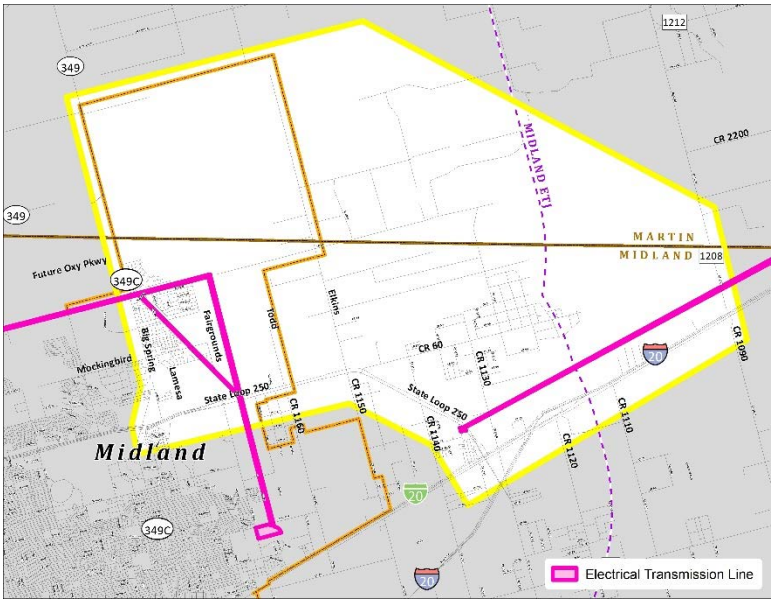


Figure 15: Electrical Transmission Lines

The first contains a set of transmission lines which begin at the electrical substation located on the southeast corner of Fairgrounds Road and Golf Course Road and run parallel to Fairgrounds Road until Loop 250 where it splits. One line continues on this path toward CR 40 where it turns 90 degrees to the west toward Big Spring Street. The other line bends about 30 degrees at Loop 250 to the northwest and travels toward the intersection of Big Spring Street and Arapahoe Road. The pair of transmission lines both exit the study area near Big Spring Street and Arapahoe Road heading west toward Midkiff Road.

The other transmission line traversing through the study area begins at the electrical substation located at the intersection of Loop 250 and CR 1135 inside Loop 250. It then runs to the northeast paralleling I-20 towards Stanton.

Other minor electrical distribution lines are scattered throughout the study area, but do not have a significant impact on the development of transportation corridors in the area.

Potential Aerospace Industry

In 2012, XCOR Aerospace signed an incentive agreement with the Midland Economic Development Corporation to establish XCOR's new Commercial Space Research and Development Center Headquarters in Midland. The agreement includes provisions for Midland International Airport to attain a spaceport license and for XCOR to have $12 million in payroll based in Midland in 5 years. XCOR's new research and development facility, currently housing half of XCOR's staff in Midland, is located on the flight line at Midland International Airport where the company is developing reusable rocket engines and reusable suborbital and orbital launch vehicles (RLVs), such as the Lynx. In 2014, Midland International Airport officially received approval from the Federal Aviation Administration (FAA) of a Commercial Space Launch Site License (Spaceport). The spaceport designation will allow for more potential growth in this employment sector and make Midland attractive to other, similar companies.

Oil and Gas Operations

The extreme fluctuations of the oil industry, particularly in the Permian Basin, has a substantial impact on land use, transportation, and the environment, including in Northeast Midland. In order to plan for future corridors in the study area, the dynamics of oil exploration and production in the study area need to be understood. In 2000, the Permian Basin oil fields had been so heavily drilled that oil reserves within the area were considered to be exhausted. The oil being recovered was minimal compared to oil production in the 1940's and 1950's when the region had the richest oil fields in the world. Almost all of these wells were drilled in what is known as the "Spraberry Trend," a 1.7-million-acre layer of silt and sandstone about one and a half miles underground. The new boom had its new beginnings in 1995 when Atlanta Richfield Oil Company (ARCO) decided to experiment with different kinds of drilling techniques in a new layer of rock below the Spraberry Trend called the "Wolfcamp." ARCO was using a rig that drilled wells 10,000 feet deep into the limestone layer of the Wolfcamp. "Fracking" is a technique that pumps a gel-like fluid filled with sand down a well pipe to create fractures in the oil bearing rock strata. Oil that has been trapped in the rock then flows out of the fractures into the well and is piped via pumps to the earth's surface.

Once an oil well is drilled down to the oil producing strata, a separate piece of equipment, commonly known as a "pump jack," is used to actually pump the oil out of the ground. The typical pump jack site

(shown in the photo) is installed with a screening/security fencing and typically are electrically powered. Pump jacks work continuously and, as long as they are producing enough oil, they are left on. Every one to two years, what is known as a "rework" rig is brought in to rework the well site which will maintain the output of the pump jack. The rework rig is much smaller than a drilling rig and the rework operation can be performed with most of the pump jack left in place. A well site is generally 100'x100' inside the screened area, however a reworking rig requires a temporary area of approximately 300'x300'. The typical drill site is slightly over three acres in size.

Other issues or constraints on the use of the surface property are the collection lines, tank batteries, and injection wells. Typical collection lines are flexible plastic piping left on the surface of the ground. These lines run from each well head to the tank battery where the oil is collected. Sometimes tank batteries are emptied via pipelines, but more typically, trucks are used to remove the crude oil from the tanks due to their remoteness. For this reason, it is not only the drilling activities, but also the collection and maintenance activities that contribute to oil field traffic. In addition, the various fluids used in fracking are removed from the well and trucked to injection wells where non-oil fluids are pumped into the ground.

The heavy truck traffic to the well sites, pump jacks, tank batteries, and injection wells cause significant impact to the transportation system in Northeast Midland. Heavy equipment creates extensive damage to the roadway system, as well as increasing traffic on the major thoroughfares and at intersections.

Due to the cost for capping or relocating a well, it is vital to avoid impacting existing oil wells in the region. Relocating a well is estimated to cost approximately $2,000,000, while the estimated cost to cap a well is approximately $85,000. The large number of oil wells scattered across the study area makes it difficult to identify mobility corridors that have zero impact on oil wells. Regardless, the impacts should be minimized to the extent practicable to reduce costs.

Data from the Texas Railroad Commission provides information on the kinds of wells that are found within the study area including:

- Brine Well – A salt mining well
- Canceled Location – A previously permitted oil well location where the permit has expired.
- Oil/Gas Well – An active oil and/or gas well
- Injection/Disposal Well – A well that can be used for injecting substances, such as steam,

carbon dioxide, or water, in the well to maintain reservoir pressure. A disposal well is also used to dispose of municipal or industrial waste.

- Permitted Location – A location with a permit to drill a well in the future
- Plugged Well – A previously active well or dry hole that has been abandoned and plugged
- Shut-In Well – A well that has been shut down and has stopped producing

These well data are shown in Figure 16 and is current as of July 2016. As seen, a large number of oil/gas well sites, in addition to permitted locations, exist within the study area.

Oil and Gas Transmission

A large network of oil and gas pipelines extends throughout the Northeast Midland area (Figure 17). Major oil and gas lines have the ability to affect the location of a mobility corridor. Interstate pipelines affect transportation projects more than other pipelines due to the high volume oil or gas they transport, their economic value and the subsequent high cost of relocating one of these pipelines. There are a few interstate pipelines seen in Figure 17, but the location and alignment of these pipelines are unlikely to interfere with a mobility corridor through the study area.

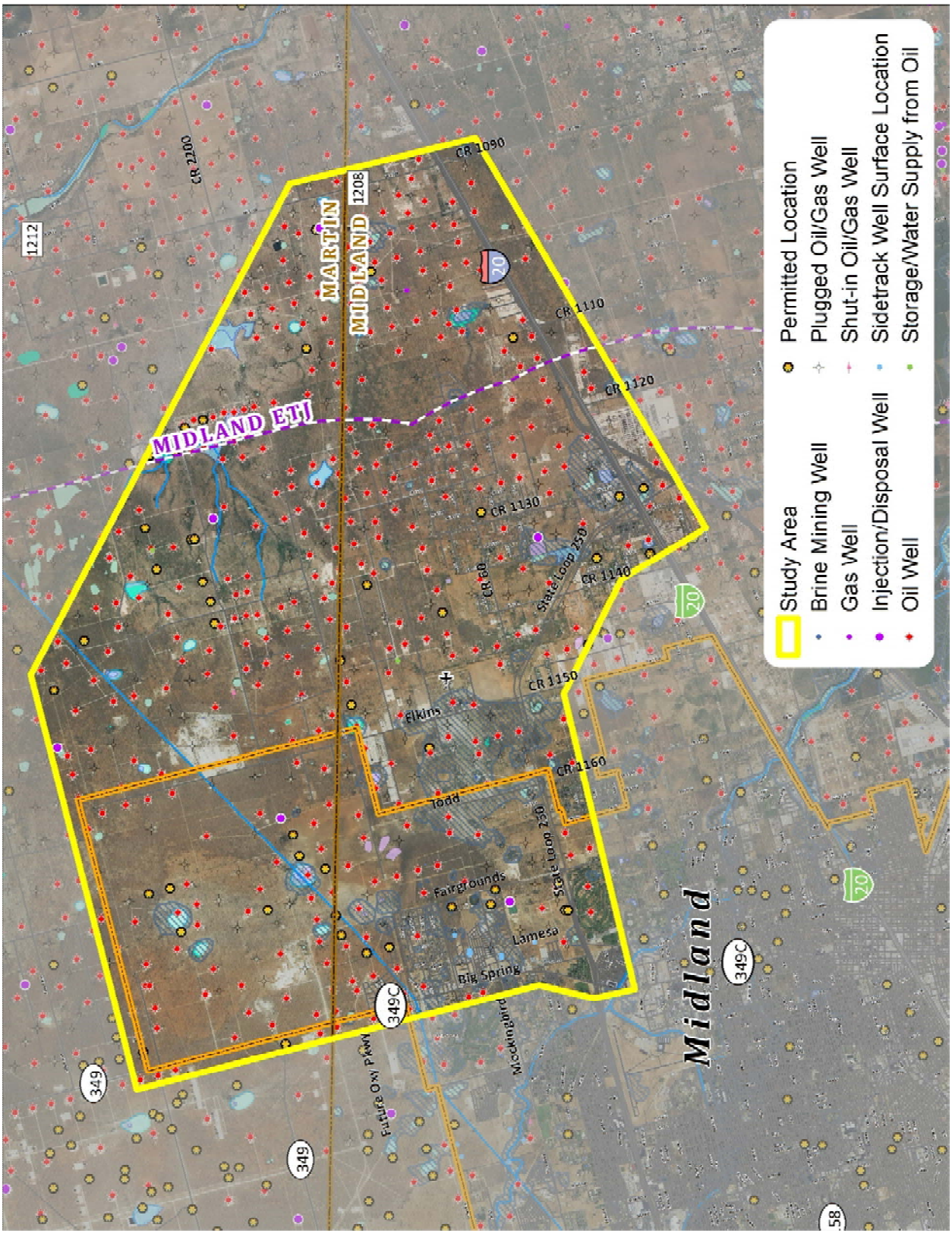


Figure 16: Oil/Gas Well Locations

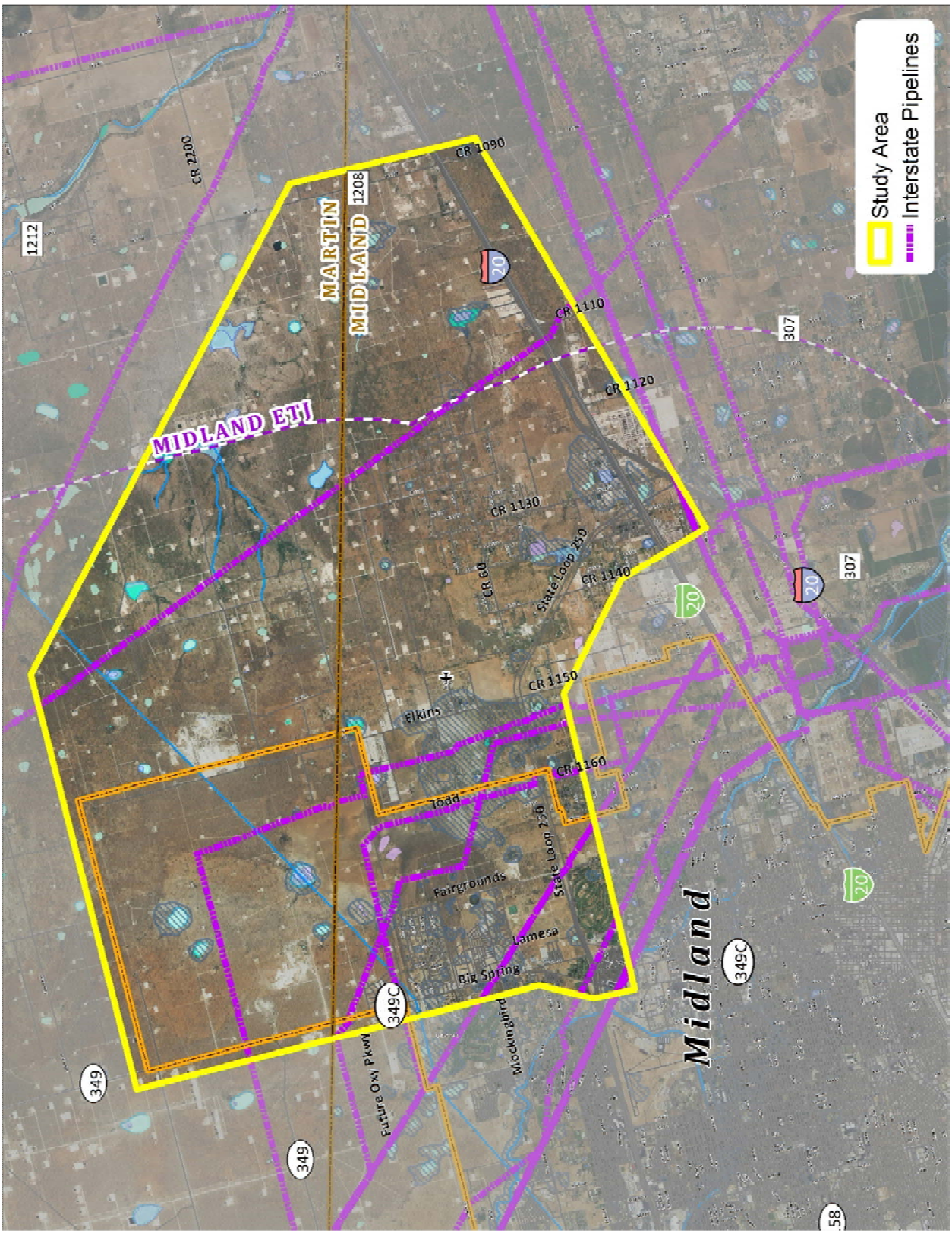


Figure 17: Oil/Gas Interstate Transmission Lines

Caliche Excavation

Two major active caliche pits are currently being excavated in the study area along with one smaller pit. East of Big Spring Road, the Jones Brothers pit operates near the intersection with Craddick Highway. On Elkins Road north of CR 2300, the Reece Albert pit operates the largest caliche operation in the study area. Additionally, a smaller active pit north of Loop 250 at the extension of Fairgrounds Road is in operation in the study area. All of these operations, Figure 18, impact the transportation needs of the area with the large trucking activity associated with the business. Furthermore, the development in the area is influenced by the presence of supporting businesses for the caliche excavation.

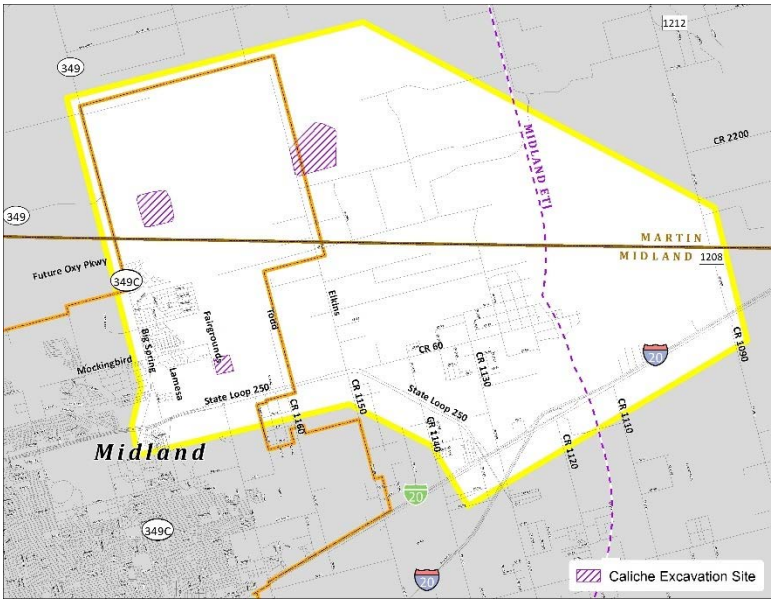


Figure 18: Caliche Excavation Site Locations

Recent Development Activity

While most of the terrain is relatively sparsely populated, there are pockets of established residential development that exist within the study area. Along Big Spring Road, major residential developments include:

- The Castaneda's
- 349 Ranch Estates
- Adobe Meadows
- Pavilion Park

Additionally, there is focused residential development along CR 60 east of Loop 250, CR 40 near Elkins, and CR 2320 north of CR 40 (Apache Trails). Inside Loop 250, numerous residential developments are in

place along Fairgrounds (Ranchland Hills, Trueland, McPherson Estates, etc.) with more recent developments occurring adjacent to Todd Road and Elkins Road. Outside of these areas of intensive residential development, scattered development is occurring throughout the study area.

With the Reece Albert caliche facility on the northern end of Elkins Road, additional industrial development has been occurring along Elkins Road to support this industry as well as other general oil and gas activity in the area.

CrownQuest's new facility along CR 2300 has also impacted the transportation needs and development of the area as many of its workers from the downtown headquarters have been moved out to be nearer to the field work.

Literature Search for Environmental Constraints

Agency Resources/Databases

During the development of environmental constraints on and potential fatal flaws to the development of the proposed transportation corridor, the project team reviewed several public databases. These databases along with the information derived from them included the following:

- US Census Data: LEP Populations, Minority Population by Block Group
- Environmental Systems Research Institute (ESRI): Cemeteries, Churches, Landmarks, Parks, Fire Stations, Institutions (College/University, Government Offices, Hospital/Polyclinics, Museums, Place of Worship, Schools)
- Federal Emergency Management Agency (FEMA): 100 Year Floodplain
- Natural Resources Conservation Service (NRCS) Web Soil Survey: USDA soils: Farmland Soils of Statewide Importance
- Texas Water Development Board (TWDB): Brackish Groundwater locations, Major Aquifers, Irrigation Wells (as it relates to Farmland of statewide importance, if irrigated category)
- State Historical Preservation Office (Texas Historical Commission): Historic Age National Bridges, Cemeteries, Archeology Site Centroids
- Texas Council on Environmental Quality (TCEQ): Municipal Solid Waste Locations, Petroleum Storage Tanks, Superfund Sites
- US Fish and Wildlife Service (USFWS): National Wetland Inventory maps (data pertaining to wetlands and other water bodies)
- Texas Parks and Wildlife Service (TPWS): Playas, NDD (Natural Diversity Database) data
- USGS: National Hydrologic Dataset: (Streams, Waterbodies)
- Texas Education Agency (TEA): School locations
- City of Midland: 100 Year Floodplain, Floodway, Jurisdictional Boundaries: City Boundary, MUD Boundaries
- Railroad Commission (RRC): Well and Pipeline data displayed by commodity type and interstate pipeline types.

The results of this data search and review are found in Figure 19.

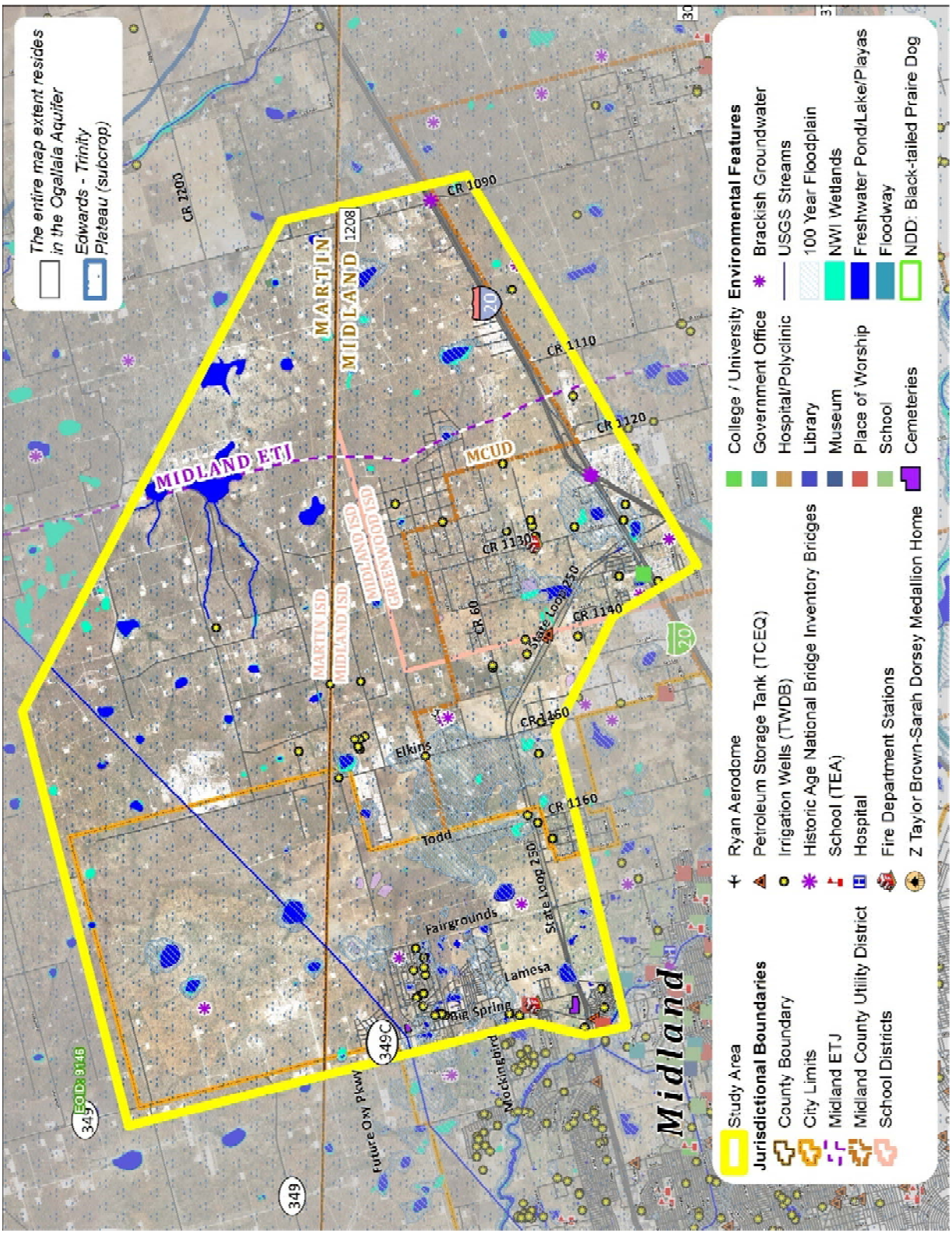


Figure 19: Environmental Constraints

Land Use/Policies to Support Follow-on ICI

Assessing a project's potential to induce development must be considered within the context of the community's plans for its own future, along with the policies it has in place to govern that development. Typically, a city has some land development authority within its city limits and within its extraterritorial jurisdiction. Although not binding, a comprehensive plan is a strong tool for directing future development and can be referenced heavily in the indirect and cumulative effects analysis. If a proposed project is consistent with the economic development and sustainability goals a community articulates for itself (including extensive public involvement), that information helps the analyst determine whether or not the specific project could be linked to substantial indirect or cumulative impacts.

The City of Midland's Tall City Tomorrow Plan identifies these economic development and sustainability goals through the inclusion and analysis of development areas, including the Current Development Area, North Development and Drilling Area, and Eastside Edge Area, which cover much of the study area. These areas are described in more detail in Appendix A.

The Future Land Use Plan included in Tall City Tomorrow also captures the anticipated and planned uses that represent the vision of Midland for land use development in the future. In the NEPA phase, each project can be assessed for direct, indirect, and cumulative impacts as compared to this future land use plan to determine compatibility. If a proposed project appears to be inconsistent with the land use plan, the NEPA process provides an opportunity for questions and discussions; these discussions may result in some design updates to help ensure the project is generally consistent with the land use plan.

The Tall City Tomorrow plan also clearly articulates the needs and goals of Midland leaders and citizens. For any project that enters the project development process under NEPA, this plan will be a strong resource for analysts to understand the potential for induced development and the extent to which it is or is not attributable to a specific project.

Another available resource is the school districts which are especially for the suburban areas around growing cities. In Northeast Midland, there are three school districts whose boundaries coincide with the study area: Midland Independent School District (ISD), Martin ISD, and Greenwood ISD. The ISDs track population growth in order to plan where schools of various sizes are needed in order to serve students in the surrounding neighborhoods. Historically in Midland, there have been some concerns with respect to transportation and access to the Greenwood ISD, especially given the limited roadway options for crossing I-20, various drainages, and floodplains; these can pose constraints to transportation in certain circumstances. The indirect and cumulative impacts analyses aspects of NEPA compliance would allow for communications with these ISD representatives – particularly in facilities planning – so the City knows where future schools could potentially be served by the additional development of transportation facilities.

Current Traffic Conditions and Influences

An assessment of existing traffic conditions was conducted to serve as a basis for the establishment of mobility strategies for long-term development within the study area. As part of this task, an analysis of the physical characteristics, planned improvements, and development influences of the study area was conducted.

Existing Roadway Network

Northeast Midland's roadway network, seen in Figure 20, consists of a growing but disconnected network streets. Big Spring Street/SH 349C, Elkins Road, CR 1130, and FM 1208 serve as the main north/south roadways in the study area, but the incomplete Loop 250 is the only east/west connection between these roadways. While there are limited established roadways in the study area, section lines of property lines continue to generally follow the classic grid network found in heart of the city. This type development is common in West Texas and provides a highly efficient roadway network when complete. Furthermore, a minor network of county and private roadways in the study area help to define transportation movements in the area.

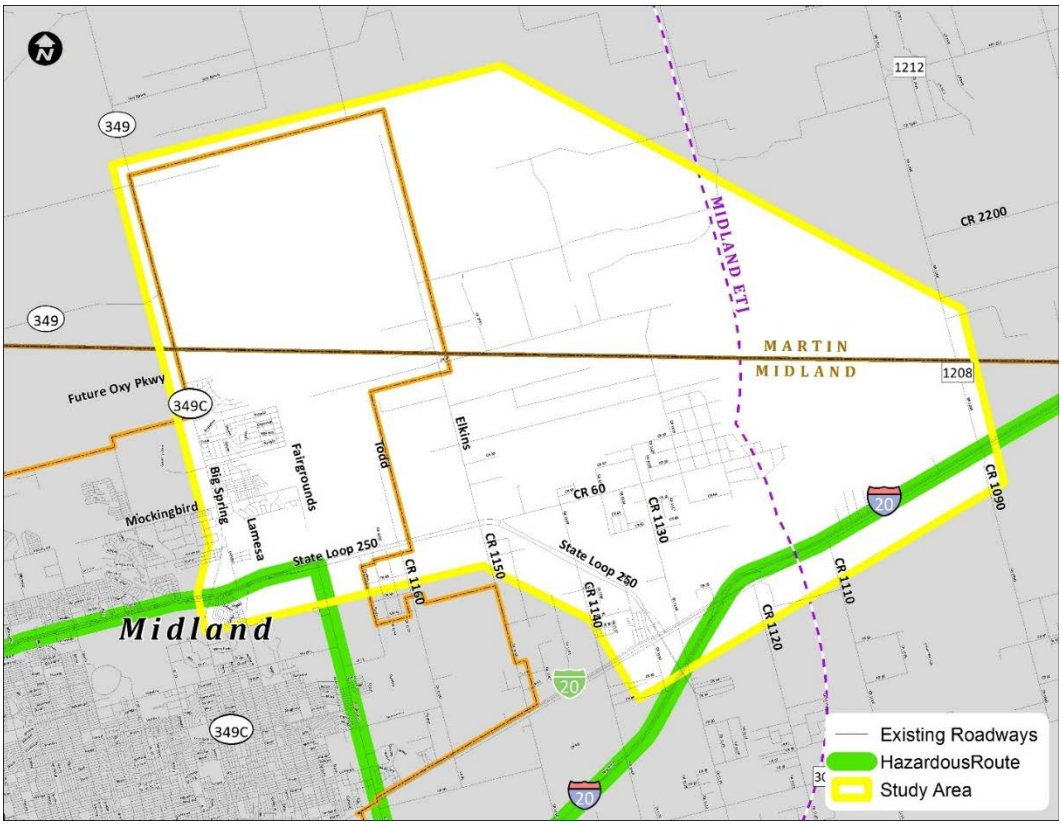


Figure 20: Existing Roadway Network and Hazardous Material Routes

With the development of residential subdivisions along Big Spring Road, a series of collector roadways has begun to be established along with a footprint for future connecting roadways between the various developments.

The major highway facilities in the study area includes Big Spring Street/SH 349C, Craddick Highway, Loop 250, BI-20, and IH-20 with characteristics as follows:

- Big Spring Street/SH 349C – Five-lane rural highway with shoulders from Loop 250 to Pueblo Street; four-lane undivided rural highway with shoulders north of Pueblo Street. Estimated 2014 AADT from TxDOT of 6,586.
- Craddick Highway – Two-lane undivided rural highway with shoulders. Estimated 2014 AADT from TxDOT of 3,130.
- Loop 250 – Four-lane divided freeway with frontage roads from west of Big Spring Road to Fairgrounds Road. From Fairgrounds Road to east of CR 1135, the frontage roads are built, but the mainlanes are not. The four-lane mainlanes, frontage roads, and interchange exists at BI-20 and IH-20. Estimate 2014 AADT from TxDOT ranges from 47,148 west of Big Spring Road to 7,065 between BI-20 and IH-20.

- BI-20 – Four-lane divided highway with shoulders and frontage roads. Estimated 2014 AADT from TxDOT of 17,450 near the interchange with IH-20.
- IH-20 – Four-lane divided freeway with shoulders and frontage roads. Estimated 2014 AADT from TxDOT of 28,384 near CR 1110.

Railroad Crossings

An additional factor contributing to the north/south movement of the area is continuous crossing of the BNSF railroad paralleling BI-20/IH-20 through Midland. The disconnect between north/south roadways in this area due to limited crossings affects the travel patterns and priority of major roadways in the study area. Railroad crossings in the area are shown in Table 3.

Table 3: Existing Railroad Crossings

Roadway	**Crossing Designation**	**Notes**
Fairgrounds Road	At-Grade	Truck crossing issues due to steep crest curve over tracks
Todd Road	At-Grade	
Elkins Road	No Crossing	
CR 1140	At-Grade	
Loop 250	Grade Separated	
East of CR 1130	At-Grade	Crossing adjacent to industrial development bound by BI-20 and IH-20
FM 1208	Grade Separated	Nearest crossing east of BI-20/IH-20 interchange

Hazardous Material Routes

Truck and hazardous material routes identified by the Federal Motor Carrier Safety Administration (FMSCA) plays a major factor in the movement of freight and goods through the area. The FMSCA designates hazardous material routes to mitigate the negative impacts that the transportation of hazardous materials might have on other motorists or area residents while still providing safe and efficient routes for the trucking industry.

In the study area, IH 20 through the study area, Loop 250 from IH 20 to Fairgrounds, SH 349 from IH 20 to the North City Limits, and Fairgrounds from South City Limits to Loop 250 serve as designated hazardous materials routes. Figure 20 illustrates hazardous material routes.

Regional Connectivity

The various freeway and highway facilities within the study serve multiple regional travel needs in the area. Regional travel, predominantly trucking traffic associated with the oil and gas industry and shipping related to the Ports-to-Plains or La Entrada corridor, has two major movements, north-south and east-west.

Effects of the La Entrada corridor and trucking from local oil/gas production result in heavy trucking along SH 349, Loop 250, and IH 20. Additionally, the location of the oil tank farm on Fairgrounds north of IH 20 adds heavy local trucking to Fairgrounds, Todd, and Elkins from the oil fields in Northeast Midland.

Figure 21: La Entrada Corridor (Source: Texas Observer, 2007)

From the north-south movement, SH 349 and SH 158, outside the study area, are the primary roadways utilized. These corridors serve the origination or termination of regional trips to frequent destinations including San Angelo, Lamesa, and Lubbock. From the east-west movement, BI-20 and IH-20 are the primary regional corridors utilized. These corridors connect both Midland and the study are to destinations including Odessa, Big Spring, and Abilene. In addition to these major north-south and east-west regional corridors, Loop 250 and Craddick Highway serve as by-pass loops for regional travel around the City of Midland.

Figure 22: Ports-to-Plains Corridor

TxDOT Functional Classifications

TxDOT functional classification of roadways in Northeast Midland, as seen in Figure 23, show Big Spring Road/SH 349, Craddick Highway, most of Loop 250, Fairgrounds, and BI-20 as principal arterials. Lamesa is shown as a minor arterial. Todd and Elkins are shown as major collectors. CR 1140 and FM 1208 are shown as minor collectors.

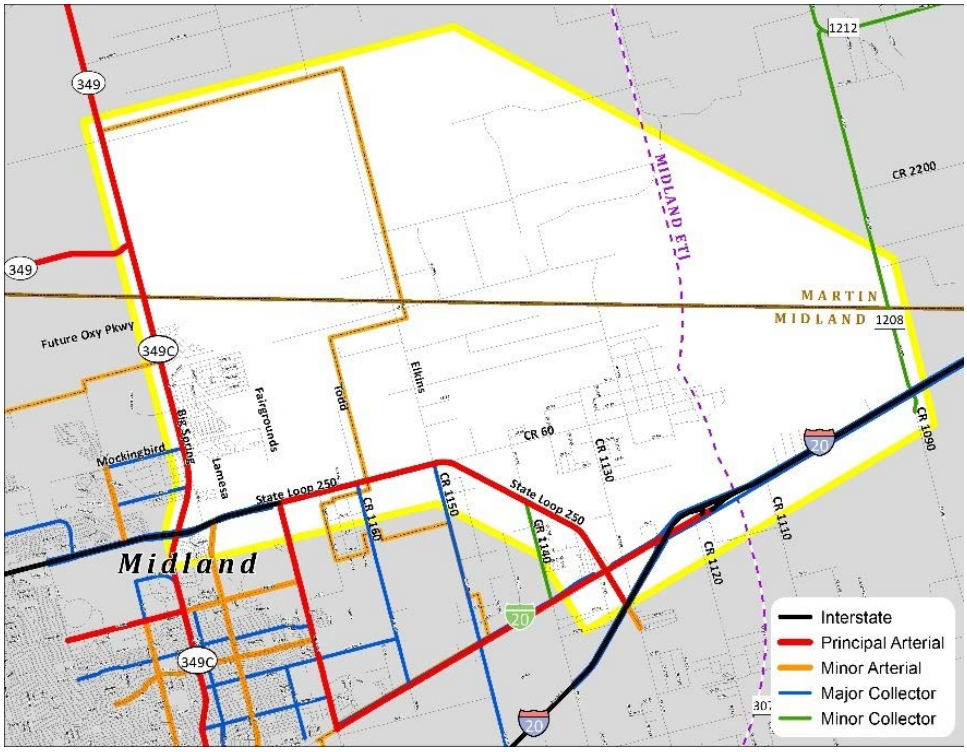


Figure 23: TxDOT Roadway Functional Classifications

Midland Thoroughfare Plan

Midland's Comprehensive Plan, Tall City Tomorrow, provides a vision for the city's future including a thoroughfare plan depicting potential long-range growth of the transportation system in the area (Figure 24). The plan identifies potential arterial and collector roadways in the city limits which covers the western portion of the study area. Fairgrounds Road, Todd Road, and Elkins Road are identified as major arterials from BI-20 to an extension of Craddick Highway. Mockingbird Lane and a new roadway north of Greentree Boulevard are also identified as major arterials from west of Big Spring Road to Elkins Road. In addition to these major arterials, a highway extension of Craddick Highway to the east into the study area is identified with an undetermined termini point to the east.

Along eastern Loop 250, interchanges and overpasses of the intersecting major roadways are also identified. Future interchanges are planned at the intersection of Loop 250 with Fairgrounds Road, Elkins Road, and CR 1140. A future overpass is planned at the intersection of Loop 250 with Todd Road.

The remaining portion of the study area east of Elkins Road outside of Loop 250 is not planned as part of Midland's Tall City Tomorrow Plan.

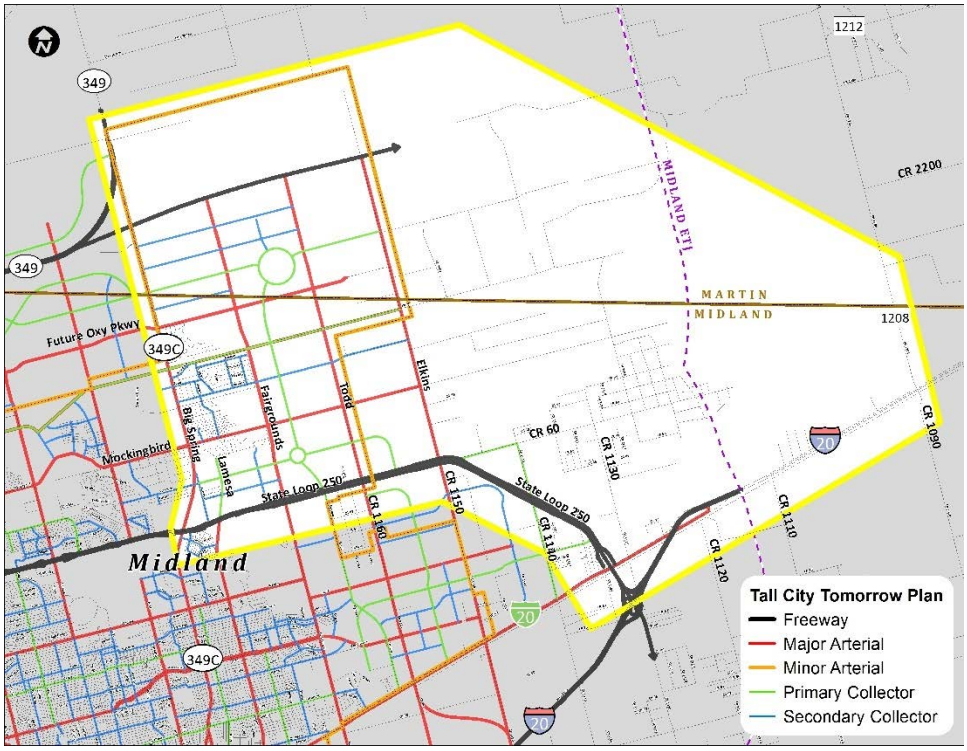


Figure 24: Tall City Tomorrow Roadway Plan

The Tall City Tomorrow Plan's roadway plan references design standards as defined in the city subdivision code by functional classification as shown in Table 4.

Table 4: City of Midland Roadway Sections

Classification	*ROW Width*	*No. of Lanes*	*Lane Width*	*Sidewalk Width*	*Bike Lanes*	*Median*
Major Arterial	150'	6	12'-13'	6'	Yes	26' Raised
Minor Arterial	120'	4	12'-13'	6'	Yes	16' Raised
Major Collector (Option 1)	100'	5*	12'-13'	6'	Yes	None
Major Collector (Option 2)	100'	4	11'-13'	6'	Yes	16' Raised
Major Collector (Option 3)	65'	3*	11'-12'	6'	Yes	None

*Includes center two way left turn lane

Traffic Volumes

TxDOT 2014 traffic volumes were compiled within the study area to better understand traffic circulation and growth patterns. Figure 25 and Figure 26 highlight current and projected traffic volumes, respectively, within the project area.

Annual average daily traffic (AADT) data from TxDOT on key highways reveal heavier traffic volumes in the western portion of the city over those to the east. This is indicative of the loading of facilities by Midland residents where more growth has historically occurred in the western portion of the city. But while western Loop 250 currently has heavier traffic volumes, the higher annual growth rate of eastern Loop 250 shows the movement of development toward Northeast Midland.

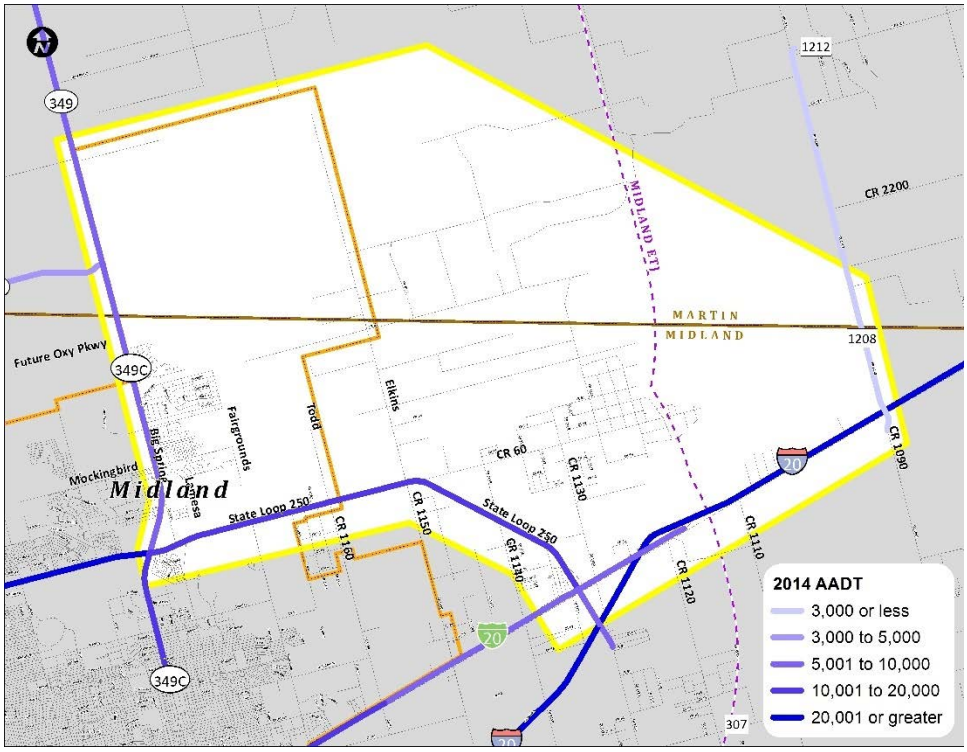


Figure 25: 2014 AADT

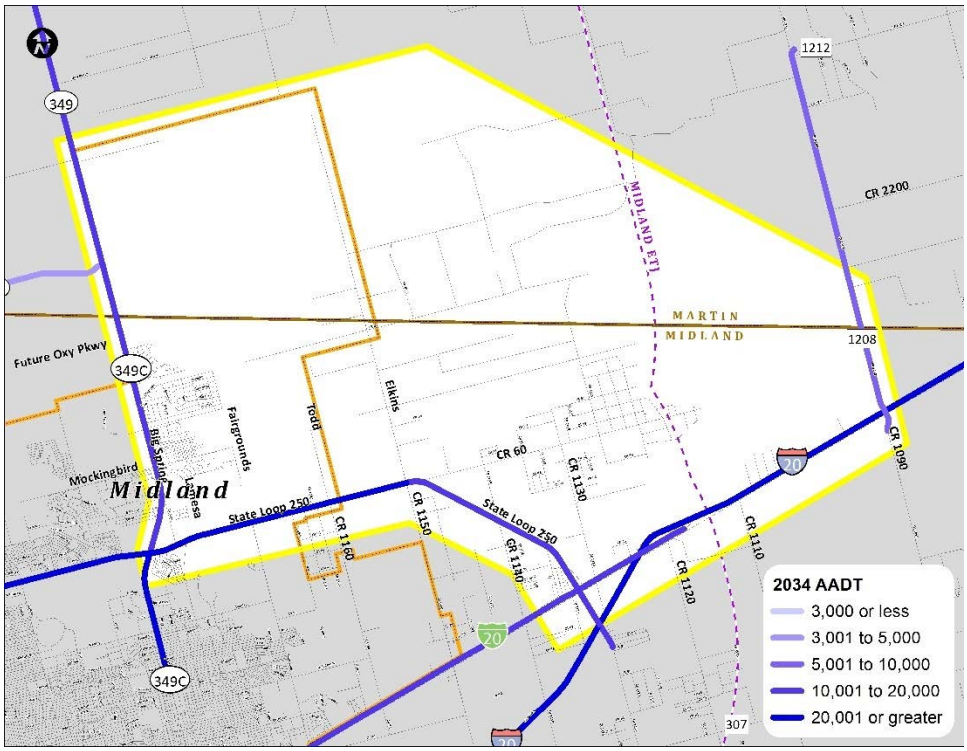


Figure 26: 2034 AADT

Historic traffic counts show varied growth among key state facilities since 2007. Corridors in developing areas of the study area, such as eastern Loop 250, BI-20, and FM 1208 have seen high annual growth rates ranging between 10 and 15 percent per year. The more developed and defined corridors, such as western Loop 250 and IH-20 have seen lower, but still significant, annual growth ranging between 1 and 8 percent. These varying growth rates and AADT among the key state facilities in the study area from 2007 to 2014 is shown in Table 5.

Table 5: Roadway Traffic Growth within Study Area

Roadway	*Location*	*2007 AADT*	*2014 AADT*	*Percent Growth*	*Annual Growth*	*Net Growth*
Big Spring Street/ SH 349C	North of Loop 250	3,900	6,586	68.9%	7.8%	2,686
Loop 250	West of Big Spring Road	35,000	47,148	34.7%	4.3%	12,148
Loop 250	Big Spring Road to Elkins Road	7,500	17,100	128.0%	12.5%	9,600
Loop 250	Elkins Road to IH-20	4,500	10,903	142.3%	13.5%	6,403
BI-20	Fairgrounds Road to Elkins	7,300	12,098	65.7%	7.5%	4,798
BI-20	Elkins Road to Loop 250	5,500	11,170	103.1%	10.7%	5,670
BI-20	Loop 250 to IH-20	8,300	17,450	110.2%	11.2%	9,150
IH-20	West of BI-20	22,000	23,960	8.9%	1.2%	1,960
IH-20	BI-20 to FM 1208	16,300	28,384	74.1%	8.2%	12,084
FM 1208	North of IH-20	920	2,544	176.5%	15.6%	1,624

Crash History and Trends

Vehicle crashes are a source of significant personal distress, disruption, loss of personal property and time, and in some cases, result in injury. In the worst cases, crashes can be fatal. Analysis of crashes recorded over the prior three-year period of available data was conducted to determine if patterns were prominent in the study area, and whether guidance for resulting projects can be made. The analysis showed that, generally, arterials in the study area have a comparable number of crashes per year compared to similarly situated arterials in the Midland/Odessa area.

For the three-year period, an average of 570 crashes per year were reported on roadways in the study area, with 12 crashes resulting in fatalities over the three-year period. Of the crashes resulting in incapacitating injury in the study area, nearly all occurred on roads with a posted speed limit averaging 50 miles per hour or higher. Nearly two thirds of the crashes occurred on the three roadways with the highest average daily travel – Loop 250 and I-20. One segment of the Texas 250 Loop was found to have a higher rate of crashes per length – on the segment where the freeway design section transitions to a four-lane divided section. It may be that this segment is proving more difficult for drivers because it involves vehicles accelerating and decelerating as well as merging. A more detailed operational analysis would be useful, separate from this general network study.

Table 6: Traffic Crash Trends

Road Segment	*Crashes*	*Crash involving fatality*	*Length (Mi.)*	*AADT*	*Rate per Length*	*Rate per Volume*
Loop 250 (FM 349 to Fairgrounds)	345	3	1.3	25,784	**265**	0.01
Loop 250 (Fairgrounds to CR 1160)	131	1	1	21,327	131	0.01
Loop 250 (CR1160 to CR1150)	92	0	1	21,327	92	0.00
Loop 250 (CR1150 to I-20)	295	2	2.6	13,598	113	0.02
I-20 (in study area)	260	4	3	24,302	87	0.01
Business 20 (In Study Area)	111	1	2	8,108	56	0.01
CR 1160 (Todd)	6	0	1	880	6	0.01
CR 1150 (Elkins)	77	0	2.3	810	33	**0.10**
CR 1140	14	0	1.7	370	8	0.04
CR 1130	33	1	2.6	540	13	**0.06**
CR 50	15	0	3.5	1,000	4	0.02
FM 349C	323	1	6	14,188	54	0.02
Average					*61*	*0.01*

For the study area, two collector-class roadways were also found to have higher rates of crashes per traffic volume than surrounding roadways. These segments can give instructive guidance for the project. CR 1140

and CR 1150 each had higher rates of crashes per volume than other roadways. For the crashes on CR 1140, contributing factors may include the higher number, mix and close spacing of driveway access along the roadway combined with the posted speed limit of 45 MPH. Limited shoulder space may also be a contributing factor. For crashes on CR 1150, the posted speed limit average was reported to be above 50 miles-per hour. Though there are not excessive driveways nor mix of uses on this roadway, the limited shoulder space was noted as similar to CR 1140. Speeding behavior as a contributing factor in the crashes was not analyzed.

Weight differential can often also be a significant contributing factor. Commercial vehicles as a subset of vehicle types were involved with a limited number of crashes overall in the period analyzed. For Texas Loop 250, commercial vehicles were involved in a limited number of crashes, approximately 6%, which is proportionate to the truck percentage of vehicle traffic on the roadway. However, commercial vehicles were found to be involved in 16% and 20% of the crashes reported on the two collector roadways, CR 1140 and CR 1150, respectively. Though, commercial vehicles were not involved in the crash resulting in fatality on CR 1140. Neither time of day nor weather conditions appeared to be contributing factors for fatal crashes for the period studied.

The policy implications for the corridor project are that speed differentials between vehicles appear to be increasing crash frequency. Access management and better visual cues for vehicles entering and exiting the roadway may be warranted, with the additional provision of shoulder space for vehicles to accelerate and decelerate. For intersections, modern roundabout designs may be a useful traffic control to reduce both crash frequency and crash severity. However, this intersection treatment is not appropriate on corridors with large volumes of truck traffic, such as Elkins Road. Lastly, lower design speeds and posted speeds may be more appropriate for areas with a mix of commercial and residential traffic, with enforcement and education of speed risk an ongoing concern.

Transit

The Midland Odessa Urban Transit District (MOUTD) provides oversight of the transit system operating in Midland, known as EZ-Rider. EZ-Rider provides scheduled fixed-route service for Midland within Loop 250 and IH-20 as seen in the service area map depicted in Figure 27.

Figure 27: EZ-Rider Service Area Map

Demand response paratransit service provided by EZ-Rider is the only form of transit currently provided in the study area. This is also the only foreseeable transit service provided in the future to the area due to the low density of the development that is not conducive to fixed-route service.

Bicycle/Pedestrian

Midland's 2015 Trails Plan identifies potential routes with the city limits. Currently, no hike or bike paths exist in the study area outside of Loop 250. A potential future sidepath is proposed on Mockingbird Lane west of Big Spring Road traveling east toward Big Spring Road. This sidepath would then bend and travel north on Big Spring toward Arapahoe Road. The only other proposed trails within the study area are inside Loop 250 in Hogan Park and a sidepath along Fairgrounds from Hogan Park to Cuthbert Avenue. The Midland Trails Plan is shown in Figure 28.

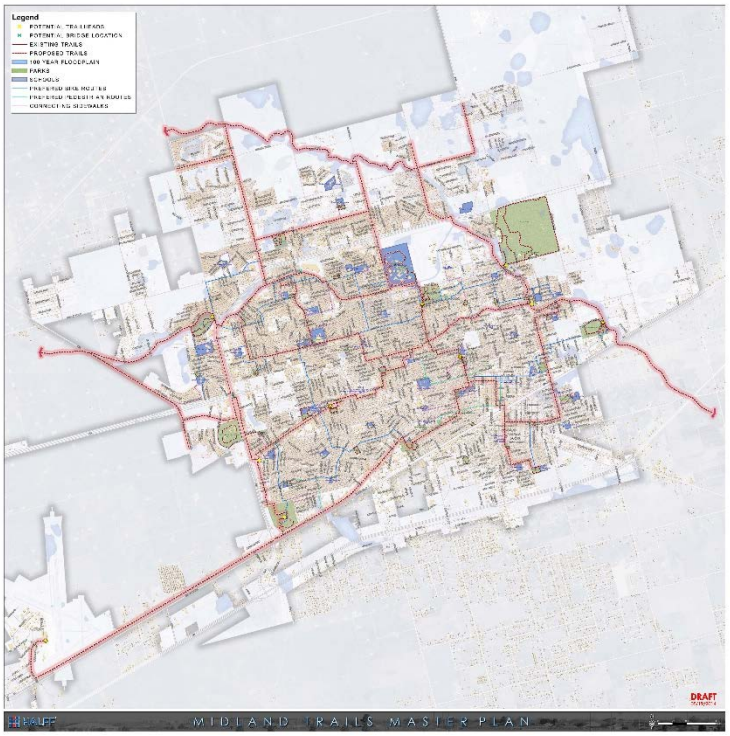


Figure 28: Midland Hike and Bike Plan

With much of the study area outside of the city limits, plans do not exist for hike or bike facilities external to the city.

Planned Improvements

The City of Midland, TxDOT, and the Permian Basin MPO all have local plans that address long-range activities for the study area.

Permian Basin MPO's Vision 2040 Metropolitan Transportation Plan (MTP) – In 2015, the Permian Basin MPO, adopted a 25-year regional transportation plan addressing future transportation needs of the metropolitan area. The MTP identified existing and projected future conditions in regards to expansion of the transportation system. This comprehensive look at the transportation system included highway and roadway systems, public transit, bicycle/pedestrian, air, and freight movement.

TxDOT Odessa District –TxDOT continuously maintains and improves roadways in the district. TxDOT addresses system needs and releases roadway projects yearly to improve the efficiency of the transportation system.

The City of Midland's Tall City Tomorrow Comprehensive Plan – In 2016, the City of Midland adopted a comprehensive plan addressing needs of the city, setting goals and objectives, and planning for the future of the city. This document covered all areas of the city and ETJ addressing demographics, land use, thoroughfares, infrastructure, public facilities, and zoning.

Roadway

The Permian Basin MPO 2015-2040 Metropolitan Transportation Plan, Vision 2040 Plan, has identified a range of projects within the planning area. Project prioritization was categorized into the following three types:

- Funded
    - FY 2015 – 2018 Transportation Improvement Plan (TIP)
    - Proposition 1
    - County Energy Transportation Reinvestment Zone (CERTZ)
    - Regionally Significant Funded Projects
- Projected Fiscally Constrained Priority Projects
- Unfunded Projects

These projects are listed in Table 7, Table 8, Table 9, and Figure 29.

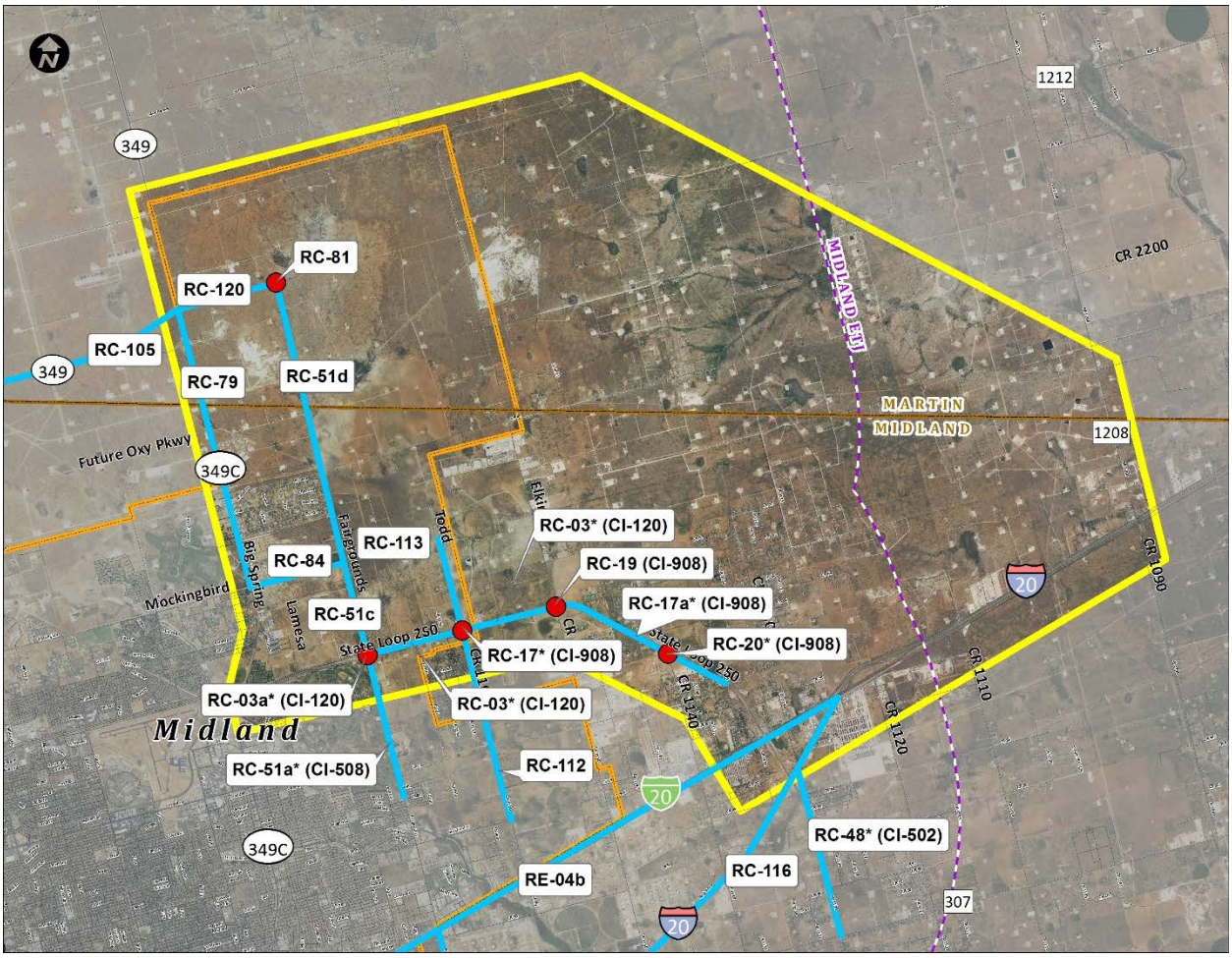


Figure 29: MTP Project Locations

Table 7: Vision 2040 MTP Funded Projects

Roadway	Limits	Project Description	MPO-ID	Total Project Cost	Funding
Fairgrounds Rd.	Loop 250 to Pecan Ave.	Widen non-freeway	RC-51a (CI-508)	$5,700,000	TIP
South Mobility Corridor	IH 20 to SH 349	Feasibility study	RC-91	$900,000	Regionally Significant

Table 8: Vision 2040 MTP Fiscally Constrained Priority Projects

Roadway	Limits	Project Description	MPO-ID	Total Project Cost	Target Year
BS 349	Mockingbird to SH 349	Widen non-freeway	RC-79	$12,300,000	2032
Fairgrounds Rd ext	Loop 250 to Mockingbird	Construct new location non-freeway	RC-51c ext	$1,960,000	2040
Loop 250	At Fairgrounds	Construct new interchange	RC-03a* (CI-120)	$16,640,000	2017
Loop 250	Fairgrounds to Todd	Convert non-freeway to freeway	RC-03* (CI-120)	$3,360,000	2033
Loop 250	At CR 1150/CR 60	Construct new interchange	RC-19* (CI-908)	$19,200,000	2021
CR 1130	IH 20 to FM 307	Upgrade to standards non-freeway	RC-48* (CI-502)	$5,292,000	2040

Table 9: Vision 2040 MTP Unfunded Projects

Roadway	Limits	Project Description	MPO-ID	Total Project Cost
SH 349	Garfield to BS 349	Convert non-freeway to freeway	RC-105	$4,200,000
Fairgrounds Rd	At SH 349	Construct new interchange	RC-81	$16,000,000
SH 349	BS 349 to Fairgrounds ext	Construct new location non-freeway	RC-120	$2,000,000
Fairgrounds Rd ext	Mockingbird to SH 349 ext	Construct new location non-freeway	RC-51d ext	$2,700,000
Mockingbird ext	SH 349 to Fairgrounds	Construct new location non-freeway	RC-84	$1,000,000
Todd Rd	Golf Course Rd to Loop 250	Widen non-freeway	RC-112	$5,250,000
Todd Rd ext	Loop 250 to Mockingbird	Construct new location non-freeway	RC-113	$1,000,000
Loop 250	At Todd	Construct new interchange	RC-17* (CI-908)	$16,000,000
Loop 250	Todd to CR 1135	Convert non-freeway to freeway	RC-17a* (CI-908)	$6,000,000
Loop 250	At CR 1140	Construct new interchange	RC-20* (CI-908)	$16,000,000
BI 20	Front St to IH 20	Improve mobility and add capacity	RE-04b	$54,000,000
IH 20	SH 158 o BI 20	Improve mobility and add capacity	RC-116	$5,500,000

Additionally, the Texas Department of Transportation (TxDOT) has on-going roadway projects in the study area. These projects are categorized into these four types and listed in Table 10:

- Construction Scheduled
- Finalizing for Construction
- Under Development
- Long Term Planning

Table 10: TxDOT STIP Projects

Type	Roadway	Limits	Description	Construction Cost/Estimate
Construction Scheduled	Fairgrounds	East Pecan Ave. to Loop 250	Widen non-freeway	$6,205,048
Construction Scheduled	Loop 250	At CR 1140	Install Intersection Flashing Beacon	$61,201
Construction Scheduled	Loop 250	At CR 1150	Install Intersection Flashing Beacon	$57,078
Construction Scheduled	SH 349	Midland County line to SH 349C	Seal Coat	$78,714
Construction Scheduled	SH 349	SH 176 to Midland County line	Texturize Shoulders	$80,984
Construction Scheduled	SH 349	Martin County line to Pueblo St	Texturize Shoulders	$12,158
Construction Scheduled	SH 349	At BS 349C	Install Intersection Flashing Beacon, Install Advanced Warning Signals and Signs	$54,828
Construction Scheduled	FM 1208	FM 1212 to Midland County line	Texturize Shoulders (profile Pavement Markers)	$21,498
Finalizing for Construction	Loop 250	0.7 mi W of Fairgrounds to 1.0 mi E of Fairgrounds	Construct Overpass, Mainlanes and Ramps	$13,646,000
Finalizing for Construction	Loop 250	BS 158B to Fairgrounds	Frontage Road Rehabilitation	$3,898,000
Finalizing for Construction	BS 349C	Martin County line to Loop 250	Roadway Rehabilitation	$5,650,000
Long Term Planning	IH 20	0.4 mi E of SH 349 overpass to Martin County line	IH 20 Corridor Study	$30,000,000

Transit

As discussed earlier, EZ-Rider does not have plans for transit system expansion within the study area. The intensity of development needed to support fixed-route transit is not anticipated in the foreseeable future. Demand response paratransit is the only transit service expected to be implemented in the study area.

Bikepath Improvements

The City of Midland has a 2015 Trails Plan, as discussed earlier, but this focuses on the core of the community. No specific bike paths are foreseen to be implemented within the study area outside of Loop 250 or east of Big Spring Street. The largest potential for bicycle facilities in the study area is Hogan Park which serves the surrounding neighborhoods and has planned connections to the south as well as an internal network of trails.

With the implementation of new roadways in the area, there is the potential for bike lanes or sidepaths within the study area as the area develops. These projects could be incorporated in roadway designs already planned for implementation in the MTP. These bicycle facilities could supplement the Trails Plan in connecting the emerging neighborhoods north of Loop 250 to Hogan Park, local schools, and the other amenities within Midland.

Freight/Goods Movement

Input from the stakeholder interview process revealed a desire for freight/good movement as a tool to support land planning considerations. The economical driver of goods movement and the oil/gas industry in Midland should be supported for continued growth of the area. The presence of major freight routes, such as SH 349 and Loop 250, has the potential to impact the future land use development pattern in the future and impacts to freight movement from congestion on these roadways.

No specific improvements in the study area were identified to support freight/goods movement in the Vision 2040 MTP. The development of major freight routes, such as SH 349 and Loop 250, does impact the movement of freight to improve truck movement efficiency. The development of reliever routes for commuter travel also serves

to benefit the movement of freight in the area by moving this kind of traffic away from the regional movement.

Summary

Connectivity and Continuity Gaps

The underdeveloped nature of Northeast Midland's roadway network can be seen in the connectivity and continuity gaps common throughout the area. Segmented roadways, mainly county roads and private roads, traverse the study area but fluid connections between these roadways to create a complete network are lacking. For north-south movement, Big Spring Street/SH 349C, Elkins Road, and FM 1208 are the only continuous roadways in the area, while east-west, Loop 250 is the only major roadway providing continuous connection. Within the study area, CR 40 and CR 60 also serve east-west connections but do not provide continuous connections between multiple major roadways.

These gaps in the local transportation network hinder the mobility in the entire area and negatively affect major corridors, such as Loop 250 and Big Spring Street, by funneling local traffic onto these facilities instead of a local network that could support this type of traffic. With the availability of developable land and historic trends of growth in Midland, Northeast Midland serves as a prominent location to accommodate this growth, but the connectivity and continuity gaps in the network hinder the efficiency and quality of this development.

Barriers to Implementation

The physical and political environments uncovered in this study revealed many opportunities and constraints for the continued development and implementation of a transportation network in Northeast Midland.

Environmental

The various bodies of water, including floodplains and playas, pose the largest physical constraint for roadway alignments through the area. The level terrain and largely undeveloped land of Northeast Midland allows roadways to be aligned to preserve these water resources.

A cursory overview of other environmental and historical constraints found that this area of Midland is largely clear of obstacles toward development. The lack of water for development hinders potential development, but physical environmental or historical constraints are not prominent in the area.

Political

The availability of funding poses the largest barrier to the implementation of a transportation network in the study area. A balancing of funding in the Permian Basin region and differing priorities within Midland slows the rate with which a more connected and complete roadway network can be implemented in Northeast Midland. Additional state funding through recent propositions, such as Proposition 1 and Proposition 7, can help the regional considerations of Northeast Midland, but the remaining local network will be limited to local funding.

The desire from both stakeholders and the public to complete existing regional assets, such as Loop 250, also impacts the timing and availability of resources to implement future corridors in the study area. From stakeholder interviews and public input, it was made apparent that the congestion and safety issues present on Loop 250 need to be remedied prior to the advancement of new major corridors in this area. This commitment will assist in the near-term development adjacent to Loop 250, but will slow the progress of filling connectivity gaps in the study area as a whole.

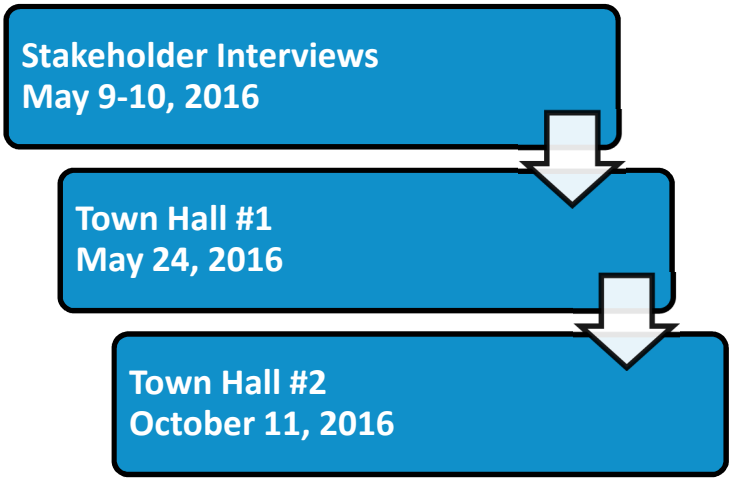
Growth in the County

About 20 percent of the study area is located outside Midland's city limits or ETJ. Texas law only allows control of the subdivision of land and dedication of roadway right-of-way within the ETJ. Outside the ETJ, there are no controls on land, land use, or its subdivision. Continued growth in the county may affect the development of key corridors from a right-of-way perspective outside the city and ETJ. The close proximity of development to property lines may inhibit necessary right-of-way needs to implement key arterial or collector class facilities. Further, uncontrolled growth could limit the ability to provide connections to key roadways within the study area.

CHAPTER 4: VISIONING

The Transportation Stakeholder Interviews and Initial Public Involvement

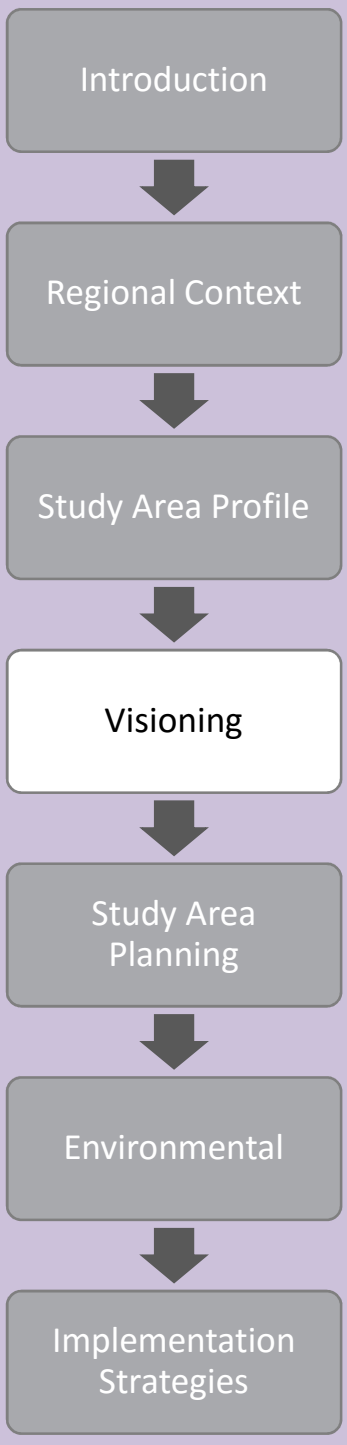
A public involvement plan was created at the outset of the project to engage the public and stakeholders in the planning process of the study. Meetings were scheduled with stakeholders, civic groups, and the general public throughout the conduct of the study to include participation throughout the study area. These meetings were organized to educate the public on the information gathered during the study process, encourage feedback on the process and results of the study, and engage the community of Northeast Midland to ensure a common vision for the future of the study area is created.



Stakeholder and Agency Input

Prior to meeting with a large public audience, the planning team met with key stakeholders from throughout the study area, including members of City Council, County Commissioners, civic group leaders, and other community activists. The group met on May 9 and 10, 2016, for individual interviews with the stakeholders in the community and discussed political, environmental, traffic, and safety related issues. These stakeholders provided a

Chapter Guide



comprehensive understanding of the existing conditions of Northeast Midland and their thoughts on the opportunities and barriers for planning a future mobility corridor through the study area. This session laid the foundation of key concerns that were later developed in the public meeting.

The stakeholder interviews resulted in general themes on characteristics in Northeast Midland, a vision of how the area should develop over time, and concerns in the study area. A comprehensive list of the results from the stakeholders is available in **Appendix B**, but is summarized as follows,

Characteristics of Northeast Midland

- Largely undeveloped; wide open spaces
- Rural quality of life
- Lack of water/wastewater infrastructure
- Disconnected roadway network
- Potential for development

Vision for Northeast Midland

- Community growth
- Preservation of community character
- Promote local development through increased accessibility
- Framework for an integrated, multimodal transportation system
- Economic growth through increased mobility
- Safety and efficiency of the roadway system
- Safety

Concerns in Northeast Midland

- Loop 250 still incomplete
- Lack of backage road system to Loop 250
- Truck traffic interfering with daily life/commuter traffic
- Traffic congestion and crashes along SH 349C and Loop 250

- Expanding water/wastewater systems could be a challenge
- General safety is important, especially with an emerging cycling community
- Oil businesses pose a challenge to development of the area

Stakeholders also provided information regarding specific traffic congestion and safety concerns, environmental constraints, and potential mobility corridor alignments for a future regional corridor through Northeast Midland. This input was utilized to compile a list of potential mobility corridors and vision and goals for the initial Town Hall meeting. Figure 30 illustrates the potential corridors and goals crafted in the stakeholder interview process and brought to the public for input at the initial Town Hall meeting.

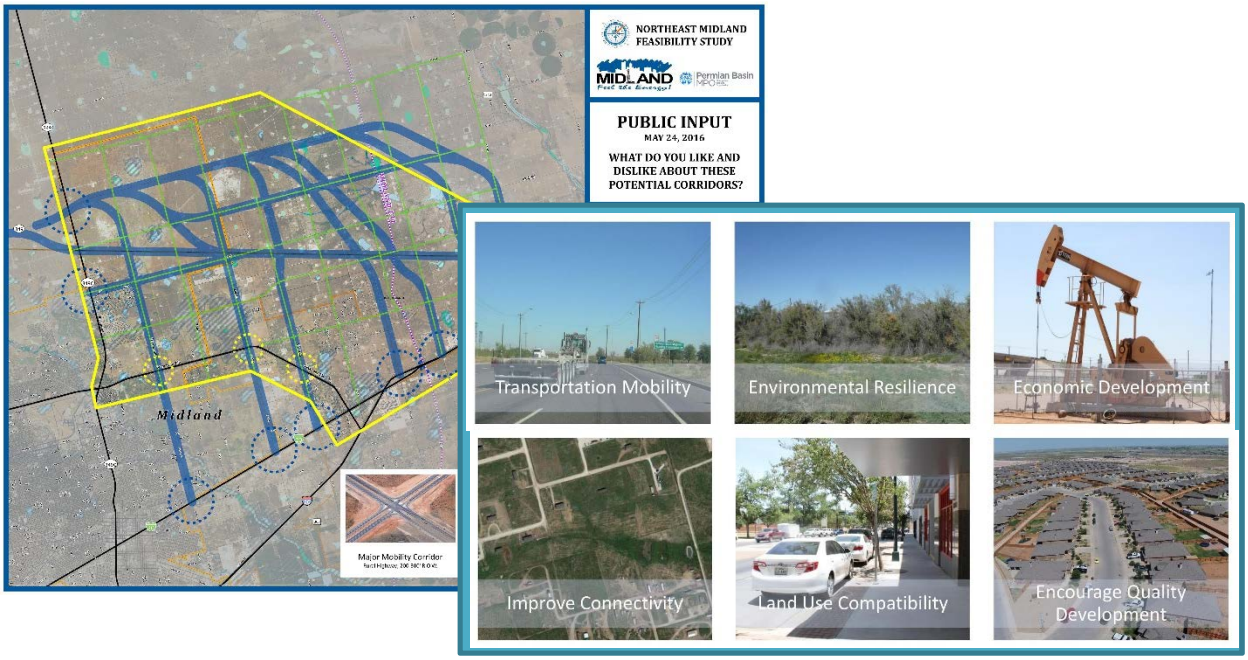


Figure 30: Initial Input to Potential Regional Corridors

Study Oversight Committee Meeting #1

A study oversight committee (SOC) consisting of representatives from the City of Midland, Midland County, Permian Basin MPO, and TxDOT as well as local developers and residents was formed at the beginning of the study to oversee the direction of the study and provide in-depth input into the process.

In combination with the stakeholder interviews held in early May 2016, the initial study oversight committee meeting was held on May 9, 2016 to introduce the project and gain any additional input regarding vision and goals and existing conditions in the study area. Since many of the committee members had been interviewed through the stakeholder input process earlier in the day, minimal additional comments were submitted during this meeting. The main area of concern was regarding the implications south of I-20 with the implementation of a regional corridor through Northeast Midland. Like the development of Loop 250 terminating at I-20 and CR 1130, the termination of a mobility corridor

through Northeast Midland at I-20 would have indirect and cumulative impacts on the area south of I-20 surrounding the Greenwood community. The consideration of this impact was determined to be vital in the future analysis of any major corridor in the area.

This input and general agreement with the study positioned the team for the initial Town Hall meeting to present the initial findings and stakeholder input to the public as well as gain insight from the public on the issues prominent in the study area.

Town Hall Meeting #1

An initial public meeting was held to gain input from local residents and other members of the community in Northeast Midland. This meeting was held on May 24, 2016, where citizens gave input on topics similar to those the stakeholders gave. This included information such as existing conditions in Northeast Midland, any issues present in the area, vision and goals for the study area, and potential corridor alignments.

The Town Hall meeting began with a brief introduction to the project, including the project's goals and objectives. The audience was then dispersed to four different tables where they could interact with a member of the planning team more closely. Each table focused on a different aspect of input the planning team wished to receive from the public, including vision and goals, existing conditions, potential mobility corridor location and termini, and response to potential mobility corridor alignments identified through the stakeholder interview process. The smaller group format encouraged audience participation and provided a setting better suited for personal questions. After the breakout session, the entire audience gathered together again and heard a summary of the common themes heard at each table from the planning team members.

The meeting was well attended with 54 participants signed-in. A summary of concerns and suggestions from this group is as follows:

Vision and Goals

- Most supported vision statement phrases:
  - Preservation of community character
  - Safety of the roadway system
  - Connectivity
- Support for existing six goals (Transportation Mobility, Environmental Resilience, Economic Development, Improve Connectivity, Land Use Compatibility, Encourage Quality Development)

Issue Identification

- Finish Loop 250
  - Need intersection improvements at Loop 250 @ Fairgrounds and Loop 250 @ Elkins (safety concerns and school bus movement)
- Emergency services: no resources to reach out into this area
  - EMS response times
- Concern of land use: business vs. homes
- Increase in traffic and speed on SH 349C

Identify a Mobility Corridor

- Need improvements to N/S corridors (Fairgrounds, Todd, Elkins)
- Need to get to/from SH 158
- Get ROW now before it gets too expensive
- Logical termini: Craddick Hwy @ SH 349C; along I-20 between BI-20 interchange and FM 1208
- Path should keep north to avoid residential and business development

Reaction to Potential Corridor Alignments

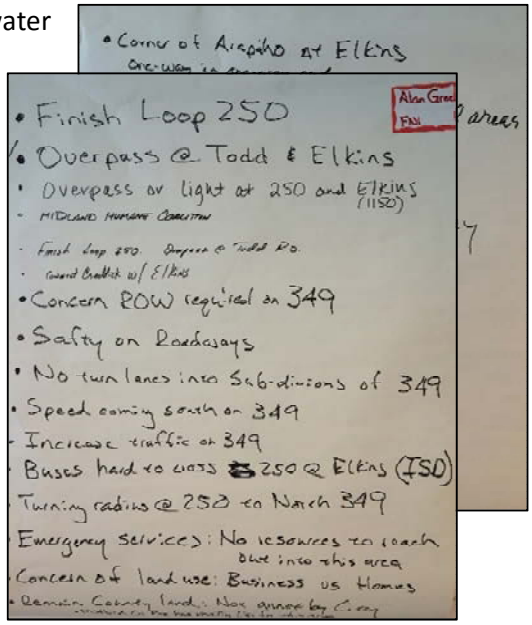
- Concerns for major mobility corridor along Fairgrounds
  - Too many existing developments
- Concerns for major mobility corridor along county line
  - Impacts to residences
- Mixed support for major mobility corridors along Elkins
  - Positive for truck movement
  - Negative for adjacent residential developments
- Support for corridor alignments from Craddick Hwy @ SH 349C running north of Reece Albert and terminating along I-20 east of interchange with BI-20
  - FM 1208 termini may be too far out

Meeting with Martin County Commissioners

In addition to stakeholder interviews and public meetings, a special meeting was held on May 24, 2016, with the Martin County Commissioners to ensure their input was received. The Martin County Commissioners' input was vital to the study due to the large portion of the study area located in Martin County.

The Commissioners' voiced a concern for timing of growth of the area as there has been historically very little to no net growth in Martin County from the study area profile, Martin County grew by -0.1 percent from 1990 to 2010. The Commission was also hesitant toward an outer mobility corridor through the study area due to the property ownership in the area. The southern portion of Martin County is made up of large parcels with ownership that is unlikely to sell or develop in the foreseeable future. Additionally, the area within Martin County is limited by the lack of infrastructure to support expansive growth into Martin

County. It was not seen that the roadway, water, and wastewater infrastructure needed to implement major development would be possible in the planning period due to the high public cost.



Summary of Stakeholder and Initial Public Input

Stakeholder interview and public input at the initial Town Hall provided insight into the existing conditions and problems within the study area of Northeast Midland. A concern for the long-range planning of mobility corridor when other regional corridors were still in initial phases, i.e. Loop 250, was frequently expressed with a desire for those corridors to be completed first before planning too far in advance for the next project. The study area's lack of a cohesive local area network and framework for future development was also expressed. This feedback resulted in the study steering towards a larger focus on defining a local transportation network with an eye towards potential future regional needs as development occurs in the area.

The vision and goals expressed during the input process toward maintaining the rural community character of the area and providing better mobility and accessibility within the area were key in defining the need and purpose of the project. Additionally, the impacts of a mix of residential and industrial travel needs in the area and constraints to development in Martin County were insightful for defining the needs in the area.

Need and Purpose

Need for the Project

Extensive growth within the study area requires that varying levels of transportation corridors be defined within the study area. This need has been identified as a result of input from stakeholder and public meetings, as well as discussion with the City of Midland Staff and Councilmembers, Midland County Commissioners, Martin County Commissioners, Permian Basin Metropolitan Planning Organization (MPO) staff, and TxDOT Staff. Project definition is needed to identify local area network versus potential freight/regional corridors in Northeast Midland. Locally, further definition of the roadway network outlined in the Comprehensive Plan is needed to support:

- Continued growth and economic development within this sector of the community;
- Connectivity between established roadway corridors, both within the city and counties;
- Mobility enhancement and safety needs within the area;
- Reduce area congestion experienced on the current roadway network; and
- A unified vision and orderly development by establishing priority corridors.

Regionally, definition of potential major corridors in this study area is needed to support:

- Potential regional or freight mobility/by-pass for the community;
- Identification of logical connections, or termini, that supports a potential regional corridor;
- Identification of key corridors for the focus of truck movement;
- The separation of local and trucking activities to avoid conflicts between trucking activities and local traffic including residents, school buses, and other private and public vehicles; and
- Connectivity to potential greater regional transportation systems including, La Entrada, Interstate Highway 20, Craddick Highway, State Highway 349, Farm-to-Market Road 1208, and State Highway 158.

Purpose of the Project

The purpose of the project is to designate local area networks and potential regional/freight corridors for future evaluation. This definition will serve to support the development of a safe, effective, and efficient local transportation system in Northeast Midland which provides internal connectivity to the currently disjunct roadway network within the project area and would connect the project area to the broader regional network. A potential regional facility within this network would serve to improve safety by routing trucks off local serving roadways onto a major mobility corridor. The local roadway network would also allow for continued development of the project area, while preserving the community character, through the improved access to, within, and from the area, thereby stimulating the area to new residential, commercial, and industrial development.

Summary Statement

A recommended Need and Purpose statement for further studies on the project is as follows:

> Northeast Midland is currently experiencing substantial growth due to the proximity to amenities within the City of Midland but lacks the necessary internal and external transportation access to support continued development. The purpose of the project is to designate a local roadway network and potential regional/freight corridors from the subarea network for future evaluation which will serve to support the development of a safe, effective, and efficient transportation system for all users. This system would serve to improve safety by routing trucks off of local serving roadways and onto a major mobility corridor and would provide a framework and unified vision for future development in the area.

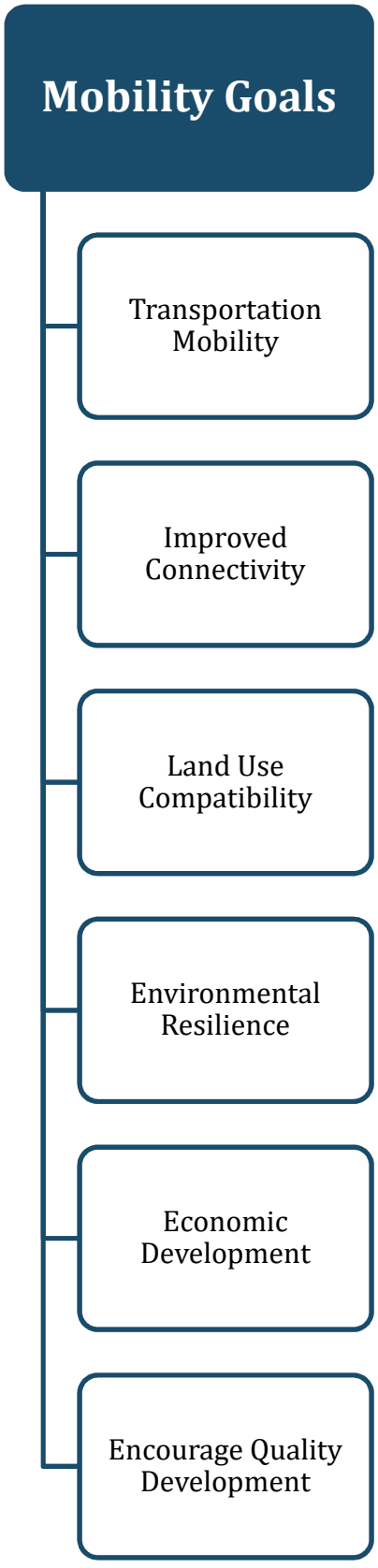
Goals and Vision

Public input was used as a basis for deriving key goals and a vision for the Northeast Midland transportation network as future studies and development further its development.

Goals

The mobility demands and methods to address these issues help to define the goals and objectives for potential transportation corridors moving forward. Six key goals for a mobility corridor in Northeast Midland as defined through public and stakeholder input includes:

- *Transportation Mobility:* Trucks and local traffic should be able to navigate through Northeast Midland safely and efficiently.
- *Improved Connectivity:* Connectivity between existing and future development should be encouraged to support local movement within the area without disrupting the major regional corridors.
- *Land Use Compatibility:* Local land uses and developments as well as projected growth should be considered when developing the potential transportation corridors.



- *Environmental Resilience:* Impacts to natural resources should be minimized or negated.
- *Economic Development:* Growth and development should be encouraged along the corridor and be overseen by the City of Midland and Midland County.
- *Encourage Quality Development:* The corridor network should support and encourage a development pattern that enhances the local quality of life for existing and future neighborhoods.

Vision

The definition and implementation of a transportation network that will preserve the community character and support orderly growth of high quality development while providing for the safe and efficient travel of all users through a highly connected network of streets and roads.

CHAPTER 5: STUDY AREA PLANNING

Conceptual Land Use Planning

The right for municipalities to coordinate growth is rooted in the need to protect the health, safety, and welfare of its residents. An important part of establishing the guidelines for such responsibility is land use planning, which establishes the overall framework for the preferred pattern of development. While the city maintains regulatory control over the land use development inside through city limits through zoning, this regulation does not exist in the ETJ or county jurisdiction.

The study area's location consisting of mainly city ETJ and county jurisdiction means that an official Land Use Plan will not be enforceable as development occurs unless the city begins to annex these areas into the city limits. To help guide the creation of a transportation network, future land use scenarios were developed. A preferred scenario was identified by the planning team and stakeholders that is intended to function as a high-level guide allowing staff and decision-makers from Midland, Midland and Martin Counties, and TxDOT to make infrastructure and transportation decisions that are coordinated with long-term potential land use decisions. This plan does not serve as THE Future Land Use Plan, like that of a comprehensive plan, but intended as a guide to assist in transportation planning for the area.

In order to create the land use scenarios, a variety of different factors were considered:

- **Existing conditions:** including existing land uses, the existing transportation network, environmental conditions, and physical constraints.
- **Past planning efforts:** including the Tall City Tomorrow comprehensive plan adopted by Midland in 2016, planned and potential development projects, and past planning studies.

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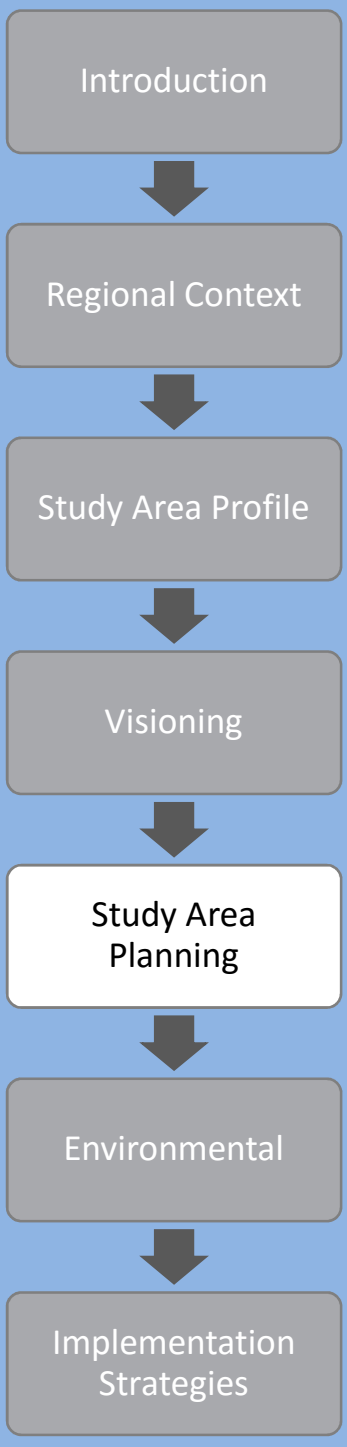


- **A visioning process:** including city staff and stakeholder input to remain consistent with the expected development type and intensity in the area.

Based upon these factors, two different land use scenarios were developed. Both scenarios maintained the land use plan within the city limits as outlined in the Tall City Tomorrow plan. Minor adjustments or further definition was made as existing or proposed developments were incorporated into this study. Details pertaining to these two scenarios are described in more detail to follow.

Land Uses

The Tall City Tomorrow specifically served as a basis for the land use planning as definition to the area west of Elkins Road was all included in this planning effort. The land use categories of this plan were also maintained for consistency with some minor modifications to reflect the more rural nature of development in Northeast Midland. The land use categories utilized and their definitions are as shown to the right and continued on the next page.

Residential – Low/Large Lot	Intensity (DU/A): >1
Description: Rural neighborhoods with very large lot, single-family homes and other rural land uses.	
Residential – Low	Intensity (DU/A): 1-6
Description: Neighborhoods emphasizing single-family detached homes.	
Residential – Medium	Intensity (DU/A): 6-12
Description: Neighborhoods that incorporate a mix of housing types, including single-family detached, single-family attached and townhouse uses. Civic uses would also generally be allowed.	
Urban – Low	Intensity (DU/A): 2-7
Description: Neighborhoods with relatively low-density housing and easily accessed neighborhood commercial services. As compared to denser areas, Urban-Low has more space and separation of uses, with farther distances between destinations and fewer shared amenities.	
Urban – Medium	Intensity (DU/A): 7-12
Description: Vibrant, urban areas that draw customers and employees from outside the immediate area. A mix of housing types, neighborhood and community commercial, office, and service uses.	
Urban – High	Intensity (DU/A): 12+
Description: Higher-density mix of housing, major commercial, office, and service uses, and limited industrial in suitable locations.	
Urban – Neighborhood Center	Intensity (DU/A): 10+
Description: Village hubs for the city's growth areas. They should offer small to moderate scale commercial development connected to an anchor store surrounded by a mix of housing types.	
Employment Reserve	Intensity (DU/A): N/A
Description: Areas preserved for larger business development essential to Midland's economic stability and future growth. These areas protect larger acreages to maximize clustering for specialization, synergy, transportation efficiency, and knowledge exchange.	

Concept 1

A nodal scenario was prepared to demonstrate potential development around the major regional corridors within the study area.

Features of the nodal scenario are as follows:

Business Park	Intensity (DU/A): N/A
Description: Development area along the I-20 corridor where special consideration should be given to the image travelers have as they pass through Midland. Preservation of sites suitable for industrial and business development adjacent to railroad and interstate access is important to the economic development of the region.	
Civic/Institutional	Intensity (DU/A): N/A
Description: To provide space for educational, institutional, assembly, and other public uses, including hospitals, major campuses, cemeteries, airport, landfills, water plant, and major utilities.	
Parks/Open Space	Intensity (DU/A): N/A
Description: Areas intended to remain undeveloped and natural or recreational in character.	

- Land uses west of Elkins Road will remain consistent with the Tall City Tomorrow plan with a few adjustments. The area north of Loop 250 between Todd and Elkins was altered to be residential development due to the incoming development being constructed. Existing residential development around Elkins and CR 40 were identified and accommodated. The area on the far north of the study area west of Elkins was defined as a civic/institutional uses due to discussions of a potential airport at this location in the future. Similar uses to those identified in Tall City Tomorrow was extended to the proposed civic/institutional uses. Other supportive employment reserve uses were extended along Elkins adjacent to the potential airport location.
- Nodal development around I-20 and Loop 250 was defined with medium-density urban uses closest to the intersection and transitioning outward to residential and neighborhood commercial uses that provide a cohesive node of mixed-uses.
- The existing residential development surrounding CR 60 is assumed to remain and continue its low-density form.
- Continued business park development that is oriented toward industrial businesses is located along the I-20 corridor with supporting railroad infrastructure and backage road structure.
- At the I-20 at FM 1208 intersection, an additional node of commercial development is expected to coincide with the access at this location to I-20 and further development of Greenwood.
- Finally, on the northeast portion of the study area, the rural nature of Martin County is assumed to remain intact consistent with feedback the team received from stakeholders and constraints of the area for development.

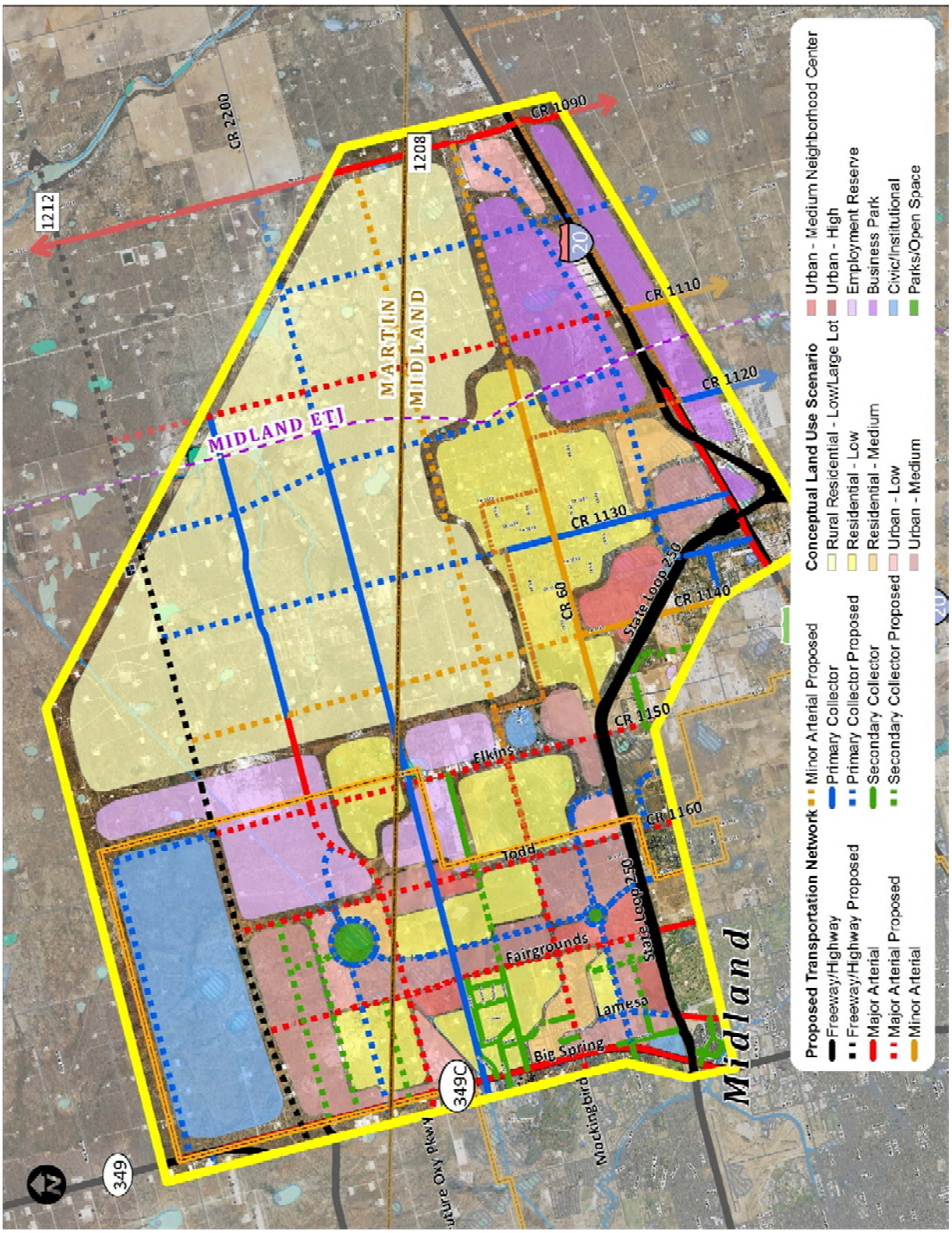


Figure 31: Land Use Concept 1

Concept 2 (Selected Scenario)

A second scenario, with linear development along Loop 250 and I-20, was also prepared and determined to be the preferred land use scenario by the city staff and stakeholders.

Features of the preferred scenario are as follows:

- Unchanged from the first scenario, the land uses west of Elkins remained consistent with Tall City Tomorrow with a few adjustments. The area north of Loop 250 between Todd and Elkins was altered to be residential development due to the incoming development being constructed. The housing around Elkins and CR 40 were identified and accommodated. The area on the far north of the study area west of Elkins was defined as a civic/institutional uses due to discussions of a potential airport at this location in the future.
- Circumferential development around the east side of Loop 250 is focused on the highest intensity near the corridor transitioning into lowering intensities as it moves into Martin County. Nearest the Loop will be an expectation for a mix of medium-density commercial and residential development. About a mile outside Loop 250, it will begin to transition to low-density residential development which is already beginning to occur in the area.
- Continued business park development that is oriented toward industrial businesses is located along the I-20 corridor with supporting railroad infrastructure. This is expected to be a narrower strip of industrial development than the previous scenario with the area being less intensively developed.
- Finally, like the previous scenario, the rural nature of Martin County is assumed to remain intact consistent with feedback the team received from stakeholders and constraints of the area for development.

The lower intensity of development and broader shape of potential land uses were key components in the linear development scenario becoming the preferred scenario by city staff and stakeholders. With the largely rural nature of the area and lack of land use controls by the city, this scenario provides a greater future potential condition of the area as well as, provides flexibility in the future as more development definition occurs.

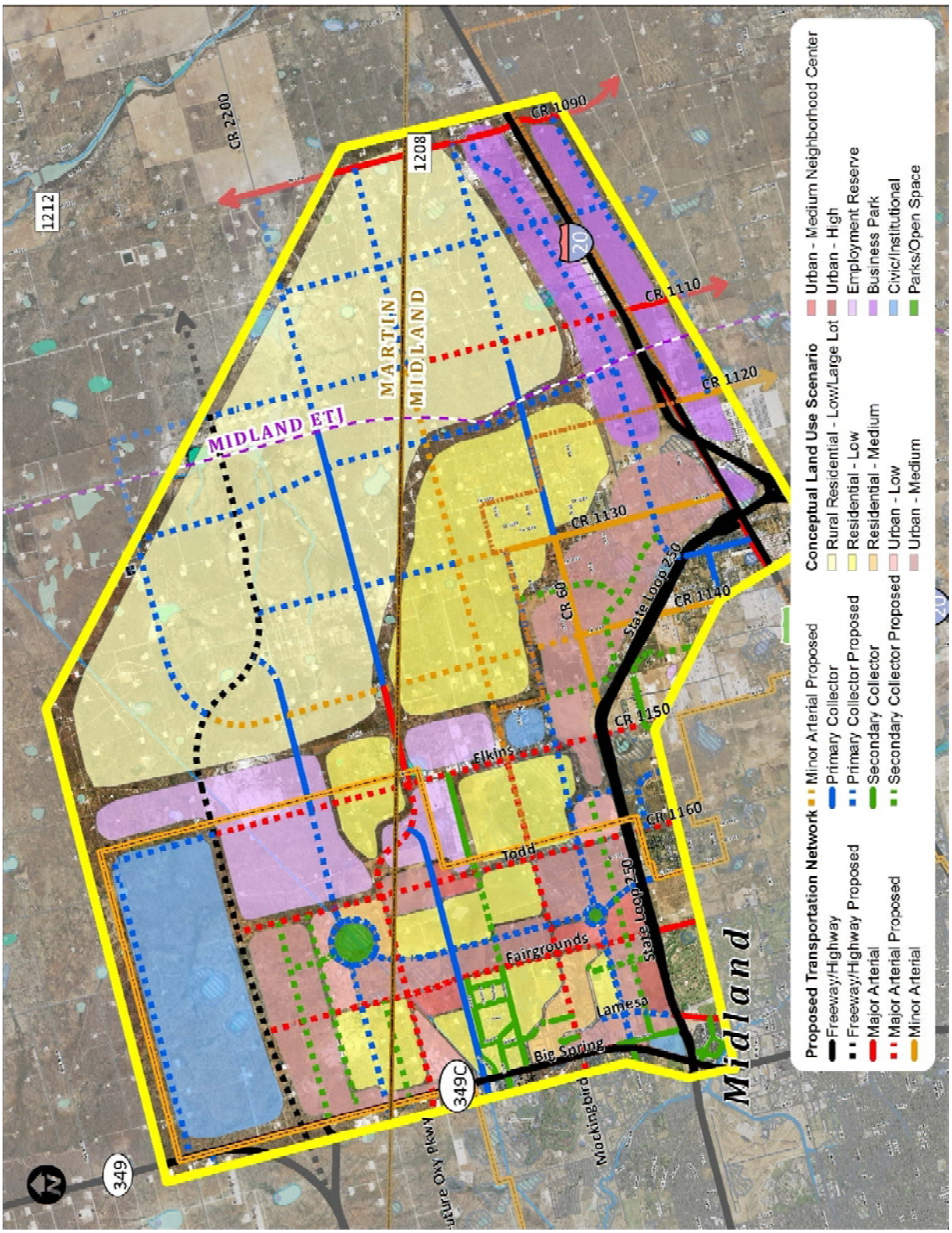


Figure 32: Land Use Concept 2 (Selected)

Transportation Network

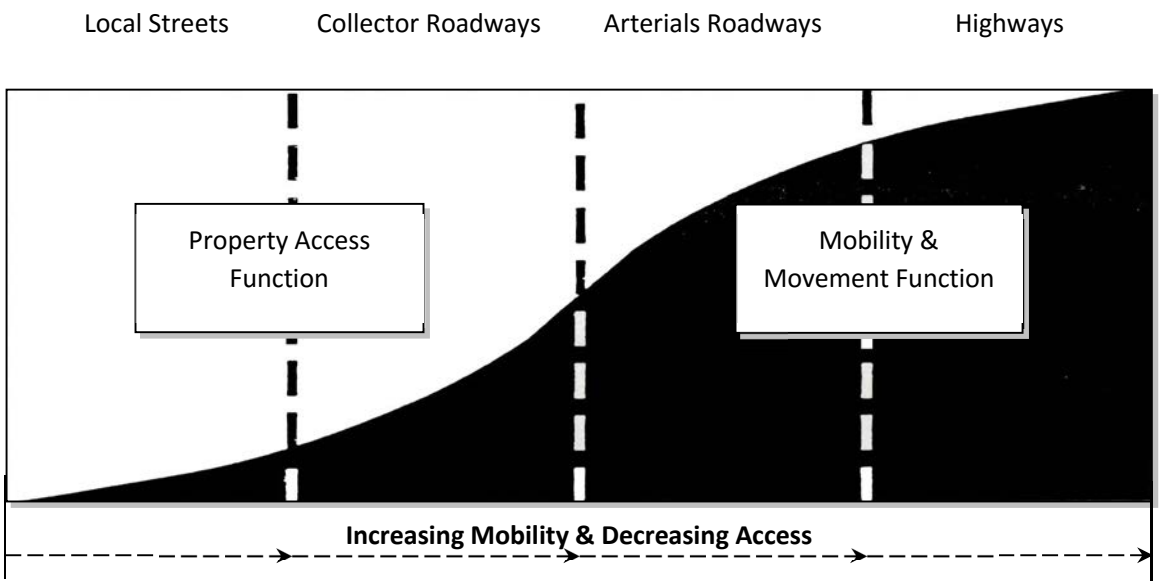
Using the land use concept determined to lay out the expected development of the study area, a transportation network and functional classification hierarchy could be developed to serve the area. The land uses served to define the density and intensity of the roadway network throughout the study area. As density increases, more transportation infrastructure is needed so arterial spacing and frequency is smaller. In rural areas, such as that in the northeast portion of the study area in Martin County, the larger parcels and lower density of residences and businesses requires less transportation infrastructure to serve the needs of the development so the spacing between major facilities is increased. A map of the roadway network, functional classifications, and interchange/overpass locations is shown in Figure 33.

Study Area Local Network Definition and Functional Classification

Functional Street Classification

The functional classification of streets provides for the circulation of traffic in a hierarchy of movement from one classification to the next. Functional classes can be subdivided further into major and minor designations to further detail their role in the community.

Access and movement functions are directly related in that as inhibited movement increases (speed), points of access decrease and vice versa. This is typically why freeways, with a high level of movement,



Functional Classification System

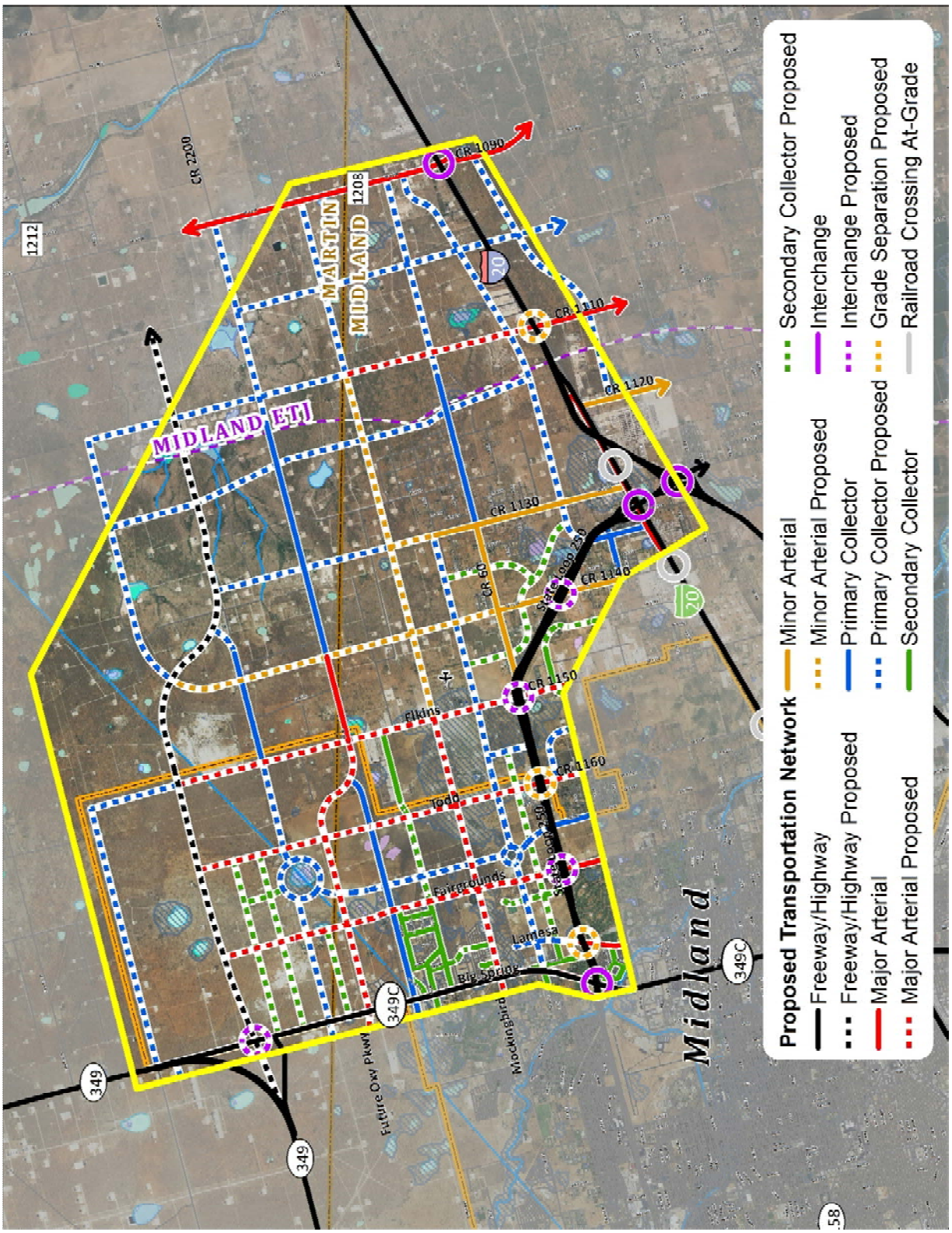


Figure 33: Proposed Transportation Network

have limited access points whereas streets in neighborhood areas have more access points and reduced speed. Midland's current Thoroughfare Plan recognizes four general classifications for roadways based upon a hierarchical function and were retained as part of this planning update. These include local streets, collector roadways, arterial roadways, and highways. The arterials are also split into major and minor categories and collectors split into primary and secondary to emphasize the more prominent roadways of these street types in the network. Planning for the local area network kept the same classifications as those defined by Midland's Thoroughfare Plan to maintain planning consistency.

Transportation Plan Integration

In addition to maintaining consistency with Midland's Thoroughfare Plan's functional classification system, the Plan's network defined in Tall City Tomorrow was maintained in the western portion of the study area. From Big Spring Street to Elkins Road, the transportation network was defined as part of the transportation planning effort in the Tall City Tomorrow Plan. The network in this area was largely maintained to comport with public input and vision established as part of that study. Alterations were only made on a couple east-west corridors to properly tie-in with roadways east of Elkins Road. This includes a realignment of the Future Oxy Parkway east of Todd Road to tie-in with CR 40 to avoid negatively impacting Timber Wolf Estates and an extension of the east-west primary collector adjacent to Loop 250 on the north to serve other development east of Elkins Road. The interchanges and overpasses along Loop 250 and the intersecting roadways was also maintained from that of Tall City Tomorrow.

The continuation of the grid network was also continued into the eastern portion of the study area mimicking the existing network inside Loop 250 and the area planned between Big Spring Street and Elkins Road as part of Tall City Tomorrow. The typical one mile spacing of roadways is consistent with the existing disconnected infrastructure in the area which includes various county and private roadways.

Additionally, the transportation plan's north-south crossing of I-20 account for the existing crossing and constraints produced by the federal highway and adjacent railroad. This led to the prioritization of FM 1208 and its existing interchange with I-20 and the addition of an overpass of an additional north-south roadway between Loop 250 and FM 1208.

Land Use Considerations

The lower density development of this region is reflected in the spacing of the major corridors outside of Loop 250. The first arterial (Mockingbird) is spaced one mile north of Loop 250 with the following arterials (Oxy Parkway, Craddick Highway extension) each being spaced 1.5 miles from the previous arterial. The tighter spacing of the mile grid near Loop 250 is due to the anticipation of more intense development along this corridor. With development becoming more rural radially away from Loop 250, larger spacing between the arterials will continue to meet the transportation needs of this area.

For the rural residential in the northeastern portion of the study area, the very low density of development does not warrant arterial class facilities by traffic generation, so a gridded collector system was identified to meet the needs of this area with adjacent major facilities in the Craddick Highway extension and FM 1208 serving the mobility needs to travel to the regional roadways in the area.

In addition to the gridded arterial and collector system, a system of backage roads was developed paralleling Loop 250 to provide access and local movement between the residences and businesses in this area. A backage road paralleling I-20 was also developed to serve the anticipated industrial development along this corridor and provide access to the connection points at Loop 250 and FM 1208 onto I-20. These backage roads, spaced roughly 1200' to 1500' from the major regional corridor they support, provide relief to regional corridors by moving local traffic off these corridors onto the backage road. This allows the regional corridor to serve as solely a mobility corridor with the backage road serving the accessibility needs of the area.

Regional Considerations

In addition to providing a framework for local area mobility and accessibility, an eye was kept on the regional needs of the area. This includes the relief of SH 349C/Big Spring Street, especially at the intersection with Loop 250, and enhancement of the Ports to Plains Corridor movement. Planning for the relief and support of these travel movements led to the identification of specialty corridors

WHY BACKAGE ROADS?

- Provide access to a greater number of individual properties
- Supports development along both sides of the road, rather than just one on frontage roads
- Greater access leads to increased land value
- Minimizes impact on highway/arterial mainlanes by moving visual distractions, headlight glare, and intersection congestion
- Provides another ingress/egress point for trucks and service vehicles

within the local area network. Input from stakeholders and the public directed the need for separation of commuter traffic from the commercial and industrial traffic generated by the oil/gas industry and trucking in the area. Specialty designations of "commuter" and "regional" corridors were developed from this input to help identify any potential corridors that would meet this need.

Commuter Corridor

- The commuter corridor was determined to be a specialty corridor type that could specifically support the growth of residential and retail development in Northeast Midland as well as connectivity of parks and other community amenities along this corridor. With this type of development beginning to occur along Big Spring Street and expected to continue in this direction, an arterial-type facility designated to serve this type of traffic is needed to protect and support this future growth. This corridor is intended for vehicular mobility in addition to accommodations for other non-motorized transportation modes to create transportation choice and connections to area neighborhoods.

Regional Corridor

- A regional corridor designation was determined as a specialty corridor type that could support the larger regional movement and potential trucking travel patterns in Northeast Midland. For vehicles traveling to or from the North on SH 349, a singular path along SH 349C/Big Spring Street to Loop 250 limits the options for reaching I-20 and SH 158 on the south side of Midland. This limitation leads to heavy congestion at the intersection of SH 349C and Loop 250 with it only expecting to get worse in the future. By designating an additional path(s) within the local transportation network in Northeast Midland, vehicles can divert from SH 349C/Big Spring Street and travel an alternate path to Loop 250 or I-20 thereby relieving this intersection.

Specialty Corridor Selection

Using the land use concept, potential specialty corridors were identified based on the context of surrounding uses and its position in the overall transportation network. Highway and arterial type facilities were the only base network corridors considered for a specialty corridor designation due to the heavier vehicles volumes expected for commuter and regional corridors. A map of the commuter and regional corridors identified in the evaluation process of this study are shown in Figure 34.

A single commuter corridor was identified – Fairgrounds Road. The corridor bisects an area in Northeast Midland of residential and neighborhood commercial/retail uses. This context is conducive toward

providing mobility and accessibility to the residences and businesses traveling into or out of the core of Midland. The corridor's proximity to Big Spring Street providing a parallel route also provides a backage facility for the residential development occurring along Big Spring Street. Identifying Fairgrounds Road as a commuter backage for Big Spring Street provides a safer alternative for the turning movements and needs of commuter traffic within these neighborhoods and enhances the flow of the regional and heavy vehicle traffic along the existing Big Spring Street.

Multiple potential corridors were identified as regional corridors in order to create a complete path from the initial termini along SH 349 at Craddick Highway. The regional corridors identified include an extension of Craddick Highway, Elkins Road, and FM 1208. An initial regional path extending the Craddick Highway eastward to Elkins Road, near the Reece Albert pit, then south toward Loop 250 was identified to support the regional movement and local mobility of heavy vehicles in Northeast Midland. As the area continues to develop, a later evolution of the regional corridor through the study area was anticipated to extend Craddick Highway further to the east and connect with FM 1208 which would head south toward Greenwood. This connection is expected to provide access to SH 158, but further evaluation of this path and timing is needed in the future as the region continues to grow.

Elkins Road was identified as the initial north-south regional corridor due to existing and growing industrial development along the corridor, but also limited existing development along the corridor which is conducive for redefining the corridor in the near future. The mix of development surrounding the corridor, especially south of Loop 250, does position the corridor to a roadway section that may differ from the Craddick Highway extension to meet the needs of these adjacent uses. Elkins Road's overpass over I-20 and connection to the tank farm also positions the corridor well for a heavier use than simply a local arterial. Similarly, FM 1208's existing interchange with I-20 positions this corridor as a potential future regional corridor connection due to the interstate access that it provides.

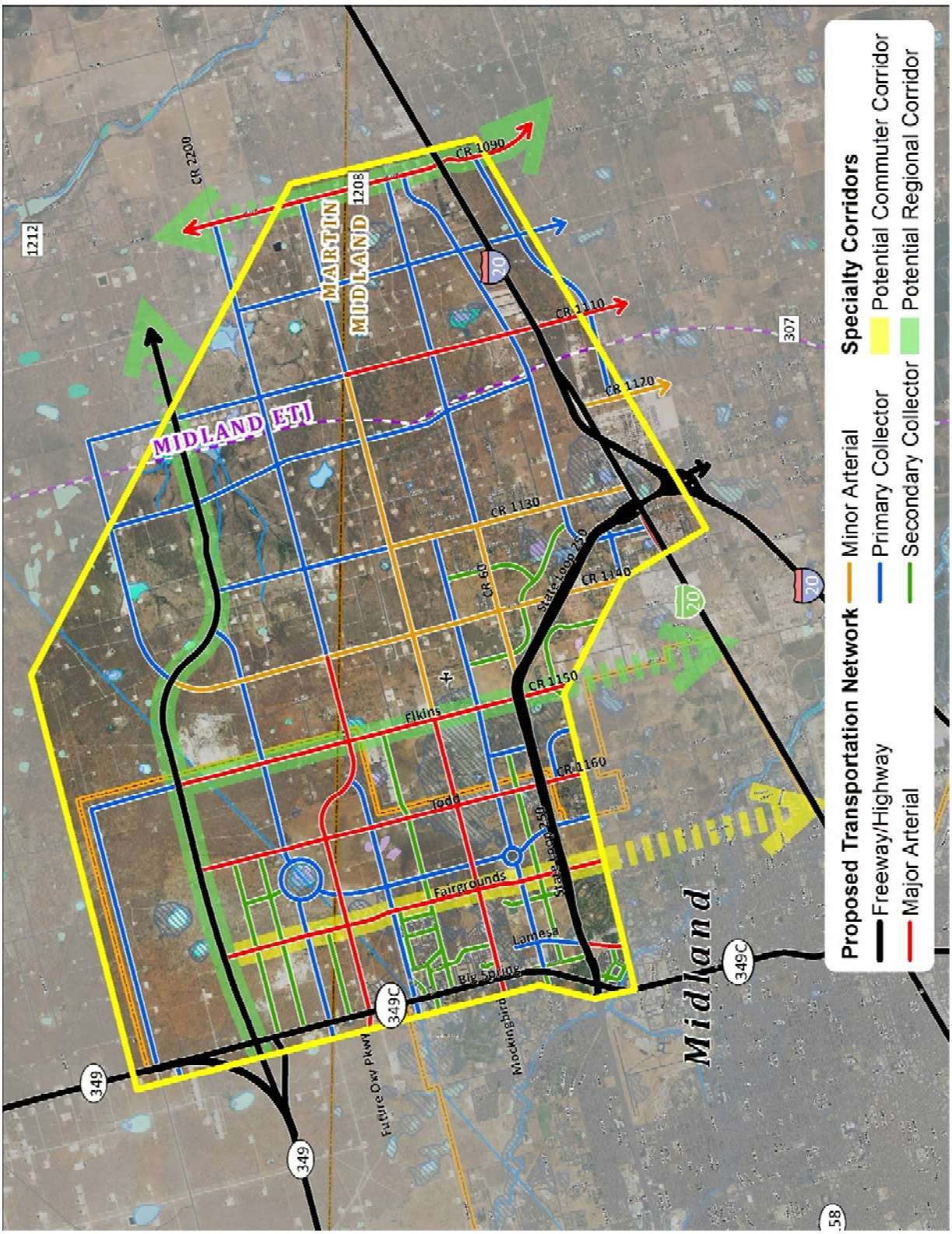


Figure 34: Potential Specialty Corridors

Potential Roadway Sections

The roadway sections, and specifically, the potential right-of-way (ROW) needs of the transportation network were also considered for the various functional classifications and specialty corridors. The designation of ROW is critically important to ensure sufficient ROW is acquired to implement the facility but also to determine the action required by the City as development occurs in the area.

Special corridor sections were developed by the planning team to meet the needs of each corridor and were presented to the public at Town Hall #2 for input and comment. The sections for potential development in the future are described below.

Commuter Corridor

The commuter corridor, identified along Fairgrounds Road, is expected to require special consideration to accommodate the context of development surrounding the roadway. The adjacency of mixed residential and commercial along this corridor led to a focus on protecting vulnerable users, such as pedestrians and cyclists, by providing greenery and amenities to support these transportation modes. Four potential sections were developed for this corridor with varying amenities for pedestrians, cyclists, transit, and automobiles. All of the proposed sections provide four travel lanes for vehicles as well as sidewalks for pedestrians. Narrower travel lanes reflect the residential/retail nature of the corridor and the type of land use interaction expected along it. The ROW varies from 128’ to 180’ for the commuter corridor.

Commuter Corridor 1: A boulevard section with a wide median for pedestrian movement and small pocket parks along the corridor for open space amenities. Protected bike lanes are also included paralleling the vehicle travel lanes and can be placed along either the inside or outside travel lane.

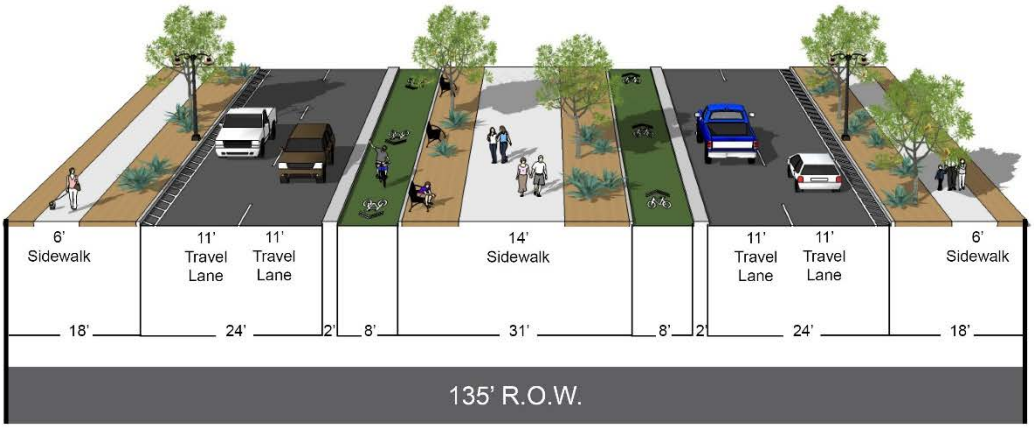
Commuter Corridor 2: A multi-way boulevard section providing parallel parking along the one-way slip-road for adjacent businesses. Bicycle facilities are also included within the slip-road lane due to this lane’s lower design speed. Sidewalks are also included at the edge of the ROW for business access and movement in addition to a sidewalk in the median between the main travel lanes and slip-road for linear movement along the corridor and transit stop access.

Commuter Corridor 3: A more traditional section that provides outside protected bike lanes and a wide parkway with sidewalk for pedestrians.

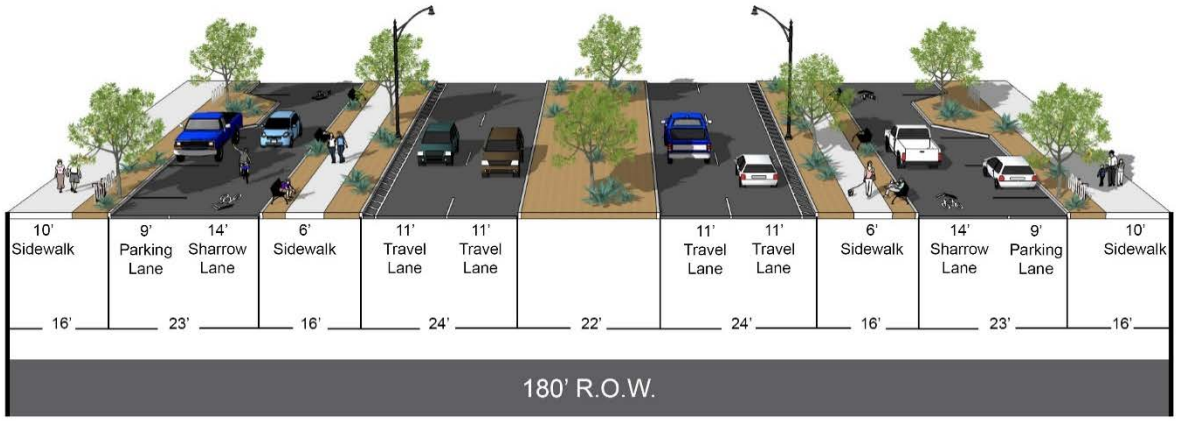
Commuter Corridor 4: A multimodal corridor section with bus/transit lanes in the center median and protected bike lanes and sidewalk for pedestrians on the outside of the travel lanes.

The variety of corridor options promote different aspects of transportation and accessibility for residences and businesses. A combination of these sections may likely be needed in the eventual implementation of the corridor to meet the changing needs and context along the corridor.

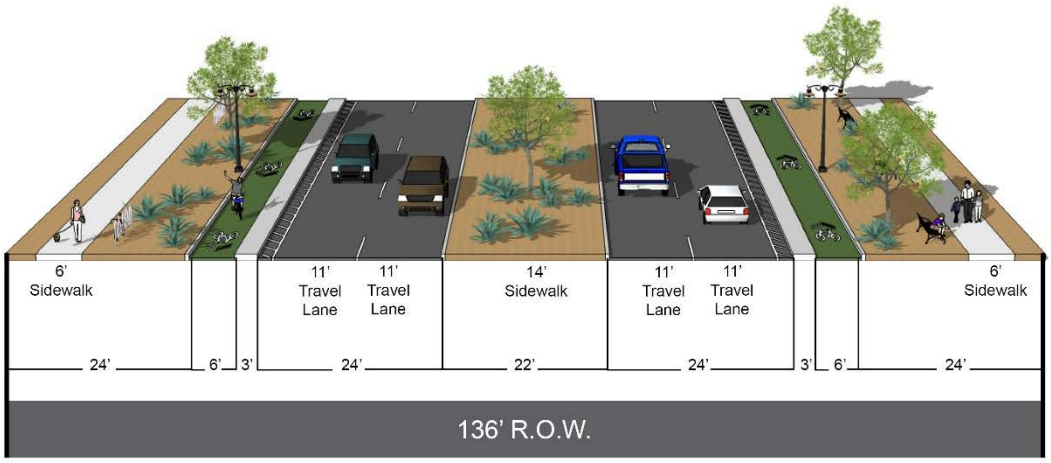
COMMUTER CORRIDOR 1



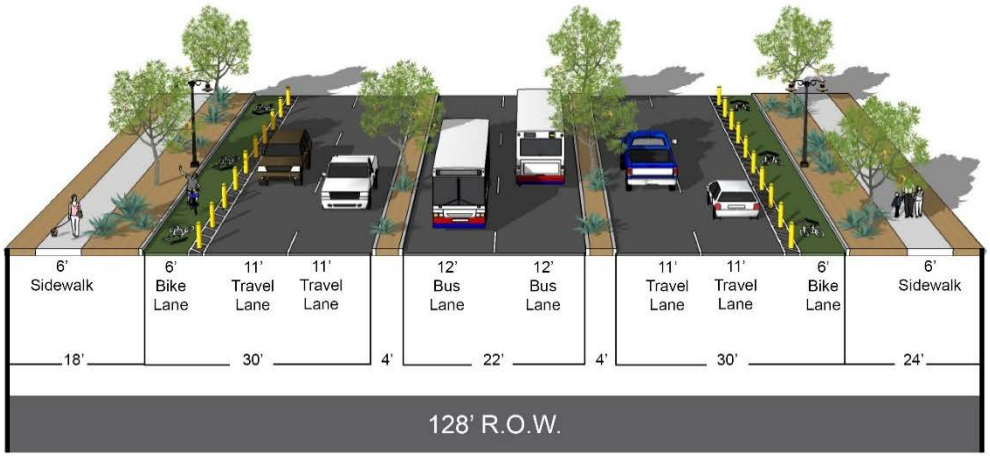
COMMUTER CORRIDOR 2



COMMUTER CORRIDOR 3



COMMUTER CORRIDOR 4



Regional Corridor

The regional corridor, identified along Elkins Road, the extension of Craddick Highway, and potentially FM 1208, is expected to require a special section to accommodate a greater regional travel pattern of Northeast Midland. The adjacency of growing industrial development and connections to other major regional facilities, including SH 349, Craddick Highway, and Loop 250, led to a focus on designing a corridor for trucking and regional travel with more minimal accommodations for residential travel and vulnerable users. Wide travel lanes and shoulders are provided on these sections with minimal landscaping to reflect the industrial nature of the corridor and higher speed and larger vehicle expected along the roadway. This corridor varies more greatly in ROW and sizing than the commuter corridor due to the potential for major regional travel in the future depending on how the area develops. The ROW varies from 140' to 300' for these potential sections.

Regional Corridor 1: A super-arterial section with wide travel lanes and shoulders to accommodate oversized vehicles and turning movements. A wide sidepath is included on one side to accommodate recreational pedestrian and cyclist movement.

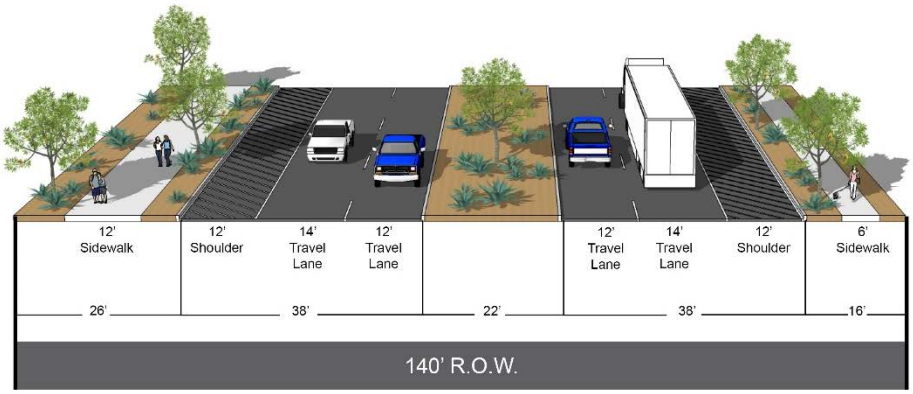
Regional Corridor 2: A rural highway section without frontage roads. Like existing Craddick Highway, this section provides wide lanes and shoulders with no amenities for other transportation modes. This section is designed for higher speeds and mobility rather than accessibility.

Regional Corridor 3: A super-arterial section with slip-road on one side to accommodate local access needs for residential subdivisions and businesses. The wide travel lanes and shoulders are also included like Regional Corridor 1.

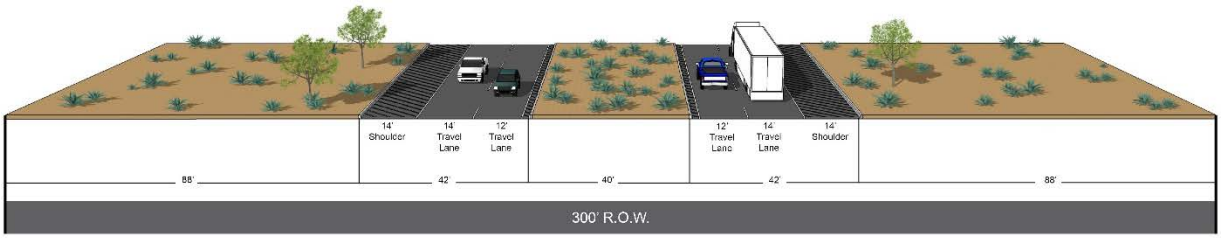
Regional Corridor 4: A rural highway section with frontage roads. This section provides wide lanes and shoulders with additional frontage roads for access to businesses and a sidepath for pedestrian amenities.

The range from super-arterial to rural highway along the regional corridor reflects the potential constraints and changing needs along the corridor in the future. With multiple corridors identified as regionally significant, different sections may be needed for each to meet the context. For example, Elkins Road may develop as a super-arterial type section due to the constraints of existing development while the Craddick Highway extension may develop as a rural highway to mimic the existing Craddick Highway corridor. These sections may change over the length of the corridors as well to meet the mobility and accessibility needs of the surrounding land uses.

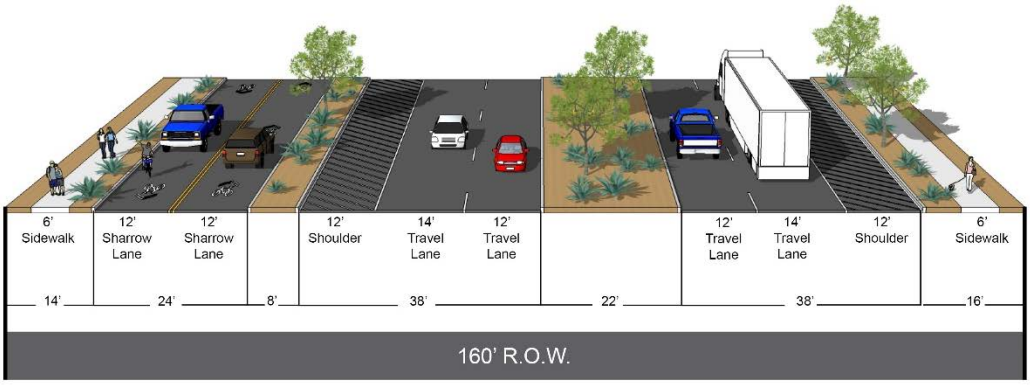
REGIONAL CORRIDOR 1



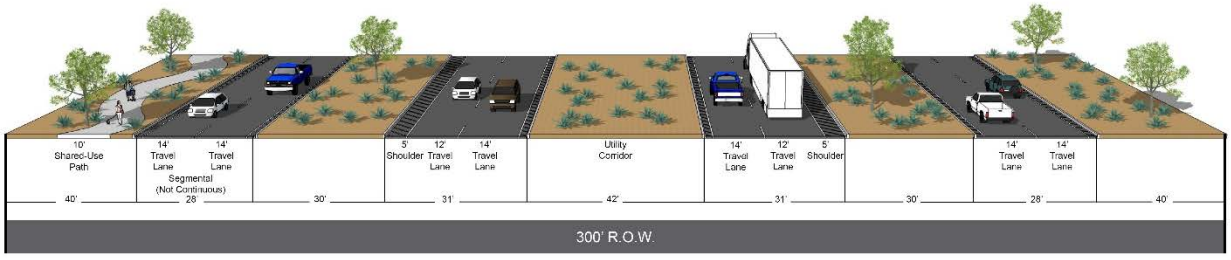
REGIONAL CORRIDOR 2



REGIONAL CORRIDOR 3



REGIONAL CORRIDOR 4



Standard Roadway Functional Classifications

The remaining roadways within the study area will follow the sections and requirements set forth in the Tall City Tomorrow Plan and the City's standard paving details, as summarized in the following table.

Classification	*ROW Width*	*No. of Lanes*	*Lane Width*	*Sidewalk Width*	*Bike Lanes*	*Median*
Major Arterial	150'	6	12'-13'	6'	Yes	26' Raised
Minor Arterial	120'	4	12'-13'	6'	Yes	16' Raised
Major Collector (Option 1)	100'	5*	12'-13'	6'	Yes	None
Major Collector (Option 2)	100'	4	11'-13'	6'	Yes	16' Raised
Major Collector (Option 3)	65'	3*	11'-12'	6'	Yes	None

*Includes center two way left turn lane

Other Transportation Considerations

Railroad Crossings

A major obstacle to the development of north-south regional corridors in Midland is the railroad paralleling I-20/BI-20. The connection between the north and south sectors of the city is paramount for regional travel, especially to connect SH 158 with SH 349 to the north of the city. As shown in the Study Area Profile, limited at-grade or grade separated crossings exist along the railroad. With the potential development of Elkins Road as a regionally significant corridor, a new crossing will need to be installed at this location to provide connectivity between the north and south. Prioritization of north-south corridors by the city will be required to determine the best approach to gain this crossing, whether the cost is worth a grade separation on Elkins or if other crossing(s) can be forfeited to gain an at-grade crossing.

Additionally, the constraints posed by the combination of the railroad and federal facility (i.e. I-20) limits the connections into the regional network by the local transportation network in Midland east of Loop 250. The existing interchange at FM 1208 provides the nearest access to and crossing of I-20 east of Loop 250. An additional overpass was identified midway between Loop 250 and FM 1208 to provide connectivity between the Northeast Midland north of I-20 and Greenwood, but a new interchange connection with I-20 is not anticipated to be feasible at this time due to the physical, regulatory, and financial constraints.

Active Transportation Concepts

The incorporation of active transportation concepts (i.e. pedestrian, bicycling, etc.) was included in the development of specialty corridor sections to support alternative modes in the area. By allowing walking or cycling for short trips, additional vehicle traffic can be removed from the roadway reducing congestion. The provision of accommodation for these modes also provides a safe space for these vulnerable users, whether recreational or utilitarian, from the faster moving vehicular traffic.

Future updates and integration with the Hike and Bike Plan is also necessary to ensure continuity is kept throughout the network so active transportation modes can be used between Northeast Midland and the core of the City. Purposeful connections across major roadway facilities, such as Loop 250 and Big Spring Street, are vital to the development of a comprehensive hike and bike network.

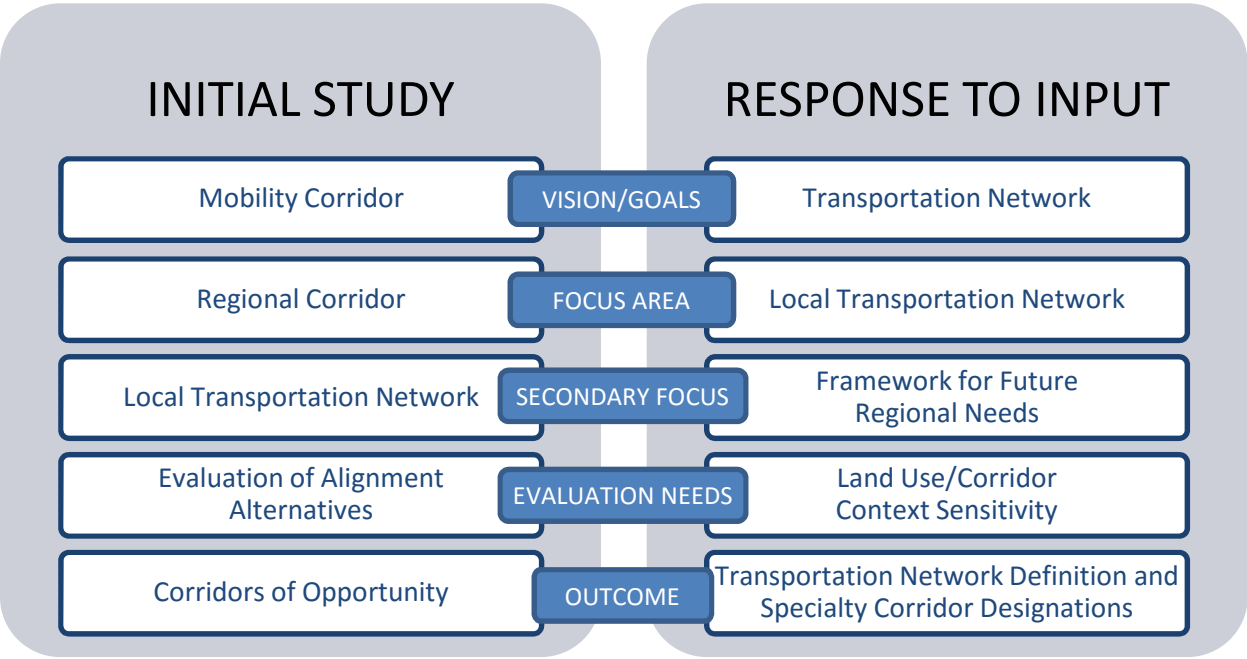
The potential for fixed-route transit was also considered along the commuter corridor, Fairgrounds. While EZ-Rider does not expect a fixed-route in Northeast Midland at this time due to the low density of the area, the area's rapid growth could warrant the need in the future. By planning now, the pieces to create smart and efficient accommodations can be set aside for use in the future.

Public Involvement – Conceptual Plan Input

Study Oversight Committee Meeting #2

After the initial development of land use concepts and corresponding transportation networks, a follow-up study oversight committee meeting was held to update the committee on the progress of the study and redirection following the stakeholder and public input. This meeting detailed the shifted focus from the identification and evaluation of regional corridor alternatives to a focus on the development of a local roadway network framework.

A general agreeance from the committee confirmed the land use concept and transportation network developed in the study. Minor adjustments were made to alignments and functional classifications from comments received during this meeting. Comments were also addressed pertaining to the specialty corridor roadway sections.



Town Hall #2

To verify the study's direction and outcomes, a second Town Hall meeting was held on October 11, 2016 at the Hispanic Cultural Center of Midland. The study team updated the public on the progress of the study, development of land use concepts, transportation network planning, specialty corridor definitions, and potential environmental constraints. Citizen input was requested to ensure the study was meeting the expectations of the public and transportation network planning reflected the input and desire expressed at the initial Town Hall.

The Town Hall meeting format paralleled that of the first meeting by beginning with a brief overview of the project and progress since the previous meeting. The audience was then dispersed to tables setup with graphics showing the details of the plan including environmental constraints in the study area, the selected land use concept, the local transportation network, and potential sections for specialty corridors. During this time citizens were provided the opportunity to interact with the study team and City Staff to express any opinions or concerns regarding the plan. After this breakout session, the audience gathered again and heard a summary of the common themes heard by planning team members during the breakout session.

This meeting, like the initial Town Hall, was well attended with a total attendance of 61 participants signed-in. A general agreement was received from the participants in regard to the structural layout of the transportation network and thought processes that went into its development. The commuter corridor's aim to be less intrusive to residential activity and inclusion of bicycle facilities was well received. General approval of the regional corridor was also received, but concerns due to existing development such as Timber Wolf Estates and other emerging

residential development were also voiced. Comments pertaining to minor adjustments to specialty corridors were also heard to better accommodate cycling.

A focus on the implementation of the various corridors was also seen through the public input session. The importance of interchanges and main lane implementation along Loop 250 were reiterated due to the tragic safety issues ongoing along the corridor.

Overall, the study's redefined focus with transportation network and specialty corridors was well received by the public and seen to reflect the values and vision of the area to support structured growth in the future.

Outcome

Input from stakeholders and the public at the initial Town Hall meeting caused for re-evaluation and redirection of the focus of the study which led to the development of conceptual land use scenarios and definition of a transportation network to support long-term growth in Northeast Midland. In the second Town Hall and coordination with the Study Oversight Committee, general approval of Land Use Concept 2 was received along with the local transportation network and specialty corridors. Goals and vision developed from initial input was brought into the area's planning which was well received by the public and stakeholders.

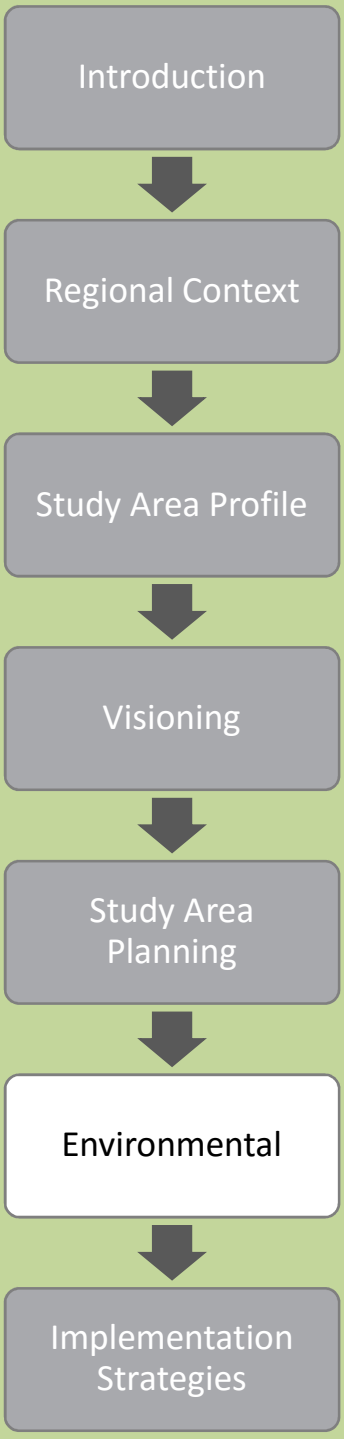
CHAPTER 6: ENVIRONMENTAL

Environmentally Sensitive Receptors

Environmental features present in the project area consist of manmade and naturally occurring features. The predominant naturally occurring features are the numerous playa lakes that are dispersed across the land scape. These playa lakes have several functions that make them valuable resources. These functions include water storage, flood attenuation, groundwater recharge, and wildlife habitat. Some playa lakes may be considered waters of the U.S., therefore any impacts to jurisdictional playas would require authorization from the U.S. Army Corps of Engineers (USACE) Fort Worth District prior to any activity that would result in the placement of fill or dredged materials within their boundaries. The jurisdictional status of the playa lakes can only be determined by the USACE. An important natural feature in the project area is Mustang Draw, which is located near the eastern edge of the study area and is likely a jurisdictional water. Mustang Draw provides a unique habitat in the area due to the presence of potential wetlands, a stream channel or swale, and the associated wooded riparian corridor. There is no mapped floodplain of Mustang Draw or the remainder of Martin County. This does not mean that a floodplain is not present, only that no data exists for the area regarding floodplains. Any development in the area should consider proximity to Mustang Draw and any potential effects of a floodplain. The Draw also serves as a minor barrier to development, and its capacity as a barrier should be considered in locating any transportation corridor.

There are four federal threatened or endangered species listed for Midland and/or Martin County by the U. S. Fish and Wildlife Service. These include the least tern (Sterna antillarum), piping plover (Charadrius melodus), red knot (Calidris canutus rufa), and whooping crane (Grus americana). Of these four species, only the whooping crane requires consideration for non-wind energy related projects.

Chapter Guide



The whooping crane is a potential migrant to the area, but any impacts to this species are unlikely and would likely be considered minor. State listed species as listed by Texas Parks and Wildlife Department (TPWD) are shown below in Table YY. Prior to the final development of any transportation route, a survey should be conducted to determine if habitat is present for any of these species. If present, actions to avoid these species should be considered, including adjustments to any roadway alignment and coordination with TPWD.

A review of the TPWD's Natural Diversity Database indicated one occurrence of a species of concern, black-tailed prairie dog (Cynomys ludovicianus), just northwest of the study area and no occurrences of any species of concern within the study area. A full list of threatened and endangered species in Midland and Martin Counties can be found in Appendix C.

The predominant manmade features are the numerous oil and gas wells and well pads. These are not concentrated in any specific area, but tend to be scattered throughout the project area as well as all the surrounding areas. These wells should be considered in siting the roadway, and appropriate measures should be taken if any wells would be located in the project ROW. Review of the 2010 census data and the field visit indicate that there are likely Environmental Justice and Limited English Proficiency (LEP) populations within the area. There is an area with over 50% minority persons located in the southwest portion of the project area south of Loop 250 and east of Branch 349. These populations must be considered in developing the alignment of any proposed roadway to ensure that they are not impacted disproportionately from the remainder of the area's population.

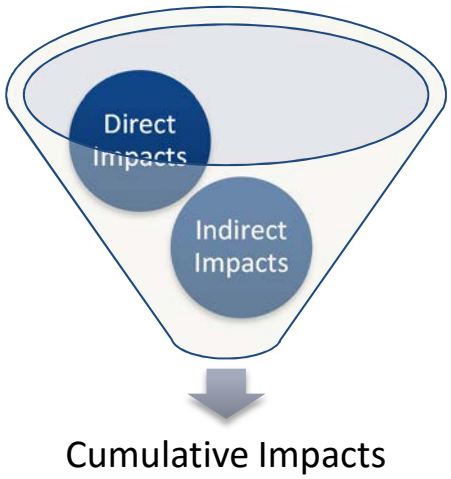
Additionally, there is a park located south of Loop 250 and east of North Lamesa Road. This park would likely be a Section 4(f) property. In addition, Resthaven Memorial Park, a cemetery, located at the northeast quadrant of the North Big Spring Street/Loop 250 interchange. A mausoleum and cemetery as well as an area with potential cultural remains are located north of Arapahoe Road and east of North Big Spring Street.

Scattered previously recorded archeological sites are located mostly in the western part of the project area. The majority of the study area has not been investigated for cultural resources. Archeological surveys will be required prior to any further project alternative development.

Land use features that may serve as constraints are located in various parts of the project area. These include concentrations of housing south of Loop 250 and between N County Road 1160 and North Big Springs Street, North of US 80 and east of Loop 250, east of Big Spring Street and from 1.0 to 2.5 miles north of Loop 250. A quarry is located north of IH 20 just east of its intersection with US 80. A small airport with a grassy runway, Ryan Aerodrome, is located east of County Road 1150 and north of Loop 250. Glide slopes for this facility could create some design constraints for features such as bridges and lighting.

Indirect and Cumulative Impacts

Indirect and Cumulative Impact analysis are required under the National Environmental Policy Act (NEPA) TxDOT for projects with federal funding triggers NEPA review. State-funded projects may also be required to follow a similar process to meet TxDOT's requirements. This is relevant to the city for the Northeast Midland Feasibility Study because priority projects identified by the City may eventually be identified as eligible for some level of funding administered by TxDOT, which in turn would make those projects subject to their environmental analysis and clearance criteria.



The Texas Council for Environmental Quality provides specific definition of impacts and effects that are caused by a proposed transportation project to area land use and the environment. Specific guidance for analyzing direct impacts (predictable end results), indirect impacts (reasonably predictable effects that occur later in time), and cumulative impacts (effects which have resulted from incremental impacts added to other past,

present or reasonably foreseeable future actions) are provided by TxDOT, NCHRP and AASHTO to assess project implications as codified by NEPA. A white paper in Appendix A details references and steps for proper evaluation, analyses and environmental documentation. Other key items are referenced below.

Scoping and Stakeholder Involvement

Scoping is a process used to determine the extent of the analysis needed and to define the study area. During the NEPA compliance process, scoping is an early initial step and can include early discussions of indirect and cumulative impacts considerations. The scoping process has two overall goals: (1) determining the level of effort and approach needed to complete the analysis, and (2) determining the location and extent of the indirect effect or cumulative impact study area. During the feasibility study stage, it is recommended that stakeholder groups be identified early in the process and that coordination and consultation with those groups be maintained up to and throughout the NEPA compliance process. This is because those stakeholders will be familiar with larger regional goals and can bring that understanding to the feasibility study and/or NEPA analysis. Additionally, during the feasibility study stage, those stakeholders will develop an understanding of the background information relevant to each project; this understanding will be carried forward into the NEPA phase of analysis.

For the Northeast Midland Feasibility Study, the established stakeholder advisory group should be maintained when projects are advanced to NEPA analysis—the stakeholder group can provide consistency within the planning and environmental compliance process. Scoping activities can include public and agency meetings as well as specific stakeholder meetings. Recommended scoping activities that could smoothly transition into NEPA could include the following:

- Regular coordination among the study team and the project's sponsors and stakeholders
- Agency stakeholder meetings
- Public involvement through public information meetings
- Distribution of a questionnaire to local agencies and organizations

INDIRECT EFFECTS ANALYSIS STEPS

- Assess the Potential for Increased Accessibility
- Assess the Potential for Induced Growth
- Assess the Potential for Impacts to Sensitive Resources
- Assess Potential Minimization and Mitigation Measures

Source: American Association of State Highway and Transportation Officials' (AASHTO) *Assessing Indirect Effects and Cumulative Impacts Under NEPA* (August 2016).

The public and stakeholder meetings could be used to introduce the project to the general public and to solicit comments and input on the project as it progresses. Meetings with neighborhood associations, environmental groups, and other stakeholders will result in an improved NEPA product with more community understanding during the indirect and cumulative impacts assessment component of the compliance processes.

If other planning efforts are underway, such as Planning and Environmental Linkage studies, they should be referenced as a project moves from feasibility into the NEPA phase. This will ensure that cross-referencing allows maximum utilization of other studies that have been completed.

Good Planning Ideas

- Draw information about modal options from existing planning documents to inform the NEPA analysis.
- Connect public involvement efforts from the planning process (i.e. Mobility 2035) to public involvement for the NEPA analysis and continue the conversation from planning phase to the implementation/NEPA phase.
- Utilize NEPA issues in planning - if large-scale study areas can be investigated at a high level during planning studies, that information would be useful for NEPA compliance.
- Identify commutesheds or watersheds that could help define the Area of Influence for indirect effects analysis during NEPA.
- Where applicable, prepare regional studies such as Regional Toll or Environmental Justice analyses that can be used during NEPA by multiple projects/entities.
- Integrate cross-cutting data such as air quality data that applies to both planning and environmental studies.
- Start early to define clear purpose and need statements that form the cornerstone for future development of NEPA projects.

Study Area Resources and Constraints

Understanding existing conditions within a study area is the first step in environmental impact analysis. At the feasibility study stage, environmental constraints data is collected from remote data sources but is not necessarily field verified; field studies for NEPA compliance are most efficient once a project is beyond the feasibility study stage and into the planning and project development process.

For a feasibility study, the environmental analysis entails preparation of a preliminary constraints map and a high level environmental risk assessment based on readily available information from remote data sources identified in Table 11. Constraints information includes but is not limited to developed land uses,

oil and gas resources, biological resources, aquifer limits, potential wetlands, hazardous waste sites, floodplain limits, and cultural resources. During the NEPA phase, this environmental data will be used to evaluate potential constraints to roadway improvements and to determine whether any alternatives have fatal flaws. Often, even when using only high-level constraints data, the data collection and alternatives evaluation process can help screen out alternatives that would not be feasible, allowing the team to concentrate resources on the most potentially feasible options.

For the Northeast Midland Feasibility Study, a general description of constraints is provided in Chapter 3. These provide the basis for understanding key or sensitive constraints that may be of concern moving forward.

General Implications to Potential Regional Corridors within the Study Area

Different methods for evaluating alternatives may be used: using evaluation matrices, vetting alternatives through the public involvement process, and using GIS to analyze alternatives. Whatever the methodology for comparing alternatives at the feasibility level, the environmental evaluation must be clearly documented and technically supported in order to maximize the opportunity to carry these initial selection efforts and analyses into the NEPA phase. When done correctly, this creates a more streamlined environmental documentation process. When a project is actually in the NEPA phase, the alternatives analysis will examine design options in detail, and engineers will work closely with environmental specialists to avoid impacts with time-consuming regulatory compliance or mitigation requirements. Examples of types of considerations that can be analyzed in order to understand constraints to development as well as how one corridor may compare to another corridor are seen in Table 11.

Table 11: Considerations Utilized in an Alternatives Evaluation Process; Environmental Considerations

Historic Resources	Number of recorded historic resources or historic districts within proposed right-of-way (ROW)
Archeological Resources	Number of recorded archeological resources within proposed ROW
Vegetation and Wildlife Habitats/Threatened and Endangered Species	Potential for encountering wildlife habitat/vegetation/T&E impacts within proposed ROW
Land Use	Potential changes in land use due to alternative
Relocations/Displacements	Potential relocations/displacements associated with alternative
Hazardous Materials	Recorded sites associated with proposed ROW areas
Wetlands and Water Resources	Number of NWI features within proposed ROW; total number of water features cross by project; potential Section 404 permit considerations
Parks and Recreational Resources	Number of publicly owned parks impacted or adjacent to alternative
Other Community Impacts including Visual Resources (Environmental Justice Considerations)	Potential for qualitative impacts to community; potential impacts to community cohesion and access; loss of community facilities such as churches and libraries; community cohesion adversely affected by relocations and displacements; potential visual changes

The specialty corridors identified for further investigation in this study are two arterial corridors; stakeholder feedback indicated that improvements to these two corridors may have a higher priority than other areas of the study area.

During the NEPA phase, the direct impacts would determine the potential for indirect and, subsequently, cumulative impacts to occur. Because these are only generalized study corridors, a detailed assessment of potential impacts is not being undertaken at this stage.

TXDOT Methodology for Assessing Indirect Impacts – Induced Land Use Growth Impacts

The indirect impacts analysis would need to be prepared in accordance with TxDOT's Indirect Impacts Analysis Guidance (TxDOT 2016a). The following six-step methodology is currently utilized by TxDOT to conduct induced growth impact analysis:

1. Define the methodology.
2. Define the Area of Influence (AOI) and study time frame.
3. Identify areas subject to induced growth in the AOI.
4. Determine if growth is likely to occur in the induced growth areas.
5. Identify resources subject to induced growth impacts.
6. Identify mitigation, if applicable.

Additional guidance (previously referenced) typically utilized by the project team throughout the analysis includes the 2002 NCHRP report entitled NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (NCHRP 2002), and the NCHRP Project 25-25 Task 22 report entitled Forecasting Indirect Land Use Effects of Transportation Projects (NCHRP 2007).

> INDIRECT EFFECTS are "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."
> (40 Code of Federal Regulations [CFR] § 1508.8)

Numerous methods of analysis are available for the study of the effects of induced growth impacts. The required environmental review document content is as much about which method is selected as explaining how that method was implemented. The document needs to identify very clearly the method of analysis used, the assumptions and limitations involved in that method, and the underlying data used in the analysis. The document also needs to explain how that analysis was applied to produce the documented results. The most common method utilized for TxDOT projects is the "collaborative judgement" method. This involves interviewing local officials who have knowledge of the project area, including development trends and plans. Collaborative judgment can be used for any type of impact (direct, indirect, and cumulative) and might include public involvement and

panels of experts. Collaborative judgment is likely to be viewed as more legitimate than a single planner's judgment, but if one primary local expert is consulted, that may suffice if it represents best available data.

Key Considerations for Defining the Area of Influence for Indirect Impacts Analysis

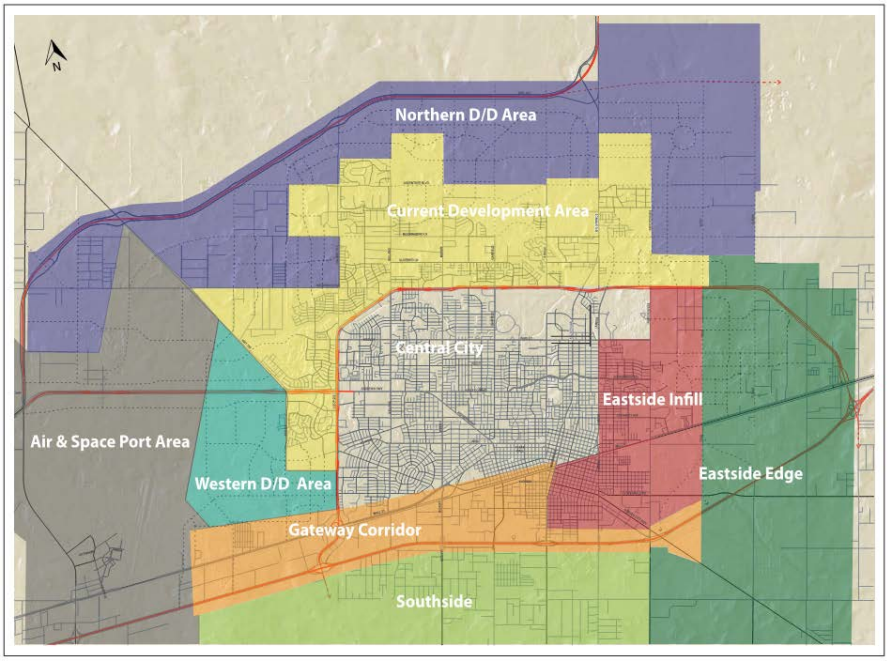
Several techniques are available to determine the appropriate study area for induced growth impacts, or the AOI. These techniques include adopting political and/or geographic boundaries, using the project commuteshed, using the location of the next major parallel roadway, and incorporating input gathered from stakeholder interviews or public involvement. Parcels traversed by or adjacent to the proposed project footprint are also commonly utilized as a beginning point for initial AOI delineation. Parcels that are traversed by or adjacent to the proposed project limits are most likely to experience potential induced growth resulting from the proposed project because of altered existing access or the creation of new access. Combined, these techniques can define the appropriate AOI for the full ranges of potential induced growth effects impacts. Generally, larger project improvements with greater savings in travel time, such as improved mobility and access, have a larger AOI. Large-scale projects of regional importance might have much larger study areas.

Selection of an appropriate AOI also requires consideration of the timeframe. Most analyses use the transportation plan horizon year as the appropriate timeframe for an induced growth impacts analysis. For example, projects located within the City of Midland would rely on the 2040 planning horizon for the Permian Basin Metropolitan Planning Organization's (MPO) Vision 2040 Plan (Permian Basin MPO 2015). Timeframe considerations for an induced growth impact analysis only have a future component, unlike cumulative impacts analyses. While an induced growth impacts analysis does not require a past temporal boundary, the analyst should consider past trends when determining if growth might occur.

A preliminary sample AOI for the commuter and regional corridor improvements that could result from the Northeast Midland Feasibility Study is illustrated in the white paper in **Appendix A**. This AOI is primarily comprised of adjacent parcels and consists of approximately 15,343 acres. Because land development has historically taken place along section lines, there is a visible grid on maps. Development appears to be radiating out from the central city in all directions, including to the northeast. Development seems to have taken place along the network of roadways within this grid, and some development has occurred along the "I" and the "T". In other places, the land is still in use for agriculture or oil and gas industry uses. Meeting with a local expert, preferably with planning responsibilities, is key to learning about platted and planned developments that may take place near the proposed project area. While it is appropriate for these interviews to take place once the actual project is in project development and NEPA compliance is underway, the process of coordinating with local planning experts is described below.

Incorporating Land Use Plans and Policies

Assessing a project's potential to induce development must be considered within the context of the community's plans for its own future, along with the policies it has in place to govern that development. Typically, a city has some land development authority within its city limits (possibly for both full purpose and limited purpose jurisdictional boundaries) and within its extra territorial jurisdiction. Counties in Texas may have some authority to approve subdivision plats but otherwise have limited planning authority. Although not binding, a comprehensive plan is a strong tool for directing future development and can be referenced heavily in the indirect and cumulative effects analysis. If a proposed project is consistent with the economic development and sustainability goals a community articulates for itself (including extensive public involvement), that information helps the analyst determine whether or not the specific project could be linked to substantial indirect or cumulative impacts.



The City of Midland has recently completed a comprehensive planning process entitled The Tall City Tomorrow (City of Midland, 2016 and Carpenter, 2016). In the Comprehensive Plan (CP) there are three sections that include about half of the Midland Feasibility study area, and they are as follows: Current Development Area, North Development and Drilling Area, and Eastside Edge Area. Key areas of study are summarized in Appendix A and include:

- Current Development Areas
- North Development and Drilling Area
- Eastside Edge Area
- Future Land Use Plan
- School District Planning

Encroachment Alteration Impacts

Examples of potential encroachment alteration impacts to biological resources could include, but are not limited to habitat fragmentation, degradation of habitat, disruption of natural processes (i.e. hydrology, species competition, etc.), pollution effects on species, and disruption of ecosystem functioning related

to direct mortality. Potential encroachment on the human environment generally can be attributed to changes in travel patterns and access or direct relocation or alteration of homes, businesses, or public facilities and/or community centers. These direct impacts might lead to indirect impacts on neighborhood cohesion, neighborhood stability, travel patterns, the local economy, access to specific services or products, recreation patterns at public facilities, pedestrian dependency and mobility, perceived quality of the natural environment, personal safety and privacy, and aesthetic and cultural values.

Encroachment alteration impacts are more closely related to direct impacts than induced growth impacts. When looking at a direct impact, it may be most helpful to think about how that impact would look five, ten, or twenty years from construction. Additionally, how the direct impact would impact the resource outside of the project footprint should be considered. Although these impacts will be documented by resource, it is important to remember that resources, both biological and social, are interrelated. A single project action has the potential to impact a variety of resources. For example, the placement of fill into a waterbody could impact not only the waterbody itself but also water quality, vegetation, soils, and wildlife habitat. NCHRP Report 466 provides guidance on how to analyze and identify potential encroachment alteration impacts.

It is TxDOT policy to analyze and document encroachment alteration impacts concurrently with the direct impacts analysis to focus the indirect impacts analysis on induced growth. The induced growth impact analysis is conducted after the encroachment and direct impact analyses and uses information from both analyses.

Overview of TxDOT Methodology for Assessing Cumulative Impacts

The cumulative impacts analysis would need to be conducted in accordance with TxDOT's Cumulative Impacts Analysis Guidelines (TxDOT 2016b). According to TxDOT's 2016 Guidance, the five steps of a cumulative effects analysis for a TxDOT project are:

1. Establish the resource study area, conditions, and trends.
2. Study the direct and indirect effects on each resource from the proposed project.
3. Evaluate other actions—past, present, and reasonably foreseeable—and their effect on each resource.
4. Evaluate the overall effects of the proposed project combined with other actions.
5. Mitigate cumulative effects.

The cumulative impacts analysis should focus on those resources substantially impacted by the project or those that are currently in poor or declining health or at risk, even if project impacts (either direct or indirect) are relatively small; only those resources meeting these criteria are brought forward for further analysis of cumulative effects.

To help identify which resources may need to be assessed for cumulative impacts analysis, a "screening" table can be prepared to help document the decision of whether or not to carry specific resources

forward. Appendix A (Chapter 7) provides an example screening table that can be utilized by the project team either internally or in formal documentation (i.e. the cumulative impacts analysis technical report) to help determine whether or not cumulative impacts analysis is warranted for resources that have been assessed for direct impacts.

Once resources are identified that may potentially experience cumulative impacts (in this example, water resources and water quality are carried forward), the next step is to define a specific study area for further analysis.

Key Considerations for Cumulative Impacts Analysis

The consideration, documentation, and analysis requirements for the cumulative effects analysis will vary in degree by class of action and scope of work, and should be commensurate with the potential for adverse and significant impacts. Scaling the cumulative effects analysis to reflect the scale and degree of impacts associated with the proposed project is very important. Using past experience, it is reasonable to anticipate that a particular action may have little potential for adverse or significant impacts. Some projects warrant a brief discussion that is largely qualitative in nature and relies largely on existing data sources (AASHTO 2016). Proposed actions that are typically finalized with a finding of no significant impact usually involve only a limited cumulative impact assessment to confirm that the effects of the proposed action do not reach a point of significant environmental impacts (CEQ 2005). An abbreviated analysis using the five step methodology discussed above might be appropriate in some cases.

> CUMULATIVE EFFECTS are effects "on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7)

Keep in mind that a resource in poor or declining health may factor into the level of analysis. Consultation with TxDOT ENV staff during the scoping process will assist in identifying projects suitable for a simplified cumulative impacts analysis.

A preliminary sample RSA representing water resources that could be impacted to varying degrees as a result of direct impacts from projects implemented from the Northeast Midland Feasibility Study is illustrated in Appendix A - Sample Water Resources RSA. This sample RSA is delineated by the 5

subwatersheds that intersect the “T” and the “I” (Cowden Ranch-Midland Draw, Glass Ranch, High Sky Girls Ranch-Midland Draw, Pease School-Midland Draw, and Salt Lake-Mustang Draw). This preliminary sample RSA is approximately 127,227 acres in size. There are approximately 61 playas (789 acres); 329 National Hydrography Dataset (NHD) water bodies (1,515 acres), only one of which is named—Salt Lake; 364,142 linear feet of NHD streams; 2,484 acres of NWI wetlands; 7,252 acres of 100-year floodplain; and 784 acres of floodway within this RSA.

In the NEPA phase, the analyst considers direct and indirect impacts along with past, present, and reasonably foreseeable future projects to determine whether or not cumulative impacts would be significant. This analysis has to meet the NEPA "hard look" test.

Existing Regulatory Framework

When assessing potential cumulative impacts to water resources, for example, it is important to understand the existing regulatory framework that is in place when considering mitigation strategies. Impacts to waters of the U.S., including wetlands, whether direct, indirect, or cumulative, would be regulated through the USACE Section 404 permit process. There are a variety of activities to minimize the impacts from construction to vegetative or undeveloped habitats, wetlands, floodplains or other stream areas that range from site related actions to best management practices.

All development (public or private developers) must comply with flood control regulations under Federal Emergency Management Agency (FEMA) and the local floodplain administration, the Endangered Species Act, the Clean Water Act (CWA), CWA Section 401 Water Quality Certification requirements, CWA Section 404 permits for projects impacting waters of the U.S., and other regulations requiring mitigation if there are effects on species habitat.

Identifying mitigation for cumulative impacts to a resource beyond the normal bounds of state and federal regulations should be approached on project by project basis. Any shared mitigation responsibilities (project sponsor, municipality, and/or private land developer) should be explained and disclosed in the project documentation.


WEST
LOOP
250
EAST
LOOP
250
STOP
MAYS

CHAPTER 7: IMPLEMENTATION STRATEGIES

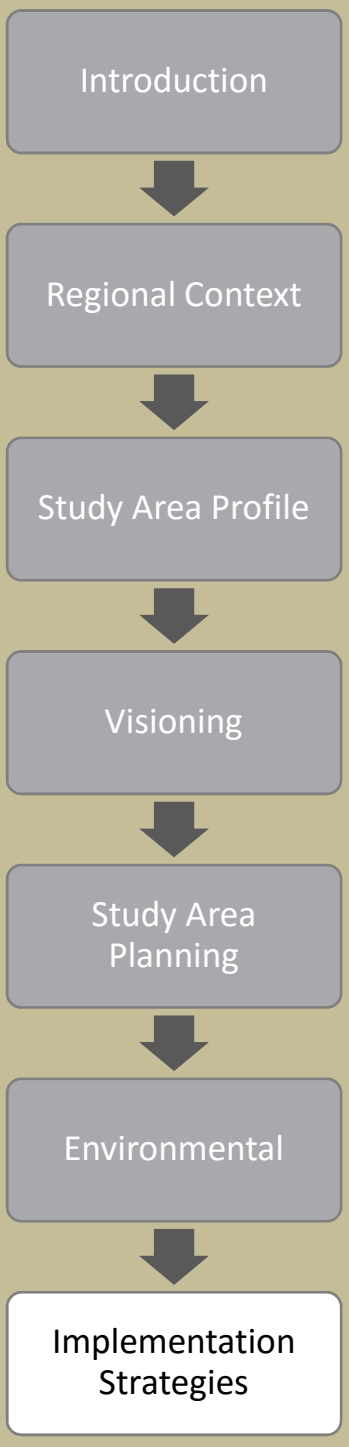
The development of the transportation network in Northeast Midland will require coordination of activities from a variety of agencies with an eye towards achieving the described long-range vision. Coordinated planning at the city, county and regional levels will be key to sequentially implementing local and regional segments of the system. With implementation likely occurring over a lengthy timeframe, decision-making regarding transportation will also need to be at the forefront with regard to other considerations involving land use and development. Corridor and access management will be key to preserving and promoting mobility, safety and land access of the thoroughfare network. Transportation investments that are operationally well managed will also leverage economic and community benefit.

Most of the corridors defined in the transportation network will be implemented through the subdivision process as administered by the City and Midland and Martin Counties and may require independent or coordinated action between agencies or others including TxDOT or the Permian Basin MPO. In any effect, coordinated agency action will leverage network implementation from both a time and cost savings perspective.

Land Use Strategies

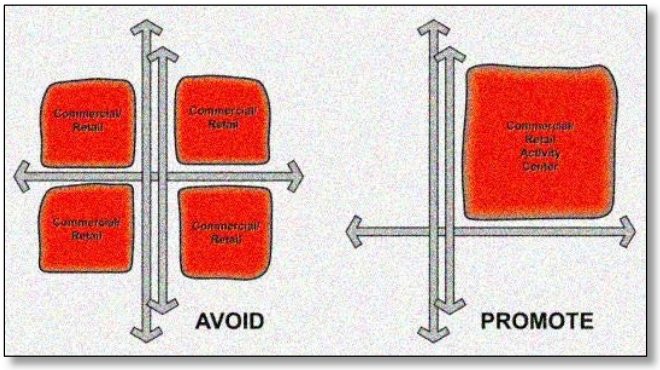
Land use planning provides an overall policy and high-level framework from which future development decisions can be rationally based. Land use planning not only helps to set the framework for growth and development, but in doing so helps to protect the interests of stakeholders, property owners, residents and businesses.

Chapter Guide



Key recommended land use implementation actions include:

- Consider annexing key growth areas for regulatory control over land use development and right-of-way protection.
- Create a corridor overlay zone to apply uniform and consistent standards including; subdivision, thoroughfare, drainage and development. For specialty corridors, define specific right-of-way and access management standards. Consider developing a special intergovernmental application.
- Protect key corridors and intersection locations from development encroachment and oil & operations. Place setback requirements for oil & gas to be at least 100' from the back of ROW of the "local" major thoroughfare network, and 500' from the ROW of the 'commuter' and potential 'regional' corridors.



- At the time of platting, require properties along special corridors to contain allowances for ROW, cross access easements and/or connection to shared drives.
- Promote development that is accessible and connected to the bike/pedestrian components of the proposed thoroughfare network. Encourage development of activity centers that allow for internal circulation rather than typical four-corner development.
- Develop a future land use plan from concepts defined within this study, incorporate and amend to the Future Land Use Plan of the Tall City Tomorrow Plan.

Transportation Strategies

Key recommended transportation implementation strategies include:

- Adopt the Northeast Corridor Feasibility Study to define a framework for study area mobility and safety. Amend the Tall City Tomorrow Thoroughfare Plan to incorporate the proposed transportation network and defined specialty corridors. Preserve ROW needs though focused initiative or the development process.
- Work with Midland and Martin Counties to adopt this plan to establish alignment, location and ROW needs of the transportation network. Alternatively, seek development agreements during the development process to enable implementation of the thoroughfare network.

- Implement corridor overlays to specialty corridors to preserve long-term ROW needs. Implement access management standards

detailing; intersection spacing, driveway locations from intersections, median openings, and intersection improvements. For landside development, detail requirements for shared drives and/or cross-access easements.

- Initiate a follow-on study using the updated MPO travel demand model to determine lane needs for specialty corridors and define appropriate corridor section for application.
- Develop a capital improvements plan to define and prioritize key improvements for sequential implementation. Coordinate with the Permian-Basin MPO and TxDOT to incorporate transportation system recommendations into regional and state improvement programs.
- Define funding strategies to implement transportation improvements. If a city objective, strategically incentivize priority areas and corridor segments.

Corridor Management

Corridor management refers to the coordination of land development and transportation facilities within an existing or planned corridor to coordinate or reduce the number of curb-cuts along a corridor, enhance the carrying capacity of the facility, and to promote orderly circulation of adjacent development. Corridor management involves long-range transportation planning and involvement/coordination of both local and regional agencies in order to maximize investment in transportation facilities. A listing of some best practices is listed in Table 12 on the next page.

Table 12: Corridor Management and Improvement Strategies

Strategy Type	Examples
Major Roadway Improvements	• New or lane additions and intersection improvements • Medians and channelization • Shoulder widening • Horizontal and vertical curve realignment • Climbing/passing lanes • Designated truck routes • Intelligent transportation systems (ITS) strategies such as traveler information and incident response • Seasonal and special event controls
Operational Improvements	• Improved signage and markings • Signals and other intersection controls • Bulb-outs and pedestrian signals • Off-road safety improvements • Drainage systems and practices to reduce environmental impacts, improve water quality, etc.
Land Use Controls	• Land use and zoning provisions to encourage connected and concentrated development • Designation of specific planning areas/zones with guidelines for development, resource protection, and access management • Designation of scenic view corridor • Site plan review requirements for developments along special corridors • Subdivision regulations that encourage pedestrian connectivity and internal street connections to reduce main road volumes • Cross access easements/Provisions for shared parking among adjacent uses • Growth management tools, such as development phasing and infrastructure concurrency requirements • Overlay districts to protect critical resources • Performance standards for new developments
Access Management	• Driveway consolidation/sharing • Turn restrictions and medians • Intersection spacing •Development Policies (activity centers with internal circulation, adjacent land use connectivity, etc.)
Alternative Mode Improvements	• Sidewalk improvements • Signs and markings (pedestrian crossings, bicycle lanes) • Off-road bicycle/pedestrian paths • Transit service improvements
Modal Connectivity Improvements	• Park-and-ride lots • Bike racks on buses • Shuttle services

Navigating Regulatory Tools for Implementation

The Texas Council for Environmental Quality provides specific definition of impacts and effects that are caused by a proposed transportation project to area land use and the environment. While either an predictable end result (direct) or reasonably predictable effect that occurs later in time (indirect) or effects which have resulted from incremental impacts added to other past, present or reasonably foreseeable future actions (cumulative), specific guidance for analyzing these impacts are provided by TxDOT, NCHRP and AASHTO in order to assess project implications as codified by NEPA. A white paper in Appendix A details references and steps for proper evaluation, analyses and environmental documentation.

TxDOT ICI Risk Assessment Tool

The Scope Development Tool, which was designed by TxDOT to recommend the appropriate level of environmental documentation required for a specific project, will help to initially determine whether or not indirect and cumulative impacts analyses are warranted for a specific project. Once the feasibility study identifies future corridor improvements, the Scope Development Tool is used to assess whether the project requires indirect and cumulative impacts analyses. Assuming the Scope Development Tool indicates these analyses are required, the next step is to confirm and document the need for these analyses using risk assessment checklists developed and provided in TxDOT's Environmental Compliance Toolkit.

Appendix A contains risk assessment checklists for indirect and cumulative impacts analyses and explains how to navigate each question based on the responses to each sequential question. These screening tools would need to be used to determine whether an indirect or cumulative impacts analyses will be required for the proposed project. Once completed by the project team, the results of the risk assessment checklists should be discussed with the lead agency or "department delegate" (assumed to be TxDOT) and project sponsor (assumed to be City of Midland) staff, and the checklists should be incorporated into the project file.

Next Steps – Feasibility to NEPA

Any state or federally funded transportation projects identified as a result of the Northeast Midland Feasibility Study will need to be appropriately classified for environmental documentation by the project sponsor (City of Midland) and the department delegate (TxDOT Odessa District). For projects classified for

processing as environmental impact statements or environmental assessments, analysis and documentation of indirect and cumulative impacts are always required. Projects processed as categorical exclusions may require these analyses. The Scope Development Tool (which is utilized by TxDOT staff to initiate project development) will recommend the appropriate level of environmental documentation required for an individual project.

While indirect impacts and cumulative impacts are often referenced together, they are two distinct types of impacts, requiring separate analyses. The TxDOT guidance discussed in the white paper located in Appendix A requires and allows for a balance between systematic methodology and a scalable application. TxDOT policy places great emphasis on maintaining a connected sequence of defendable decisions in meeting the required consideration of the indirect and cumulative impacts associated with a project.