## CONNECTING MIDLAND AND ODESSA MULTI-USE TRAIL CORRIDOR STUDY

ACCEPTED May 20, 2019

## Acknowledgments

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This plan was prepared with assistance from Halff Associates and funded by the U. S. Department of Transportation: Federal Highway Administration, Federal Transit Administration, and the Texas Department of Transportation. The contents do not necessarily reflect their views or policies.

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## Introduction

The desire for a safe bicycling connection between Midland and Odessa has been discussed for at least the past two decades. The need for a multi-purpose trail connecting the two communities was discussed within the Odessa's Parks, Recreation and Open Space Master Plan in 2004, and in the 2014 update of that plan; as well as in the City of Midland's 2015 Hike and Bike Trails Master Plan.

In September of 2017 the Permian Basin Metropolitan Organization was awarded $\$ 17,258$ in supplemental funding under the Texas Department of Transportation's (TxDOT) State Planning and Research program to commence the evaluation and feasibility of an intercity trail facility. As the designated Metropolitan Planning Organization (MPO) for the urbanized area of Midland and Odessa, the agency is tasked with incorporating alternative transportation (cycling, jogging and walking, and other forms of pedestrian active transportation) as set out in the Codes of Ordinances of the Cities of Midland and Odessa, and the regulations and policies of Midland and Ector Counties. The Permian Basin MPO Policy Board approved additional funding in the amount of $\$ 24,742$ for the study allowing the organization to proceed.

## ASSIGNMENT

As outlined within the Permian Basin MPO's Request for Proposals (RFP), the purpose of this project is to prepare a corridor routing study of multi-use trail alignments for connections to the City of Midland and the City of Odessa Bike and Trail Networks. The planning process and final proposed corridor alignments will allow affected public entities to involve and inform the public so they can participate in planning for the future construction of the identified multi-use trails.

According to the American Association of State Highway Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, a "bicycle lane" is defined as a portion of a roadway which has been designated by striping, signing and/or pavement markings for the preferential or exclusive use of bicyclists. A "bicycle path" is defined as a bikeway that is physically separated from motorized vehicular traffic by an open space or barrier, either within the highway right of way or within an independent right of way, that can also be used by pedestrians, cyclists, skaters, joggers, wheelchairs, and other non-motorized users.

## MULTI-USE TRAIL (DEF.):

A path physically separated from motor vehicle traffic by an open space or barrier and either within a public right of way or easement, which accommodates two-way, non-motorized travelers including walkers and hikers, bicyclists, joggers, and skaters.

## PUBLIC ENGAGEMENT

On three separate occasions during the course of developing the multi-use trail routing study, meetings were held with members of the Permian Basin MPO's Pedestrian and Bicycle Advisory Committee, the MPO Policy Board, and the Permian Basin Bicycle Association; the latter of which included representation from the University of Texas Permian Basin administration; to gain insight into the trail routing issues, challenges, and opportunities, and feedback on proposed routing options. Appendix A provides a list of meeting dates and attendees.

## THE CORRIDOR ROUTING STUDY INCLUDES:

- review of existing corridor options and conditions
- identification of potential routes
- citizen engagement
- order-of-magnitude cost projections
- potential implementation strategies and next steps



## Permian Basin



Source: Halff Associates

## OIL AND GAS DEVELOPMENT

The Permian Basin is a large sedimentary basin in the southwestern part of the United States. The Permian Basin is located in western Texas and southeastern New Mexico. It reaches from just south of Lubbock, past Midland and Odessa, south nearly to the Rio Grande River in southern West Central Texas, and extending westward into the southeastern part of New Mexico. It is so named because it has one of the world's thickest deposits of rocks from the Permian geologic period. The greater Permian Basin comprises several component basins; of these, the Midland Basin is the largest, Delaware Basin is the second largest, and Marfa Basin is the smallest. The Permian Basin covers more than 86,000 square miles, and extends across an area approximately 250 miles wide and 300 miles long.

According to the Texas Railroad Commission, the Permian Basin is composed of more than 7,000 fields in West Texas alone. Various producing formations such as the Yates, San Andres, Clear Fork, Spraberry, Wolfcamp, Yeso, Bone Spring, Avalon, Canyon, Morrow, Devonian, and Ellenberger are all part of the Permian Basin, with oil and natural gas production depths ranging from a few hundred feet to five miles below the surface. Recent increased use of enhanced-recovery practices in the Permian Basin has resulted in a substantial impact on U.S. oil production (www.rrc.state.tx.us).

## LANDSCAPE CHARACTER

The landscape of the Permian Basin can be characterized as generally flat, undulating terrain, with scrubby vegetation consisting of tumbleweeds, sages, cactus, and an occasional
pinyon tree. A feature that is unique to the northwestern Texas landscape is the network of playas, which are shallow depressions which capture and detain rain water for short periods of time. The landscape is also composed of dry arroyos, or seasonal riverbeds, referred to as draws, which collect and funnel seasonal deluges of floodwater into more permanent sub-watersheds. Other predominant features include oil and gas-related equipment, such as wildcat rigs and the ubiquitous pump jacks, connected by caliche roads.

## Cities



Source: Halff Associates

## PERMIAN BASIN COMMUNITIES

The Permian Basin has become one of the most productive oil and gas plays in the world, second only to Saudi Arabia. As a result, the communities within the Permian Basin are experiencing significant population growth. According to the 2010 U.S. Census, the population of Midland was 111,147. By 2017, Midland's estimated population had reached 136,089. Midland's Tall City Tomorrow Comprehensive Plan (2016) projects Midland population to grow to 293,720 by 2035, based on a 4.0 percent Annual Growth Rate (AGR); which was the growth rate between 2010-2014. Another demographic projection within the Plan uses a 2.5 percent AGR, to estimate a 2035 population of 216,488 . Both numbers are huge increases from the City's current population.

Similarly, according to the 2010 U.S. Census, Odessa's last official population was estimated to be 118,918 . Remarkably, according to the U.S. Census Bureau, this number has since increased to 159,436.

Student enrollment at the University of Texas Permian Basin (UTPB) indicates similar growth rates. In 2018, the number of students who earned a degree increased by 12 percent from the previous year, which amounts to 1,145 students. Graduate enrollment is up by 50 percent. As the UTPB-Midland campus
continues to grow, more students will be 'commuting' from UTPB-Odessa to Midland. This will remain a challenge for any student who does not have a car.

Some of the larger oil and gas companies have projected employee increases of 5,000 persons by the end of 2019; with similar increases in subsequent years. They are concerned about employee retention and quality of life issues related to the families of employees, as well as the well-being of younger employees who are used to having well-maintained parks, and trail networks, and other recreational activities they can do outside.

As discussed within the Growth and Development section of this report, much of Odessa's growth is to the east and northeast. Midland's growth has jumped Loop 250 and continues to the north and northwest.

Significant population growth and increased oil and gas production will likely exacerbate traffic congestion and increased conflicts between pedestrians, cyclists, and vehicles.

The development of an alternative, pedestrianfriendly, active transportation facility, such as a multi-use trail is a very timely and largely popular initiative; and one that has gained significant momentum and support over the past several months.


## Growth and Development

## LAND USE

As depicted in Map 4, Existing Land Use, a cursory existing land use plan was developed for the principal area between East Odessa and West Midland, The Existing Land Use Map is primarily based on review of the Future Land Use Map within the Envision Odessa Comprehensive Plan (2016); the Odessa Parks, Recreation, and Open Space Master Plan (2014); and the Current Land Use Map (Map 1.2) within Midland's Tall City Tomorrow Comprehensive Plan. Air photo interpretation using Google Earth Pro and Nearmap aerial imagery was also conducted, and later groundtruthed during photo-reconnaissance trips to the area.

The main land use within the area is associated with oil and gas development. Vehicular corridors are lined with commercial enterprises - oil and gas services, materials and equipment supply, etc.

Interspersed within this development are single family and multi-family residential subdivisions of varying densities.

As depicted on this and other maps, the Oncor overhead electrical Transmission and Distribution easement and Colorado River Municipal Water District (CRMWD) subsurface water transmission easement.

## TRANSPORTATION

Principal vehicular transportations corridors that connect Midland to Odessa include the following east-west corridors (from south to north):

- Interstate 20 (I-20)
- Interstate 20 Business Route (BI-20); its southern frontage road, W. Industria Avenue; and its northern frontage road, West Highway 80
The Union Pacific rail right-of-way is in between $\mathrm{BI}-20$ and W . Industrial Avenue
- Eastridge Road (within City of Odessa)
- Dorado Road (within City of Odessa)
- State Highway (SH) 191; its southern (eastbound) frontage road; and its northern (westbound) frontage road
- West County Road (CR) 60, connecting to

Texas State Highway (SH) 158 eastbound

- West County Road (CR) 100

And the following north-south corridors (from west to east):

- Texas State Loop 338 (SL 338)
- Texas 588 Spur / Faudree Road
- Mission Boulevard
- Texas State Highway (SH) 349 / FM 1788



## Growth and Development



Source: Halff Associates

## GROWTH PATTERN

Commercial / retail growth has primarily followed vehicular transportation corridors. The land between $\mathrm{I}-20$ and $\mathrm{BI}-20$ is predominantly built-out and development has extended northward beyond BI-20, to the east and west of the Midland International Air and Space Port and beyond the loops around the cities.

Residential development has generally occurred in new sections which are generally contiguous to existing development; primarily to the north-northwest (north of SH 191) of Midland and north and east (south of SH 191) of Odessa.

## LAND OWNERSHIP

As depicted in Map 5, Land Ownership, large acreages of land outside of Midland and Odessa are owned by several prominent landholders, primarily in the oil and gas industry.


MAP 5. LAND OWNERSHIP

## Recent Studies



Schematic of a Nature Trail from Chapter 3 Design
Standards of the 2015 Hike and Bike Trails Master Plan

## MIDLAND TRAILS PLAN

## The Midland Hike and Bike Trails Master

 Plan was completed in 2015, refer to Figure 1, Midland Trails Plan. As stated in the report, this master plan sets the framework by which the City of Midland and the private sector can work together to jointly create beautiful and meaningful trail corridors and make informed decisions as to how to fund trail development.In partnership with both the public and private sectors, the city will strive to achieve its objective of creating a system of trails to connect all of Midland. The report sets forth several recommendations in this effort including establishing a variety of recreationa facility types to accommodate all facets of the community, promoting security by creating vehicular separation, ensuring access to the trail system is readily available and focusing on citywide connectivity when designing and constructing new trails.

## ODESSA PARKS AND RECREATION MASTER PLAN

Odessa's Parks, Recreation, and Open Space Master Plan Update was completed in 2014 to analyze and address the park, recreation and open space needs within the city. A series of goals, objectives, recommendations and implementation strategies were established and approved.

Odessa has set the goal of transforming the city's parks, recreation and open spaces into one of the best systems in the State of Texas. It is outlined in the report the ways by which this goal can be achieved, including providing an adequate distribution of park facilities citywide with a diverse range of facilities and activities for all segments of the population. This is set to be accomplished through the addition of new community parks, the renovation and beautification of existing facilities, establishment of key indoor and outdoor recreational facilities and extensive expansion of the current trail system.

Partnerships with other public, semi-public and private entities to most efficiently use public funding to provide parks, recreation, and open space facilities will be utilized. Refer to Figure 2, Odessa Parks and Recreation Master Plan Trail Recommendations (2014).




Source: Halff Associates

FIGURE 2. ODESSA PARKS AND RECREATION MASTER PLAN TRAIL RECOMMENDATIONS (2014)

## Destinations



Source: Working and Learning in Odessa


Source: CBS 7 March 2016


## PRINCIPAL DESTINATIONS

The principal destinations identified during this assignment include the University of Texas Permian Basin (UTPB) in East Odessa; and the Scharbauer Sports complex in West Midland. Both the institution and special-use park have ample, well-lighted parking areas. UTPB-Odessa and the Scharbauer Sports Complex are recommended to function as the principal western and eastern trailhead termini for the multi-use trail.

## INTERIM DESTINATIONS

Because the distance between the two communities is approximately 20 miles, midpoint trailhead destinations were identified
and include UTPB-Midland campus, which contains the Wagner-Noel Performing Arts Center, and the Center for Energy and Economic Diversification (CEED). The UTPBMidland campus will also be the home for the University's College of Engineering; which provides Chemical, Electrical, Mechanical, and Petroleum Engineering Bachelor of Science (B.S.) degree programs.



## Oodessa Trailhead UNIVERSITY OF TEXAS PERMIAN BASIN (ODESSA)

The University of Texas Permian Basin (UTPB) is located in Odessa, Texas at the epicenter of a region whose economic growth and technological advancements have global significance. UTPB is home to over 7,000 students and 250 teaching faculty. The university hosts 35 undergraduate and 18 graduate programs, many of which are geared toward supplying the petrochemical industry will skilled professionals. While UTPB does have student housing, most of the students commute to school from around the region. The multi-use trail will provide students with additional commuting options.


## $O_{\text {midland Trailhead }}$ SCHARBAUER SPORTS COMPLEX

The Scharbauer Sports Complex is a full-service recreation facility. It houses the Citibank Ballpark for baseball, Cimarex Energy Pavilion for concerts and shows, and Grande Communications Stadium for football and soccer games. Community events are frequently held at the complex.

Both UTPB-Odessa and the Scharbauer Sports Complex have ample parking to function as trailheads for the multi-purpose trail. Additional programmatic elements should include water fountains, restrooms, directional and wayfinding signage, etc.


## $Q_{\text {Midpoint Trailhead } 1}$ <br> UNIVERSITY OF TEXAS PERMIAN BASIN (MIDLAND)

A rapidly growing campus, UTPB-Midland is currently home to the Wagner Noel Performing Arts Center, the Center for Energy and Economic Diversification (CEED), and the new College of Engineering; which provides Chemical, Electrical, Mechanical, and Petroleum Engineering Bachelor of Science (B.S.) degree programs.

Centrally located and poised to accommodate significant growth, both the UTPB-Midland campus and the Midland International Air and Space Port are well-situated to function as midpoint trailheads for the multi-use trail.


## $Q_{\text {Midpoint Trailhead } 2}$ <br> MIDLAND INTERNATIONAL AIR AND SPACE PORT

The Midland International Air and Space Port was granted its Commercial Space Launch Site license by the FAA on September 17, 2014. It is the first primary commercial service airport to be given a spaceport designation. Midland is now able to accommodate a wide range of aerospace and aviation businesses, and is currently home to XCOR's Aerospace Research and Development Headquarters; and Orbital Outfitters, a NewSpace company that provides a range of services to vehicle developers and other companies in the aerospace sector. The Midland International Air and Space Port hosts American Airlines, Southwest, and United Airlines, and averages half a million flights per year (www.http://tx-midlandairport.civicplus.com/).

## Guiding Principles

| WHERE AVAILABLE, THE | TRAIL MUST BE DESIGNED TO | TRAIL USER'S EXPOSURE |
| :--- | :--- | :--- |
| PREFERRED TRAIL CROSS SECTION |  |  |
| WOULD BE ATWO-WAY, PAVED, |  |  |
| MULTI-USE PATH WITH A VERTICAL |  |  |
| BARRIER SEPARATING THE TRAIL |  |  |
| FROM ROADWAY TRAFFIC AND |  |  |
| ACCESS CONFLICTS DUE TOA |  |  |
| LACK OF ACCESS MANAGEMENT |  |  |
| REGULATIONS |  |  |
| ACTIVE TRANSPORTATION, ALL |  |  |
| AGES AND ABILITIES. |  |  |$\quad$| TO VEHICULAR TRAFFIC IS |
| :--- |



## Routing Criteria - Considerations



Source: Halff Associates

## SAFETY

Pedestrian and cyclist safety is the principal driver in selecting routing options. Multiple pedestrians and cyclists have been killed riding on the frontage roads of SH 191, SH 158, and elsewhere. Refer to pages 23-28 for Tables 1 and 2 a-c and Figures 3 and 4 detailing cyclist and pedestrian injury types and locations.

## ON-STREET VS. OFF-STREET

The decision regarding whether the multi-use trail should be an off-road facility or on-street facility is based on right-of-way (ROW) width and the amount of space that can be accrued between the trail facility and roadway. The preference is to construct an off-road multi-use trail with a TxDOT—approved vertical barrier separating the trail and roadway.

## SEPARATION FROM ROADWAY

Due to the speed limit assigned to several roadways and their frontage roads (e.g., SH 191, BI-20, SH 349/FM 1788, CR 60, and SH 158), there is warrant for a physical barrier between the existing roadway (and shoulder) and the proposed multi-use trail. Order of magnitude cost estimates have been provided for the preferred trail route options. Included is a line-item cost for a 42-inch tall vehicular combination barrier rail between roadway and trail

## POTENTIAL CONSTRICTIONS

While this issue is not consistent with all transportation facilities within the study area, when crossing creeks and draws, the bridge abutments of several vehicular corridors constrict roadway shoulders, which forces cyclists to ride in the traffic lane. This condition needs to be thoroughly analyzed for all preferred route alternatives, and options considered (and priced) before selection of a preferred route alternative.

## NUMBER OF VEHICULAR CROSSINGS

A key concern with several route alternatives has to do with the lack of strict access management regulations. The Midland Code of Ordinances (Ch. 2 - Plats and Subdivisions; Sec. 11-2-1.(E) 2.(b) "Adequate Access," allows parcels to be accessed over paved public streets which have sufficient structural and width capacity to carry the estimated levels of motor vehicle traffic to and from the parcels being divided, together with the estimated levels of traffic to and from other parcels in the area which will be accessed over the same streets, based on the most intensive use allowed in the zoning districts in which the parcels are located.

The City of Odessa does not have any access management provisions within its Code of Ordinances or in the City's "Standards and Requirements for Street, Alley, Water, Sewer and Drainage Improvements" manual of regulations.

The lack of more stringent regulations allows commercial business owners to provide virtually unlimited access the full length of a parcel's road frontage. The lack of access management restrictions or turn-in lanes creates an extremely dangerous situation for cyclists, as vehicles can turn-in to a parcel at any point off of the adjacent roadway.

## CONNECTIVITY (INTEGRATION INTO EXISTING BIKEWAY ROUTES)

The multi-use trail will function as the principal east-west active transportation spine and, where feasible, should provide ancillary linkages to north-south ancillary routes and connections to existing and future neighborhoods, schools, parks, and other public institutions.

## PROGRAMMATIC FEATURES AND ELEMENTS

In addition to the 16-foot wide concrete, multi-use trail and vertical protective barrier, it
is expected that the trail facility would incorporate the following:

- striping and reflectors (particularly for on-street bicycle lanes),
- caution / warning, wayfinding / directional, locational signage
- street lighting (for off-road trails not within roadway rights-of-way
- benches
- water fountains (primarily for trailheads)
- trailheads (parking, waste receptacles, signage)


## THREE-COUNTY THOROUGHFARE PLAN

The Three-County Thoroughfare Plan was the result of a collaborative effort between Ector, Midland, and Martin Counties, and was facilitated by the Permian Basin Metropolitan Planning Organization (MPO). The goal of this planning effort was to create a cohesive and seamless Thoroughfare Plan for the region. The Thoroughfare Plan provides the functional classification of existing and proposed thoroughfares within the three-county area. By having one plan, roads that cross counties can be expanded without issue. A Resolution of Concurrence was signed by representatives of each County on October 22, 2018 (refer to Appendix B).

## TABLE 1. CYCLISTS INJURIES AND LOCATIONS 2014-2019

|  | Crash Year | Contributing Factor | Time of Day | Road Name and Type | Roadway <br> Speed <br> Limit | Injury Severity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2014 | Disregard Stop Sign Or Light | 6:34 pm | Copper Street | 40 | K - Killed |
| 2 | 2014 |  | 7:05 pm | N Midland Drive | - | B - Non-incapacitating injury |
| 3 | 2015 | Backed Without Safety | 8:12 pm | Princeton Avenue | 30 | A - Suspected serious injury |
| 4 | 2015 |  | 3:51 pm | SH 158 | 55 | A - Suspected serious injury |
| 5 | 2015 |  | 7:20 am | N Grandview Avenue | 45 | B - Non-incapacitating injury |
| 6 | 2016 |  | 3:32 pm | Rocky Lane Drive | 30 | B - Non-incapacitating injury |
| 7 | 2016 |  | 1:25 pm | Penbrook Street | 30 | C - Possible injury |
| 8 | 2016 |  | 7:28 pm | Mark Lane | 30 | C - Possible injury |
| 9 | 2017 |  | 9:03 am | SH 191 | 45 | B - Non-incapacitating injury |
| 10 | 2018 |  | 8:18 pm | SH 158 <br> Two lanes, two way | 60 | $\begin{aligned} & \text { K - Killed } \\ & \text { K - Killed } \\ & \text { A - Suspected serious injury } \end{aligned}$ |
| 11 | 2018 | Failed To Yield Right Of Way Open Intersection | 8:22pm | SH 158 | 50 | B - Non-incapacitating injury |
| 12 | 2018 |  | 9:43 am | SH 191 | 55 | K - Killed |
| 13 | 2018 |  | 2:30 am | West Highway 80 | 55 | N - Not injured |

Source: Crash Records Information System, C.R.I.S. Query, TxDOT (https://cris.dot.state.tx.us/public/Query/app/

FIGURE 3. CYCLISTS INJURIES AND LOCATIONS 2014-2019
(2018: K-KILLED
$\theta$
2014: K - KILLED

- 2018: n-not injured
- 2016: C-POSSIBLE INJURY

2018: B - NON-INCAPACITATING INJURY
2014: B - NON-INCAPACITATING INJURY
2017: B - NON-INCAPACITATING INJURY
2015: B - NON-INCAPACITATING INJURY
2016: B - NON-INCAPACITATING INJURY
2015: A - SUSPECTED SERIOUS INJURY

> Odessa Schlemeyer Field

## SECTION 3 . PROGRAM

TABLE 2 a. PEDESTRIAN INJURIES AND LOCATIONS 2014-2019

|  | Crash Year | Contributing Factor | Time of Day | Road Name and Type | Roadway Speed Limit | Injury Severity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2014 | Ped failed to yield ROW to Vehicle | 6:37 pm | John Ben Shepperd Parkway | 45 | C - Possible Injury |
| 2 | 2014 |  | 7:25 pm | John Ben Shepperd Parkway | 45 | A - Suspected Serious Injury |
| 3 | 2014 |  | 4:00 am | I-20 | 75 | K - Killed |
| 4 | 2014 |  | 2:11 am | SH 191 | 55 | K - Killed |
| 5 | 2014 |  | 8:01 am | Maple Avenue | 35 | B - Non-incapacitating injury |
| 6 | 2014 | Failed to yield ROW, Private Drive | 5:20 pm | Murfield Drive | - | B - Non-incapacitating injury |
| 7 | 2014 | Ped failed to yield ROW to Vehicle | 5:58 pm | E 8th Street | 45 | B - Non-incapacitating injury |
| 8 | 2014 | Ped failed to yield ROW to Vehicle | 9:29 pm | BI-20 | 55 | B - Non-incapacitating injury |
| 9 | 2014 | Ped failed to yield ROW to Vehicle | 9:46 pm | BI-20 | 45 | K - Killed |
| 10 | 2014 |  | 11:00 pm | E University Boulevard | 45 | C - Possible Injury |
| 11 | 2014 | Ped failed to yield ROW to Vehicle | 1:07 pm | Boulder Avenue | 30 | B - Non-incapacitating injury |
| 12 | 2014 | Ped failed to yield ROW to Vehicle | - | E University Boulevard | - | A - Suspected serious injury |
| 13 | 2014 |  | 7:03 am | W Wadley Avenue | 45 | B - Non-incapacitating injury |
| 14 | 2014 |  | 4:19 pm | Godfrey Street | 20 | B - Non-incapacitating injury |
| 15 | 2014 |  | 11:50 pm | FM 868 | 40 | K - Killed |
| 16 | 2014 |  | 6:37 pm | SH 158 | 30 | N - Not injured |
| 17 | 2014 |  | 7:27 pm | E 8th Street | 40 | K - Killed |
| 18 | 2014 |  | 8:30 am | Godfrey Street | 35 | C - Possible Injury |
| 19 | 2014 | Ped failed to yield ROW to Vehicle | 8:00 pm | FM 662 | 55 | B - Non-incapacitating injury |
| 20 | 2014 | Ped failed to yield ROW to Vehicle | 7:39 pm | N Midland Drive | - | A - Suspected serious injury <br> A - Suspected serious injury |
| 21 | 2014 |  | 10:30 pm | SH 349 | 50 | K - Killed |
| 22 | 2014 |  | 5:00 pm | Maple Avenue | 40 | N - Not injured |
| 23 | 2015 | Ped failed to yield ROW to Vehicle | 7:52 am | Eastridge Road | - | C - Possible Injury |
| 24 | 2015 |  | 11:37 am | SH 158 | 45 | B - Non-incapacitating injury |
| 25 | 2015 |  | 9:32 am | SL 250 | 45 | B - Non-incapacitating injury |
| 26 | 2015 |  | 7:30 pm | Pronto Avenue | 30 | B - Non-incapacitating injury |
| 27 | 2015 | Ped failed to yield ROW to Vehicle | 10:45 pm | E 8th Street | - | B - Non-incapacitating injury |

TABLE 2 b. PEDESTRIAN INJURIES AND LOCATIONS 2014-2019

|  | Crash Year | Contributing Factor | Time of Day | Road Name and Type | Roadway Speed Limit | Injury Severity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 28 | 2015 |  | 8:15 pm | SH 191 | 75 | B - Non-incapacitating injury <br> B - Non-incapacitating injury |
| 29 | 2015 | Ped failed to yield ROW to Vehicle | 7:50 am | Crowley Boulevard | 30 | B - Non-incapacitating injury |
| 30 | 2015 | Ped failed to yield ROW to Vehicle | 2:49 am | SH 158 | 55 | A - Suspected serious injury |
| 31 | 2015 |  | 6:27 pm | Shafter Avenue | - | C - Possible Injury |
| 32 | 2015 |  | 5:51 am | SH 158 | 55 | A - Suspected serious injury |
| 33 | 2015 | Ped failed to yield ROW to Vehicle | - | S CR 1310 | 55 | K - Killed |
| 34 | 2015 |  | 3:00 pm | BI-20 | 45 | C - Possible Injury |
| 35 | 2015 |  | 6:45 am | Village Way | 30 | B - Non-incapacitating injury |
| 36 | 2015 |  | 2:04am | SL 338 | -1 | B - Non-incapacitating injury |
| 37 | 2015 |  | 9:45 pm | Eastridge Road | 35 | B - Non-incapacitating injury |
| 38 | 2015 |  | 7:30 am | S CR 1225 | 55 | B - Non-incapacitating injury |
| 39 | 2015 |  | 6:40 pm | SH 191 | 35 | C - Possible Injury |
| 40 | 2015 | Ped failed to yield ROW to Vehicle | 7:25 pm | FM 1788 | 55 | A - Suspected serious injury |
| 41 | 2016 |  | 9:43 pm | Tanglewood Lane | 40 | B - Non-incapacitating injury |
|  |  |  |  |  |  | B - Non-incapacitating injury |
| 42 | 2016 | Ped failed to yield ROW to Vehicle | 11:27 pm | W Wadley Avenue | 45 | A - Suspected serious injury |
| 43 | 2016 | Ped failed to yield ROW to Vehicle | 6:19 pm | W Wadley Avenue | 45 | A - Suspected serious injury |
| 44 | 2016 |  | 3:15 pm | FM 1788 | 45 | A - Suspected serious injury |
| 45 | 2016 | Ped failed to yield ROW to Vehicle | 12:16 pm | Country Club Drive | 40 | B - Non-incapacitating injury |
| 46 | 2016 | Ped failed to yield ROW to Vehicle | - | Westridge Boulevard | 30 | B - Non-incapacitating injury |
| 47 | 2016 |  | 12:32 pm | Four Sixes Ranch Road | 30 | B - Non-incapacitating injury |
| 48 | 2016 |  | 6:30 pm | Graceland Drive | 30 | N - Not injured |
| 49 | 2016 |  | 6:45 pm | John Ben Shepperd Parkway | 45 | B - Non-incapacitating injury |
| 50 | 2017 | Ped failed to yield ROW to Vehicle | 6:52 pm | BI-20 | 55 | K - Killed |
| 51 | 2017 |  | 2:21 pm | Storey Avenue | 35 | B - Non-incapacitating injury |
| 52 | 2017 |  | 7:45 pm | N Midland Drive | 35 | B - Non-incapacitating injury |
| 53 | 2017 |  | 9:28 pm | FM 868 | 40 | A - Suspected serious injury |

Source: Crash Records Information System, C.R.I.S. Query, TxDOT (https://cris.dot.state.tx.us/public/Query/app/

## SECTION 3 . PROGRAM

TABLE 2 c. PEDESTRIAN INJURIES AND LOCATIONS 2014-2019

|  | Crash Year | Contributing Factor | Time of Day | Road Name and Type | Roadway Speed Limit | Injury Severity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 54 | 2017 |  | 4:20 pm | Montclair Avenue | 30 | C - Possible Injury |
| 55 | 2017 | Ped failed to yield ROW to Vehicle | 1:16 pm | SH 191 | 45 | A - Suspected serious injury |
| 56 | 2017 | Ped failed to yield ROW to Vehicle | 4:45 am | I-20 | 55 | A - Suspected serious injury |
| 57 | 2017 | Ped failed to yield ROW to Vehicle | 4:41 am | SH 191 | 55 | A - Suspected serious injury |
| 58 | 2017 |  | 10:18 pm | Mark Lane | 30 | K - Killed <br> B - Non-incapacitating injury <br> B - Non-incapacitating injury |
| 59 | 2017 |  | 12:10 pm | SH 191 | 75 | - |
| 60 | 2017 |  | 6:09 am | S CR 1255 | 55 | B - Non-incapacitating injury |
| 61 | 2017 | Ped failed to yield ROW to Vehicle | 7:00 am | Dumont Drive | 30 | B - Non-incapacitating injury |
| 62 | 2017 | Ped failed to yield ROW to Vehicle | 9:00 pm | E 52nd Street | 40 | C - Possible Injury |
| 63 | 2017 |  | 8:43 pm | BI-20 | 65 | $\begin{aligned} & \text { K - Killed } \\ & \text { K - Killed } \\ & \text { K - Killed } \\ & \text { B - Non-incapacitating injury } \\ & \hline \end{aligned}$ |
| 64 | 2017 |  | 6:28 pm | Mark Lane | 35 | C - Possible Injury |
| 65 | 2017 | Ped failed to yield ROW to Vehicle | 8:00 am | SH 158 | 45 | A - Suspected serious injury |
| 66 | 2018 |  | 11:05 am | SH 158 | 65 | B - Non-incapacitating injury |
| 67 | 2018 | Ped failed to yield ROW to Vehicle | 6:25 pm | Ric Drive | 30 | B - Non-incapacitating injury |
| 68 | 2018 | Ped failed to yield ROW to Vehicle | - | League Drive | 35 | A - Suspected serious injury |
| 69 | 2018 | Ped failed to yield ROW to Vehicle | 9:49 pm | Oakwood Drive | 35 | A - Suspected serious injury |
| 70 | 2018 | Ped failed to yield ROW to Vehicle | 8:36 pm | N Midland Drive | 40 | C - Possible Injury |
| 71 | 2018 |  | 8:10 pm | BI-20 | 55 | A - Suspected serious injury |
| 72 | 2018 | Ped failed to yield ROW to Vehicle | 1:15 am | John Ben Shepperd Parkway | 45 | B - Non-incapacitating injury |
| 73 | 2018 | Failed to yield ROW to Ped | 9:12 pm | Oakwood Drive | 45 | C - Possible Injury |
| 74 | 2019 |  | 7:53 pm | Tradewinds Boulevard | 10 | B - Non-incapacitating injury |
| 75 | 2019 |  | 7:52 am | SH 191 | 45 | B - Non-incapacitating injury |

Source: Crash Records Information System, C.R.I.S. Query, TxDOT (https://cris.dot.state.tx.us/public/Query/app/

FIGURE 4. PEDESTRIAN INJURIES AND LOCATIONS 2014-2019

| Gardendale | $\theta$ 2014:K-KıLED |
| :---: | :---: |
|  | ( 2017: K- Killed |
|  | - 2015: K-KiLled |
|  | - 2014:N-not inured |
|  | ( 2017: - not inured |
|  | 2016: - - ot inured |
|  | - 2018: C- Possible inury |
|  | $\bigcirc$ 2014:C-PSSSIBLEINUURY |
|  | ( 2017:C - Possible inury |
|  | - 2015:C-PSSSIBLEINUUR |

## Regulatory Considerations


#### Abstract

AASHTO The American Association of State Highway Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities recommends the following facility design criteria:


- A minimum paved width of 10 feet for a two-way shared use path on a separate right-of-way;
- Two feet of graded area should be maintained adjacent to both sides of the path;
- Three feet of clear distance should be maintained between the edge of the trail and trees, poles, walls, fences, guardrails, and other obstructions.
- Eight feet of vertical clearance to obstructions should be maintained, rising to 10 feet in tunnels and where maintenance and emergency vehicles must operate.


## TxDOT POLICY

It is TxDOT's policy to proactively plan, design, and construct facilities to safely accommodate bicyclists and pedestrians. Consideration and discussion of bicycle and pedestrian facilities shall be accomplished as part of the project scoping and environmental planning processes.

As summarized within the Texas Department of Transportation's (TxDOT) Bicycle and Pedestrian Accommodation Toolkit, recent legislation and regulations require the inclusion of bicycle and pedestrian policies and projects in transportation plans and project development, and federal policy is increasingly committed to develop and invest in bicycle and walking infrastructure

## MIDLAND INTERNATIONAL AIR \& SPACE PORT / FEDERAL AVIATION ADMINISTRATION (FAA)

The Midland International Air and Space Port (MAF) prohibits any public transportation facility immediately outside of the Air \& Space Port's perimeter fence. The MAF Director of Airports has reviewed Route Alternative 7 and does not foresee any problems with the alignment.

Prior to construction of any multi-use trail facility in proximity to the MAF, the FAA requires that Form 7460, Notice of Proposed Construction or Alteration be filed.

## MIDLAND OIL AND GAS SERVICES

According to the City of Midland's Oil and Gas Services, Ordinance 8769, requires wells to be located at least 500 feet from existing
development. A variance may be requested which would reduce this setback distance to 135 feet; but would require the approval of the City Council.

## CITY OF ODESSA

The City of Odessa's Code of Ordinances, specifically Chapter 4, Article 4-14 Oil and Gas Drilling, Section 4-14-13, Proximity of facilities to streets and alleys; Section 4-14-14, Proximity of facilities to buildings and grounds; and Section 4-14-15 Derrick and drilling rig, specify setback distances between oil and gas facilities and roads and structures.

[^0]

## Transportation Corridors

## SH 349/FM 1788

Functional Classification

- Principal Arterial/Freeway

ROW Width

- 120'

Road Width

- 73'

BI-20
Functional Classification

- Principal Arterial/Freeway

ROW Width

- 300'

Road Width

- 200'


## SH 191

Functional Classification

- Principal Arterial/Freeway

ROW Width

- 400'

Road Width

- 350'

LOOP 338
Functional Classification

- Principal Arterial/Freeway


## ROW Width

- 150'

Road Width

- 95'

CR 60
Functional Classification

- Local (Future Major Arterial)

ROW Width

- 60'

Road Width

- 32'

SH 158
Functional Classification

- Principal Arterial/Freeway

ROW Width

- 120'

Road Width

- 42'


## EASTRIDGE ROAD (ODESSA)

Functional Classification

- Minor Arterial


## ROW Width

- 80'

Road Width

- 62'


## DORADO ROAD

Functional Classification

- Minor Arterial

ROW Width

- 120'

Road Width

- 70'


## MISSION ROAD

Functional Classification

- Collector

ROW Width

- 80'

Road Width

- 65'




## Transmission Corridors



Source: Halff Associates

## ONCOR

Headquartered in Dallas, Oncor Electric Delivery Company LLC is a regulated electric transmission and distribution service provider that serves nearly 10 million customers across Texas. When possible, the use of Oncor's right-of-way for recreational trails is a great way to provide alternative transportation and for Oncor to partner with cities in its service area. Key trail design requirements include:

- One side of the transmission line right-of-way must remain open throughout the trail to allow Oncor access for maintenance and operations. Typically a minimum of 15 feet is required for vehicular access.
- The maximum concrete trail width is 12 feet.
- Divided concrete trails are not allowed.
- Bollards will typically be required at road crossings.
- Trail construction will minimize changes to the existing grade, elevation, and contours within the ROW.
- Minor changes will be permitted to comply with American with Disabilities Act.

For additional design requirements, a list of acceptable amenities, landscaping requirements, and programmatic facilities restrictions, refer to: Oncor Hike and Bike Trail Guidelines: A Sustainable Community Partnership Model (June 01, 2014), at: https://www.nctcog.org/ nctcg/media/Transportation/DocsMaps/Plan/ Bike/Oncor_HikeBikeTrail_Guidelines.pdf

## COLORADO RIVER MUNICIPAL WATER DISTRICT (CRMWD)

According to the Colorado River Municipal Water District's website (www.crmwd.org), planning for the future is key to sustaining our community and economy. In 1997, the Texas Legislature mandated regular, statewide water planning to ensure that regions like West Texas have the water needed to grow and thrive. As the area's primary raw water provider, CRMWD actively participates in the local regional planning processes. The District is an important member of West Texas' Region F Water Planning Group, a coalition of representatives from 32 counties who meet regularly to focus on and prepare for the Permian region's future water needs

## Region F Project Overview

The Region F water planning region includes 32 counties in western Texas. The largest cities in the region are Midland, Odessa and San Angelo. Most of Region F lies in the Upper Colorado River Basin and the Pecos River Basin. While surface water provides much of the municipal supplies, groundwater provides the majority of the water to the region and includes four major aquifers and seven minor aquifers.

## As depicted on Map 11, Transmission

Corridors, CRMWD's right-of-way for a 48-inch diameter water line, which extends from northern Odessa through northern Midland.

## Trail Route Alternatives

## INTRODUCTION

This study has identified and evaluated several routing options for a 16 foot-wide, multi-use trail facility alignment. Most of the route alternatives have been aligned within existing vehicular transportation corridor rights-of-way (ROW). Depending on ROW width, the trail facility is either proposed as an off-street trail, or a unidirectional, five-foot wide, single-lane, on-street facility.

The proposed alignments for all route alternatives are described from west to east. Alternatives 1-4 depart the UTPB-Odessa campus (Odessa Trailhead $\mathbf{O}$ ) and head west to the Scharbauer Sports Complex (Midland Trailhead $\boldsymbol{P}$ ). The midpoint of Alternatives 1 and 2 is Midland International Space and Air Port (Midpoint Trailhead $2 \boldsymbol{\ominus}$ ), and the midpoint of Alternatives 3 and 4 is UTPB-Midland campus (Midpoint Trailhead $1 \mathbf{O}$ ). The Alternative 5 alignment is from the Odessa Trailhead to the UTPB-Midland campus (Midpoint Trailhead 1). Alternative 6 runs from Midpoint Trailhead 1 to the Midland Trailhead. Alternative 7 is aligned with the Oncor Transmission easement, and extends from SH 349 to the Midland Trailhead. Alternative 8 is aligned with the Oncor Transmission easement from the Odessa Trailhead to the Midland Trailhead, with secondary routes to Midpoint Trailheads 1 and 2. The first half of Alternative 9 follows the Alternative 5 route,
then utilizes proposed thoroughfares that have been included within the Three-County Thoroughfare Plan, ultimately arriving at the Midland Trailhead.

Note: The Permian Basin MPO has chosen Preferred Alternatives, as will be discussed in Section 7, and will be identified with a blue check mark ( $\mathbb{V}$ ) as shown on this page and also within the description of each route on the following pages.

## TRAIL ROUTE ALTERNATIVES 1-2

Trail Route Alternatives 1 and 2 align with the outside edge of the BI-20 frontage roads, West Highway 80 and W. Industrial Avenue, respectively. Refer to pages 39-41 for a summary of Alignment 1; and pages 43-45 for a summary of Alignment 2.

## TRAIL ROUTE ALTERNATIVES 3-4

Trail Route Alternatives 3 and 4 align with the outside edge of the SH 191 eastbound and westbound frontage roads, respectively. Refer to pages 47-48 for a summary of Alignment 3; and pages 49-51 for a summary of Alignment 4

## TRAIL ROUTE ALTERNATIVE 5

Trail Route Alternative 5 departs the Odessa Trailhead and follows City streets and County roads to SH 349 and Midpoint Trailhead 1. Refer to pages 53-60 for a summary of this alignment.

## TRAIL ROUTE ALTERNATIVE 6

Trail Route Alternative 6 completes the Alternative 5 route to the Midland Trailhead, and departs Midpoint Trailhead 1 and heads eastward to the destination. Refer to pages 61-66 for a summary of this alignment.

## TRAIL ROUTE ALTERNATIVE 7

Trail Route Alternative 7 also completes the Alternative 5 route to the Midland Trailhead, though it takes an overland route and is aligned with the Oncor transmission easement, from SH 349 to the eastern trailhead destination. Refer to pages 67-69 for a summary of this alignment.

## TRAIL ROUTE ALTERNATIVE 8

From the Odessa Trailhead to the Midland Trailhead, Trail Route Alternatives 8 is primarily aligned with the Oncor transmission easement; from the Odessa Trailhead to SH 349; after which it follows the same alignment as Alternative 7. Refer to pages 71-74 for a summary of this alignment.

## TRAIL ROUTE ALTERNATIVE 9

Trail Route Alternatives 9 utilizes the Alternative 5 alignment to SH 349; then is aligned with proposed thoroughfares identified within the Three-County Thoroughfare Plan (Ector, Midland, and Martin) to reach the Midland Trailhead. Refer to pages 75-79 for a summary of this alignment.

PERMIAN BASIN MPO

FIGURE 5. TYPICAL MULTI-USE TRAIL SECTION


## Trail Route Alternative 1

## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX WITH CONNECTION TO MIDLAND INTERNATIONAL AIR AND SPACE PORT.



Source: Halff Associates


Source: Halff Associates

TEXAS STATE LOOP 338 (SL 338)


Departing UTPB-Odessa Campus (Odessa Trailhead), travel south along East University Boulevard (SL 338) for 3,500 feet to West Highway 80 (the north frontage road of $\mathrm{BI}-20$ ).

SL 338 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 150 feet. The roadway is approximately 95 feet wide with a vehicular speed limit of 55 mph

It is envisioned that this segment would include a 16-foot-wide, off-street, multi-use trail along either the east or west side of the road.

WEST HIGHWAY 80 (NORTH FRONTAGE ROAD OF BI-20)


From the SL 338, travel eastward for 7.5 miles to SL 250 Frontage Road.

West Highway 80 (north frontage road of $\mathrm{BI}-20$ ) is classified as a Service thoroughfare with right-of-way widths of approximately 300 feet. The roadway is approximately 200 feet wide with a vehicular speed limit of 65 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the north or south side of the road.


## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX WITH CONNECTION TO MIDLAND INTERNATIONAL AIR AND SPACE PORT.



Source: Halff Associates


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the east or west side of the road.


Source: Halff Associates

along the west side of the road.


## Trail Route Alternative 2

## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX WITH CONNECTION TO MIDLAND INTERNATIONAL AIR AND SPACE PORT.



Source: Halff Associates


Source: Halff Associates

TEXAS STATE LOOP 338 (SL 338)


Departing the Odessa Trailhead, travel south along East University Boulevard for 3,500 feet and cross BI-20 and the Union Pacific Railway (UPRR) to the south frontage roads of $\mathrm{BI}-20$ (including Cargo Road, West County Road 125 and 127, and West Industrial Avenue).

SL 338 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 150 feet. The roadway is approximately 95 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the east or west side of the road.

## SOUTH FRONTAGE ROADS OF BUSINESS 20 (BI-20)



From SL 338, travel eastward for 7.5 miles to SL 250 Frontage Road.

The south frontage roads of BI-20 are classified as a Service thoroughfare with right-of-way widths of approximately 300 feet. The roadway is approximately 200 feet wide with a vehicular speed limit of 55 mph . The UPRR railway runs between Business 20 and the south frontage roads.

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the frontage roads.


## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX WITH CONNECTION TO MIDLAND INTERNATIONAL AIR AND SPACE PORT.



Source: Halff Associates


Source: Halff Associates

MIDLAND INTERNATIONAL AIR AND SPACE PORT CONNECTION


From south frontage roads of $\mathrm{BI}-20$, first cross UPRR and $\mathrm{BI}-20$ and then travel northward on La Force Boulevard for 4,000 feet to Midland International Air and Space Port.

La Force Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 80 feet. The roadway is approximately 37 feet wide with a vehicular speed limit of 35 mph .


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the east or west side of the road.

## TEXAS STATE LOOP 250 (SL 250) FRONTAGE ROAD



From south frontage roads of BI-20, first cross UPRR and then BI-20 and travel northward for 1.8 miles to Scharbauer Sports Complex.

SL 250 Frontage Road is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 300 feet. The roadway is approximately 260 feet wide with a vehicular speed limit of 45 mph .


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the west side of the road.


## Trail Route Alternative 3

## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX.



Source: Halff Associates


Source: Halff Associates

STATE HIGHWAY 191 (SH 191) SOUTH FRONTAGE ROAD


Departing Odessa Trailhead, travel eastward on SH 191 South Frontage Road for 12.4 miles to Tradewinds Boulevard.


SH 191 South Frontage Road is classified as a Service thoroughfare with right-of-way widths for the entire highway of approximately 400 feet. The roadway is approximately 350 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the frontage road.

## TRADEWINDS BOULEVARD


rom SH 191 South Frontage Road, travel southward on Tradewinds Boulevard for 2,500 feet to Scharbauer Sports Complex.

Tradewinds Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 80 feet wide with a vehicular speed limit of 30 mph .


It is envisioned that this segment would include a 16-foot-wide, off-street, multi-use trail along the west side of the road.


## Trail Route Alternative 4

## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX.



Source: Halff Associates


Source: Halff Associates

## TEXAS STATE HIGHWAY 191 (SH 191) NORTH FRONTAGE ROAD



Departing the Odessa Trailhead at Preston Smith Road, cross SH 191 at signalized intersection, then travel eastward on SH 191 North Frontage Road for 11.6 miles to Avalon Drive.

SH 191 North Frontage Road is classified as a Service thoroughfare with right-of-way widths of the entire highway of approximately 400 feet. The roadway is approximately 350 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the road.

## AVALON DRIVE



From SH 191 North Frontage Road, travel southward on Avalon Drive for 1,200 feet to Deauville Boulevard.

Avalon Drive is classified as a Major Arterial thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 68 feet wide with a vehicular speed limit of 40 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the west side of the road.


UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX.


DEAUVILLE BOULEVARD


From Avalon Drive, travel eastward on Deauville Boulevard for 4,200 feet to Scharbauer Sports Complex.

Deauville Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 92 feet wide with a vehicular speed limit of 40 mph .

It is envisioned that this segment would include a five-foot wide, on-street bicycle lane along the outside edges of the road.


## Trail Route Alternative 5



## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO UTPB-MIDLAND.



Source: Halff Associates


Source: Halff Associates

EASTRIDGE ROAD


Departing the Odessa Trailhead, travel northward on SL 338 for 1,500 feet to Eastridge Road. Travel eastward on Eastridge Road for 2.2 miles to Faudree Road.


Eastridge Road is classified as a Minor Arterial thoroughfare with right-of-way widths of approximately 80 feet. The roadway is approximately 62 feet wide with a vehicular speed limit of 40 mph .


It is envisioned that this segment would include two five-foot wide, on-street bicycle lanes along the outside edges of the road.

## FAUDREE ROAD



From Eastridge Road, travel northward on Faudree Road for 3,500 feet to Dorado Drive.


Faudree Road is classified as a Major Arterial with right-of-way widths of approximately 120 feet. The roadway is approximately 72 feet wide with a vehicular speed of 50 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.


Source: Halff Associates


Source: Halff Associates


Source: Halff Associates

## DORADO DRIVE



From Faudree Road, travel eastward on Dorado Drive for 4,300 feet to Mission Boulevard.

Dorado Drive is classified as a Minor Arterial thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 70 feet wide with a vehicular speed limit of 45 mph .


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the road.

## MISSION BOULEVARD



From Dorado Drive, travel northward Mission Boulevard for 4,250 feet to SH 191 South Frontage Road.


Mission Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 80 feet. The roadway is approximately 65 feet wide with a vehicular speed limit of 30 mph .

It is envisioned that this segment would include a five-foot wide, on-street bicycle lane along the outside edges of the road.

## TEXAS STATE HIGHWAY 191 (SH 191) SOUTH FRONTAGE ROAD



From Mission Boulevard, travel eastward on SH 191 South Frontage Road for 3,900 feet to Yukon Road.

SH 191 South Frontage Road is classified as a Service thoroughfare with right-of-way widths of the entire highway of approximately 400 feet. The roadway is approximately 350 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along the south side of the road.


Source: Halff Associates


Source: Halff Associates


Source: Halff Associates

## YUKON ROAD

O 0
From SH 191 South Frontage Road, travel southward on Yukon Road for 1,000 feet to W CR 100.


Yukon Road is currently classified as a Local thoroughfare with right-of-way widths of approximately 120 feet. Per the Three-County Thoroughfare Plan the future classification for Yukon Road will be Major Arterial. The current roadway is approximately 32 feet wide with a vehicular speed limit of 30 mph .


It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along either the north or south side of the road.

## WEST COUNTY ROAD 100 (W CR 1OO)



From Yukon Road, travel eastbound on W CR 100 for 2.1 miles to SH 349/FM 1788 Pedestrian Bridge.


W CR 100 is currently classified as a Local thoroughfare with right-of-way widths of approximately 60 feet. Per the Three-County Thoroughfare Plan the future classification for W CR 100 will be Major Collector. The current roadway is approximately 32 feet wide with a vehicular speed limit of 30 mph .


It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along either the north or south side of the road.

## TEXAS STATE HIGHWAY 349 (SH 349/FM 1788)



From W CR 100, travel northward along SH 349/FM 1788 for 1.8 miles to the UTPB—Midland Campus (Midpoint Trailhead 1).


SH 349/FM 1788 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 73 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.


EASTRIDGE ROAD


Five-foot wide, on-street bicycle lane along the outside edges of the road.

## SH 191 SOUTH FRONTAGE ROAD



16-foot-wide off-street multi-use trail along the south side of the road.

FAUDREE ROAD


16-foot-wide off-street multi-use trail along the east side of the road.

YUKON ROAD


16-foot-wide off-street multi-use trail along either the north or south side of the road

DORADO DRIVE


16-foot-wide off-street multi-use trail along the south side of the road.

## W CR 100



16-foot-wide off-street multi-use trail along either the north or south side of the road.

MISSION BOULEVARD


Five-foot wide, on-street bicycle lane along the outside edges of the road.

## SH 349/FM 1788



16-foot-wide off-street multi-use trail along the east side of the road.

## SH 349/FM 1788 Pedestrian Bridge

Due to the amount of high-speed traffic and freight traveling along SH 349/FM 1788, a safe pedestrian crossing needs to be considered, somewhere in close proximity to W CR 100 (Trail Route Alternative 5 alignment). This crossing will likely need to be grade-separated. There is warrant for evaluating the potential for a pedestrian overpass, which would span SH 349/FM 1788. The pedestrian approaches to the overpass would need to comply with Americans with Disabilities Act (ADA) requirements (maximum five percent slope), and should be able to be crossed while riding a bicycle.


Legacy Trail Pedestrian Bridge. Sarasota County, Florida (American Consulting 2012 Florida's Best in Construction for Minor Bridge, Florida Transportation Builders' Association, 2013 Transportation Merit Award, Design-Build Institute of America.


Millennium Park Pedestrian Bridge. Chicago, IL. (Frank Gehry)


Belleview Pedestrian Bridge Design Concept. Dallas, Texas. (Halff Associates, Inc 2013 Merit Award for Design; American Society of Landscape Architects (Texas Chapter)


Dodge Street Pedestrian Bridge. Omaha, NE

PERMIAN BASIN MPO
tABLE 3. TRAIL ROUTE ALTERNATIVE 5 COST ESTIMATES

| Item | Unit | Approximate Quantity | Unit Price | Total Price | Description |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16' WIDE OFF-STREET MULTI-USE TRAIL | LM | 6.3 | \$2,250,000 | \$14,175,000 | 8 inch depth reinforced concrete trail 42 inch tall vehicular combination barrier rail Benches, trash receptacles, water fountains at approximately 2,000 feet on-center Wayfinding signage Minor grading and drainage |
| 5' WIDE ON-STREET BIKE LANES | LM | 3.0 | \$850,000 | \$2,550,000 | 8 inch depth reinforced concrete bike lane on either side of the road <br> Pavement markings at approximately 200 feet on-center <br> Signage <br> Minor grading and drainage |
| $\begin{aligned} & \hline \text { SH 349/FM } 1788 \\ & \text { PEDESTRIAN BRIDGE } \end{aligned}$ | LF | 300.0 | \$15,000.00 | \$4,500,000 | Pedestrian bridge Grading and drainage |
| APPROXIMATE TOTAL | \$21,225,000 |  |  |  |  |

## Trail Route Alternative 6



UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-MIDLAND TO SCHARBAUER SPORTS COMPLEX.


Source: Halff Associates

Source: Halff Associates


TEXAS STATE HIGHWAY 349 (SH 349) / FM 1788


Departing UTPB—Midland Campus (Midpoint Trailhead 1), travel northward for 3 miles to W CR 60.

SH 349/FM 1788 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 85 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the east or west side of the road.


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the road.


Trailheads
Route Alternative 1
$\qquad$ Route Alternative 2
Route Alternative 3
—— Route Alternative 4
$\qquad$ Route Alternative 5Route Alternative 6
$\qquad$ Transmission Line

- . CRMWD Water LineSchoolsParksMidland City LimitsMidland ETJOdessa City Limits Odessa ETJ




## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-MIDLAND TO SCHARBAUER SPORTS COMPLEX.



Source: Halff Associates


Source: Halff Associates

TEXAS STATE HIGHWAY 158 (SH 158)


From W CR 60, travel southward on SH 158 for 2.8 miles to Deauville Boulevard.


SH 158 is classified as a Principal Arterial/Freeway with right-of-way widths of approximately 120 feet. The roadway is approximately 42 feet wide with a vehicular speed limit of 60 mph


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the east or west side of the road.

## DEAUVILLE BOULEVARD



From Avalon Drive, travel eastward on Deauville Boulevard for 4,200 feet to Scharbauer Sports Complex.


Deauville Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 92 feet wide with a vehicular speed limit of 40 mph .


It is envisioned that this segment would include a five-foot wide, on-street bicycle lane along the outside edges of the road.

TABLE 4. TRAIL ROUTE ALTERNATIVE 6 COST ESTIMATES

| Item | Unit | Approximate Quantity | Unit Price | Total Price | Description |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16' WIDE OFF-STREET MULTI-USE TRAIL | LM | 8.8 | \$2,250,000 | \$19,800,000 | 8 inch depth reinforced concrete trail <br> 42 inch tall vehicular combination barrier rail <br> Benches, trash receptacles, water fountains at approximately 2,000 feet on-center <br> Wayfinding signage <br> Minor grading and drainage |
| 5' WIDE ON-STREET BIKE LANES | LM | 0.8 | \$850,000 | \$680,000 | 8 inch depth reinforced concrete bike lane on either side of the road <br> Pavement markings at approximately 200 feet on-center <br> Signage <br> Minor grading and drainage |
| APPROXIMATE TOTAL | \$20,480,000 |  |  |  |  |



## SH 349/FM 1788



16-foot-wide off-street multi-use trail along either the east or west side of the road.

## SH 158



16-foot-wide off-street multi-use trail along either the east or west side of the road.

W CR 60


16-foot wide, on-street bicycle lane along the outside edges of the road. Additional right-of-way would be need to be purchased to accommodate this proposal.

DEAUVILLE BOULEVARD


Five-foot wide, on-street bicycle lane along the outside edges of the road.

## Trail Route Alternative 7

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SCHARBAUER SPORTS COMPLEX TO TEXAS STATE HIGHWAY 349 (SH 349/FM 1788).
```



Source: Halff Associates


Source: Halff Associates

TEXAS STATE HIGHWAY 349 (SH 349) / FM 1788
O 0
From the SH 349/FM 1788 Pedestrian Overpass, travel south for 1.0 mile to the Oncor transmission easement.


SH 349/FM 1788 is classified as a Principal Arterial / Freeway thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 73 feet wide with a vehicular speed limit of 60 mph .


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.

ONCOR TRANSMISSION EASEMENT


From SH 349/FM 1788, travel 8.9 miles along the Oncor transmission easement to Tradewinds Boulevard (near Thomason Drive).

The Oncor Utility Easement varies in width and currently allows no vehicular access.


It is envisioned that this segment would include a 16-foot-wide, off-street, multi-use trail within the easement.


## SCHARBAUER SPORTS COMPLEX TO TEXAS STATE HIGHWAY 349 (SH 349/FM 1788).



Source: Halff Associates

## TRADEWINDS BOULEVARD



From the Oncor Utility Easement near Thomason Drive, travel southward on Tradewinds Boulevard for 1,890 feet to the Scharbauer Sports Complex.

Tradewinds Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 80 feet wide with a vehicular speed limit of 30 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.

TABLE 5. TRAIL ROUTE ALTERNATIVE 7 COST ESTIMATES

| Item | Unit | Approximate Quantity | Unit Price | Total Price | Description |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16' WIDE OFF-STREET MULTI-USE TRAIL | LM | 1.0 | \$2,250,000 | \$2,250,000 | 8 inch depth reinforced concrete trail 42 inch tall vehicular combination barrier rail Benches, trash receptacles, water fountains at approximately 2,000 feet on-center <br> Wayfinding signage <br> Minor grading and drainage |
| 16' WIDE OFF-STREET MULTI-USE TRAIL WITHIN EASEMENT | LM | 9.0 | \$3,500,000 | \$31,500,000 | 8 inch depth reinforced concrete trail <br> Pedestrian lighting at approximately 100 feet on-center <br> Wayfinding signage <br> Minor grading and drainage |
| APPROXIMATE TOTAL | \$33,750,000 |  |  |  |  |

PERMIAN BASIN MPO




## Trail Route Alternative 8

## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX WITH CONNECTION TO UTPB-MIDLAND AND MIDLAND INTERNATIONAL AIR AND SPACE PORT.



Source: Halff Associates


Source: Halff Associates

ONCOR TRANSMISSION EASEMENT


From the Odessa Trailhead, travel along the Oncor transmission easement eastward for 16 miles, cross SH 349/FM 1788 at Pedestrian Bridge to Tradewinds Boulevard.

The Oncor transmission easement varies in width and allows no vehicular access.


It is envisioned that this segment would include a 16-foot-wide, off-street, multi-use trail within the easement.

TRADEWINDS BOULEVARD


From the Oncor transmission easement, travel northward on Tradewinds Boulevard for 1,890 feet to Scharbauer Sports Complex.


Tradewinds Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 80 feet wide with a vehicular speed limit of 30 mph .


It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along the west side of the road.


```
SECTION 6 . ALTERNATIVES
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Source: Halff Associates


Source: Halff Associates


Source: Halff Associates






## UTPB-MIDLAND CAMPUS CONNECTION (SH 349/FM 1788)

From the Oncor transmission easement, travel northward for 2.7 miles to UTPB—Midland Campus (Midpoint Trailhead 1).

SH 349/FM 1788 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 73 feet wide with a vehicular speed limit of 60 mph .

It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along the east side of the road.

MIDLAND INTERNATIONAL AIR AND SPACE PORT CONNECTION, SH 349/FM 1788
From the Oncor Utility Easement, travel southward along SH 349/FM 1788 for 3,000 feet to SL 40.

SH 349/FM 1788 is classified as a Principal Arterial/Freeway thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 73 feet wide with a vehicular speed limit of 55 mph .

It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.

## TEXAS STATE LOOP 40 (SL 40)

From SH 349/FM 1788, travel eastward for 4,350 feet on SL 40 to Midland International Air and Space Port (Midpoint Trailhead 2).

SL 40 is classified as a Local thoroughfare with right-of-way widths of approximately 100 feet. Per the Three-County Thoroughfare Plan the future classification for SL 40 will be Major Arterial. The current roadway is approximately 70 feet wide with a vehicular speed limit of 30 mph.

It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along south side of the road.

TABLE 6. TRAIL ROUTE ALTERNATIVE 8 COST ESTIMATES

| Item | Unit | Approximate Quantity | Unit Price | Total Price | Description |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16' WIDE OFF-STREET MULTI-USE TRAIL | LM | 4.5 | \$2,250,000 | \$10,125,000 | 8 inch depth reinforced concrete trail 42 inch tall vehicular combination barrier rail Benches, trash receptacles, water fountains at approximately 2,000 feet on-center <br> Wayfinding signage <br> Minor grading and drainage |
| SH 349/FM 1788 PEDESTRIAN BRIDGE | LF | 300.0 | \$15,000 | \$4,500,000 | Pedestrian bridge Grading and drainage |
| 16' WIDE OFF-STREET MULTI-USE TRAIL WITHIN EASEMENT | LM | 16.0 | \$3,500,000 | \$56,000,000 | 8 inch depth reinforced concrete trail <br> Pedestrian lighting at approximately 100 feet on-center <br> Wayfinding signage <br> Minor grading and drainage |
| ATE TOTAL \$70,625,000 |  |  |  |  |  |

## Trail Route Alternative 9



## UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB)-ODESSA TO SCHARBAUER SPORTS COMPLEX.



EASTRIDGE ROAD


Departing the Odessa Trailhead at UTPB Park Drive, travel northward on SL 338 for 1,500 feet to Eastridge Road. Travel eastward on Eastridge Road for 2.2 miles to Faudree Road.


Eastridge Road is classified as a Minor Arterial thoroughfare with right-of-way widths of approximately 80 feet. The roadway is approximately 62 feet wide with a vehicular speed limit of 40 mph .


It is envisioned that this segment would include unidirectional, five-foot wide, on-street bicycle lanes along the outside edges of the road.


Source: Halff Associates


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the east side of the road.



Source: Halff Associates


Source: Halff Associates

## DORADO DRIVE



From Faudree Road, travel eastward on Dorado Drive for 3.3 miles to W CR 100


Dorado Drive is classified as a Minor Arterial thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 70 feet wide with a vehicular speed limit of 45 mph . The first 1.2 miles of this section of Dorado Drive are existing, the remaining 2.1 miles are proposed, per the Three-County Thoroughfare Plan.


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along the south side of the road.

## WEST COUNTY ROAD 100 (W CR 100)

O 0
From the proposed extension of Dorado Drive, travel eastbound on W CR 100 for 2,000 feet to the SH 349/FM 1788 Pedestrian Bridge.


W CR 100 is currently classified as a Local thoroughfare with right-of-way widths of approximately 60 feet. Per the Three-County Thoroughfare Plan the future classification for this portion of W CR 100 will be Minor Arterial. The current roadway is approximately 32 feet wide with a vehicular speed limit of 30 mph .


It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along either the north or south side of the road.

## PROPOSED THOROUGHFARE ' $A$ '



From the SH 349/FM 1788 Pedestrian Bridge, travel along Proposed Thoroughfare 'A' 2,100 feet eastward to Proposed Thoroughfare 'B.'


Per the Three-County Thoroughfare Plan, Proposed Thoroughfare ' A ' is classified as a Collector thoroughfare.


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the north or south side of the proposed road.

## PROPOSED THOROUGHFARE 'B’



From Proposed Thoroughfare ' $A$ ', travel 1.5 miles northward on Proposed Thoroughfare 'B' to Proposed Thoroughfare 'C.'


Per the Three-County Thoroughfare Plan, Proposed Thoroughfare 'B' is classified as a Collector thoroughfare.

It is envisioned that this segment would include a 16-foot-wide off-street multi-use trail along either the east or west side of the proposed road.

## PROPOSED THOROUGHFARE 'C’

- $O$

From Proposed Thoroughfare 'B,' travel 4.8 miles eastward to Deauville Boulevard.


Per the Three-County Thoroughfare Plan, Proposed Thoroughfare 'C' is classified as a Collector thoroughfare.


It is envisioned that this segment would include a 16 -foot-wide off-street multi-use trail along either the north or south side of the proposed road.


Source: Halff Associates

DEAUVILLE BOULEVARD


From Proposed Thoroughfare ' C ', travel eastward for 4,200 feet along Deauville Boulevard to Scharbauer Sports Complex.

Deauville Boulevard is classified as a Collector thoroughfare with right-of-way widths of approximately 120 feet. The roadway is approximately 92 feet wide with a vehicular speed limit of 40 mph .


It is envisioned that this segment would include a five-foot wide, unidirectional on-street bicycle lanes along the outside edges of the road.

TABLE 7. TRAIL ROUTE ALTERNATIVE 9 COST ESTIMATES

| Item | Unit | Approximate Quantity | Unit Price | Total Price | Description |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16' WIDE OFF-STREET MULTI-USE TRAIL | LM | 11.0 | \$2,250,000 | \$24,750,000 | 8 inch depth reinforced concrete trail 42 inch tall vehicular combination barrier rail Benches, trash receptacles, water fountains at approximately 2,000 feet on-center Wayfinding signage Minor grading and drainage |
| 5' WIDE ON-STREET BIKE LANES | LM | 3.0 | \$850,000 | \$2,550,000 | 8 inch depth reinforced concrete bike lane on either side of the road <br> Pavement markings at approximately 200 feet on-center <br> Signage <br> Minor grading and drainage |
| SH 349/FM 1788 PEDESTRIAN BRIDGE | LF | 300.0 | \$15,000 | \$4,500,000 | Pedestrian bridge Grading and drainage |
| APPROXIMATE TOTAL | \$31,800,000 |  |  |  |  |



## Implementation - Next Steps

## ON SELECTING A PREFERRED ROUTE ALTERNATIVE

After the analysis of the Trail Route Alternatives within the previous Section 6, Alternatives, the following routes are not recommended for consideration, due to safety concerns:

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4

As discussed, these route alternatives are aligned along the frontage roads of $\mathrm{BI}-20$ and SH 191, respectively. Due to the predominant pattern of commercial growth along these frontage roads, and the lack of enforceable access management regulations, cyclists' safety would be significantly compromised.

## PREFERRED ROUTE ALTERNATIVES

## Alternative 5

Route Alternative 5 is considered a preferred option because the proposed alignment weaves its way along generally low-speed "in-town' thoroughfares, and is directly accessible to residential neighborhoods on the eastern edge of Odessa; thus advancing the principle of not having to necessarily drive to an active transportation / recreation facility.

The difficulty with this alignment, and any other route alternatives which rely on SH 349 to support an adjacent, off-street multi-use trail, is that it appears there is inadequate right-of-way width to support a 16 -foot-wide trail facility. It is recommended that crossing SH 349 will likely require a pedestrian overpass.

## Alternative 6

Route Alternative 6 is also considered a promising option due to the ample amount of area within the right-of-way to support a 16 -foot-wide trail. Unfortunately, SH 158, which is part of this route alignment, was the site of a recent traffic accident, between two cyclists and a vehicle, resulting in two fatalities.

## Alternatives 7 and 8

Route Alternatives 7 and 8 are the only two proposed options which depart being aligned within the rights-of-way of existing thoroughfares; and are aligned to follow the Oncor transmission easement (either within or immediately adjacent to). As the Oncor transmission easement runs through existing neighborhoods within both East Odessa and West Midland, current and subsequent phases of the multi-use trail would provide access and connectivity to several existing neighborhoods. These are also by far the safest route
alternatives proposed, as pedestrian - vehicular conflicts are minimized.

From an economic development and tourism perspective, a designated off-street, multi-use trail could become a significant draw for cyclists from all over the country. The direct and indirect benefits could be significant, as with other recreational trails around the country; such as the 240-mile-long Katy Trail State Park, which is located within the former Missouri-Kansas-Texas (MKT) Railroad right-of-way, which runs from St. Louis westward along the Missouri River and enjoys over 400,000 visitors annually, with a total economic impact of well over $\$ 18$ million.

Another example is the 31-mile-long Tammany Trace, which is considered Louisiana's toprated rail-to-trail and connects the communities of Covington, Abita Springs, and Mandeville. According to the Rails to Trails Conservancy, the Tammany Trace enjoys over $\$ 3.356$ million in direct spending and $\$ 3.9$ million in indirect spending.

A third example is Indianapolis' eight-mile-long, Cultural Trail, which, within a six year period, has increased the assessed value of properties within 500 feet of the trail by over $\$ 1$ billion. It is estimated that trail users spend over $\$ 3.56$ million annually while on the trail.

PERMIAN BASIN MPO


Tammany Trace
Source: Rails-to-Trails Conservancy


## Indianapolis' Cultural Trail

Source: Nation Swell


[^1]While the other trails alternatives could be administered by existing municipal parks departments and/or other entities, Alternatives 7 and 8 would likely require its own operations and maintenance organization. This could either be a division of an existing municipal department, or it could be a quasigovernmental entity, such as an economic development corporation; or it could be a non-profit organization. This organization would be responsible for promoting the trail as a significant recreational amenity; forming partnerships and raising capital to fund improvements to the trail, as well as maintain those improvements; and perhaps most importantly, ensuring that the trail is safe for users; which would likely require partnering with the municipal Police Departments and County Sheriffs Offices.

## Alternative 9

Route Alternative 9 is also considered a preferred route in that it follows the alignment of several proposed thoroughfares that have been identified within the Three-County Thoroughfare Plan, for Midland, Ector, and Martin Counties. In that the majority of these thoroughfares have not been constructed it would, in theory, enable transportation planners to design thoroughfares to accommodate multi-use trail facilities. The only problem is
that it may take years for key thoroughfares to be designed and constructed; which would potentially leave the multi-use trail largely unfunded, with potentially little connectivity.

In summary, of the route alternatives identified, Alternatives 5, 6, 7, 8, and 9 are preferred and warrant further study.

1. Route Alternatives 5, 6, and 7 provide connections from the primary destinations Odessa Trailhead (UTPB-Odessa campus) and Midland Trailhead (Scharbauer Sports Complex) - to Midpoint Trailheads 1 and 2 (UTPB Midland and Midland Air and Space Port, respectively); and do not independently satisfy the objective of connecting Midland with Odessa.
2. Route Alternatives 7 and 8 , while different lengths, both utilize the Oncor transmission easement for the trail alignment.
3. Route Alternatives 8 and 9 are the only alternatives that run from primary destination to primary destination; but each alternative is based on the alignments of the previous route alternatives.

Refer to Table 8, Preferred Alternatives Cost Estimates Comparisons, on the following page to see how the overall costs of each alternative compare.

TABLE 8. PREFERRED ALTERNATIVES COST ESTIMATES COMPARISON

| Trail Route Alternative | Item | Item Totals | Grand Total |
| :---: | :---: | :---: | :---: |
| TRAIL ROUTE ALTERNATIVE | 16' WIDE OFF-STREET MULTI-USE TRAIL | \$14,175,000 | \$21,225,000 |
|  | 5' WIDE ON-STREET BIKE LANES | \$2,550,000 |  |
|  | SH 349/FM 1788 PEDESTRIAN BRIDGE | \$4,500,000 |  |
| TRAIL ROUTE ALTERNATIVE | 16' WIDE OFF-STREET MULTI-USE TRAIL | \$19,800,000 | \$20,480,000 |
|  | 5' WIDE ON-STREET BIKE LANES | \$680,000 |  |
| TRAIL ROUTE ALTERNATIVE | 16' WIDE OFF-STREET MULTI-USE TRAIL | \$2,250,000 | \$33,750,000 |
|  | 16' WIDE OFF-STREET MULTI-USE TRAIL WITHIN EASEMENT | \$31,500,000 |  |
| TRAIL ROUTE ALTERNATIVE | 16' WIDE OFF-STREET MULTI-USE TRAIL | \$10,125,000 | \$70,625,000 |
|  | SH 349/FM 1788 PEDESTRIAN BRIDGE | \$4,500,000 |  |
|  | 16' WIDE OFF-STREET MULTI-USE TRAIL WITHIN EASEMENT | \$56,000,000 |  |
| TRAIL ROUTE ALTERNATIVE | 16' WIDE OFF-STREET MULTI-USE TRAIL | \$24,750,000 | \$31,800,000 |
|  | 5' WIDE ON-STREET BIKE LANES | \$2,550,000 |  |
|  | SH 349/FM 1788 PEDESTRIAN BRIDGE | \$4,500,000 |  |




Source: Halff Associates

## NEXT STEPS

The following recommendations are intended to further narrow the range of route alternatives through gaining a better understanding about what may, and/or may not be possible, in order to prioritize and formulate a planning, design and construction path forward for the preferred route alternative.

Strategy 1: Identify the landholders responsible for determining the conditions under which the trail may be constructed on their property.

Actions and Initiatives:

1. Contact Oncor and determine under what conditions the multi-use trail can be aligned within their easement. (Alternatives 7 and 8)
2. As depicted on Map 5, Land Ownership, contact representatives from:

- Cumberland \& Western Resources, LLC. T\# (970) 667-1690
- Diamondback Energy, LLC T\# (432) 221-7400
- DJK, Inc. T\#

3. Contact the Colorado River Municipal Water District (CRMWD) to determine whether it may be possible to align an additional trail route alternative within their water transmission right-of-way.

Strategy 2: Develop a trail amenities program.
Develop a family of streetscape furnishings, amenities, and signage to incorporate into the trail design.

## Actions and Initiatives:

1. Work with the Midland and Odessa Parks and Recreation Departments to formulate a streetscape amenities program, including:

- benches
- bollards
- waste receptacles
- drinking fountain
- restrooms (permanent and portable)
- shade structures
- emergency 9-1-1 call boxes
- lighting (solar powered)

Strategy 3: Develop the regulatory framework through which trails can be developed, in order to promote safe and connected active transportation facilities.

Actions and Initiatives:

1. Work with the City of Midland and the City of Odessa to conduct a thorough review of each city's Code of Ordinances to determine which sections require amending to ensure that recreational trails as well as safe accessible alternative transportation modes are included within
all new municipal transportation and residential development projects.
2. Identify all of the TxDOT and AASHTO requirements, recommendations, and best practices for constructing the multi-use trail as both a series of on-street bike lanes as well as off-street, stand-alone trails. In particular, identify trail alignment, signage, and other design requirements for when the trail must cross a vehicular thoroughfare.
3. Simultaneously, amend each City's Code of Ordinances to provide enforceable access management regulations defining the specific number of points of entrance into a parcel from a public right-of-way.
4. Ensure that active transportation plans (pedestrian and bicycle plans) are featured prominently within the City of Midland's and the City of Odessa's Parks, Recreation, and Open Space Master Plan Updates.
5. Include the Permian Basin Multi-Use Trail Corridor Study in the Bicycle and Pedestrian chapter of the Permian Basin MPO's 2045 Metropolitan Transportation Plan, to ensure that the multi-use trail is included as a prioritized program.

Strategy 4: Develop appropriate policies and programs through which to administer
ongoing planning, design, maintenance, and construction-related development of the multi-use trail.

## Actions and Initiatives:

1. Work with the MPO Policy Board, Bicycle and Pedestrian Advisory Committee, Technical Advisory Committee, and key stakeholders, including the Permian Basin Bicycle Association, to develop an appropriate organizational structure to administer the development of the multiuse trail. Important powers and authorities include:

- the authority to receive (be gifted) and hold real property
- the authority to pursue funding from public and private sources
- the authority to administer projects

2. Work with the Permian Basin Bicycle Association and other stakeholders to develop a promotional program to continue to build support for the trail, before and after its construction. The program should include considerations for a trail logo, thematic and wayfinding signage, annual events such as bicycle races, etc.
3. Consider the organizational powers and authorities needed to promote, administer, manage, and maintain the trail.

Strategy 5: Formulate and secure capital and in-kind contributions.

## Actions and Initiatives:

1. Develop a menu of multi-use trail construction materials, features, and amenities with which to approach potential partners with sponsorship opportunities.
2. Work with the TxDOT Odessa District to determine likely sources of funding for additional planning and design phases and construction stages.
3. Approach the Midland and Odessa Development Corporations to determine whether additional planning and design phases can be funded through their economic development programs.
4. Approach private philanthropic foundations and corporations to determine under what conditions they may be willing to provide funding assistance.
Strategy 6: Continue to encourage public engagement through the trail alignment and design process.
Actions and Initiatives:
5. Continue to involve and work with the Permian Basin Bicycle Association (PBBA) in evaluating alternative trail alignments and the appropriate trail design cross section.
6. Approach UTPB to determine their issues and how they might participate so as to develop a safe, multi-modal trail alignment that will connect the UTPB-Odessa campus with the UTPB-Midland campus.

Strategy 7: Identify environmental constraints to proposed trail alignments.

## Actions and Initiatives:

1. Locate and map all of the playas and draws that may impact the trail alignment within the Oncor transmission easement.
2. Prepare construction details to address how the multi-use trail would negotiate natural and built drainage features, including draws and culverts.

Strategy 8: Identify optional trail cross-sections and alternative building materials for multi-use trail.

Actions and Initiatives:

1. Work with TxDOT's Odessa District to determine optional building materials for the trail; such as asphalt with concrete curbs.
2. Amend the cost estimate accordingly.

## CONCLUSION

The alignment, design, and construction of a multi-use trail to link the Cities of Midland and Odessa is an ambitious undertaking The anticipated benefits however could be significant, including increased safety for cyclists and pedestrians; connectivity from neighborhoods to parks and academic institutions; regional economic development opportunities focused on long-distance cycling; active transportation connections between UTPB campuses; and an organizing element for additional multi-use development. Based on the overwhelmingly positive community response to this initiative subsequent phases should focus on further defining the proposed alignment of the multi-use trail, including discussing with property owners who may be
impacted, cultivating capital partnerships with additional public, private, and quasi-public stakeholders, evaluating optional trail construction materials and methods, and further refining cost estimates. The Permian Basin MPO and the regional community, including the Cities of Midland and Odessa, are in a unique position to take full advantage of the public interest and enthusiasm, and leverage the available capital and other resources to realize this most worthy program.


Appendix A - Public Participation



## Appendix B Three-County Thoroughfare Plan Resolution

RESOLUTION NO. 22-10-2018-1

## A RESOLUTION CONCURRING WITH THE THREE-COUNTY THOROUGHFARE PLAN.

WHEREAS, the Permian Basin Metropolitan Planning Organization was designated by the Governor of the State of Texas as the Metropolitan Planning Organization for the Midland Odessa Metropolitan Planning Area; and

WHEREAS, the Policy Board is made up of representatives of public agencies that administer or operate major modes of transportation in the metropolitan area including portions of a three-county area; and

WHEREAS, the Permian Basin Metropolitan Planning Organization recognizes that the planning and coordinated development of a regional thoroughfare plan addressing future infrastructure needs and providing benefits for local governments in the areas of connectivity and general design conformity; and

WHEREAS, a coordinated and cooperative effort was taken to produce the three-county thoroughfare plan (Attachment A); and

WHEREAS, the Permian Basin Metropolitan Planning Organization encourages the cities and counties to adopt their portion of the plan to preserve transportation corridors and guide future development; and

NOW, THEREFORE, BE IT RESOLVED, BY THE PERMIAN BASIN MPO THAT:
The Permian Basin Metropolitan Planning Organization Policy Board hereby adopts the The Three-County Regional Thoroughfare Plan Map, this the $\mathbf{2 2}^{\text {nd }}$ day of October 2018.

BE IT FURTHER RESOLVED, that the MPO Policy Board will consider the adopted map during its project selection process.


David Turner



\# HALFF


[^0]:    The mission of Midland's Oil and Gas
    Services is to encourage the orderly production of Midland's mineral resources while enforcing reasonable and uniform regulations over oil and gas operations and development, protect the health, safety, and general welfare of the citizens of Midland and quality of the environment, and to abate or prevent potential public nuisances and to minimize the potential adverse impact to surface and mineral owners.

[^1]:    Missouri's Katy Trail State Park

