

# Master Thoroughfare Plan

City of Oak Ridge North

## Technical Memorandum

*Oak Ridge North, Texas*



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BGE, Inc.  
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**Exhibits**

Exhibit A – Existing Traffic Counts

Exhibit B – 2040 Future Traffic Projections

Exhibit C – Major Thoroughfare Plan

Exhibit D – Bicycle and Pedestrian Pathways Plan

Exhibit E – Roadway Inventory

# Section 1

## Introduction

### **1.1 Background**

Oak Ridge North is located in Montgomery County, Texas along Interstate 45. The city has a boundary of approximately 1.2 square miles and an extraterritorial jurisdiction (ETJ) of another 1.3 square miles. While the city has a 2010 population projection of 3,121 persons, the nearby developed areas to the east have a population of 56,000. Many of these residents travel through the city to access schools or major thoroughfares such as Interstate 45.

The Oak Ridge North Master Thoroughfare Plan (MTP) is a planning instrument used to implement the objectives of the Comprehensive Plan relative to Transportation Facilities:

1. Maintain and strengthen connectivity to the regional transportation system.
2. Work with regional entities to identify solutions to regional mobility that improve access to IH-45, but that also preserve the small town character of Oak Ridge North.
3. Ensure that streets and thoroughfares within Oak Ridge North preserve the small town character of the City.
4. Maintain low volumes of vehicular movement with neighborhoods in Oak Ridge North.
5. Make it easier to move around Oak Ridge North by walking or bicycle riding.

The MTP will assist the city staff in accomplishing these objectives by providing regulatory guidance for land development within the city's jurisdiction, providing planning goals for capital improvements needed to address future mobility needs, and by identifying areas of coordination and cooperation with Montgomery County and nearby communities.

### **1.2 Scope of Work**

The scope of work includes the following:

1. Review of Existing Roadways and Traffic Studies
2. Provide Projected Traffic Volumes (2040)
3. Determine Future Roadway needs and Classifications
4. Identify Corridors for Pedestrian and Bicycle Mobility

# Section 2

## Existing Roadways and Traffic Studies

### **2.1 Available Records**

A number of jurisdictions have undertaken mobility planning exercises in the general area. Following is a list of documents that have informed the MTP.

1. Thoroughfare Plan, Shenandoah (December, 2008)
2. Comprehensive Plan, Shenandoah (January, 2010)
3. Comprehensive Plan, Oak Ridge North (June 2013)
4. South County Mobility, HGAC (September, 2015)
5. Montgomery County Thoroughfare Plan, HGAC (July, 2016)
6. Pedestrian and Bicycle Master Plan, The Woodlands Township (October, 2016)

### **2.2 Significant Findings**

The following findings were considered in the preparation of the MTP.

- Shenandoah
  - David Memorial south of Tamina is a collector and has a proposed pedestrian pathway.
- The Woodlands
  - The Woodlands Township has identified The Woodlands Parkway west of IH 45 as a future bicycle lane and separate pedestrian pathway.
- South County Mobility
  - Existing and Future Traffic Counts
  - Robinson Road Improvements
  - Robinson Road/ IH 45 Intersection Improvements
- Montgomery County Thoroughfare Plan
  - Identifies county thoroughfares that were used for the MTP maps.

## 2.3 Traffic Studies

**Exhibit A – Existing Traffic Counts** includes daily traffic counts from several sources on thoroughfares in and around Oak Ridge North. These counts identify existing roadways and intersections that are congested and provide guidance for the classifications of existing roadways. **Exhibit B – 2040 Future Projections** shows projected traffic volumes adjusted based on the proposed transportation grid. **Table 1 Roadway Classification** shows the function, traffic volume, and number of lanes of various classifications of roadways found in Oak Ridge North.

**Table 1 – Roadway Classification**

<b>Classification</b>	<b>Function</b>	<b>Lanes</b>	<b>Capacity (ADT)</b>
Principal Thoroughfare	Public streets that accumulate traffic from thoroughfares and collectors for distribution to freeways.	6	45,000
Thoroughfare	Public streets that accumulate traffic from collectors to distribute to thoroughfares and freeways.	4	33,000
Major Collector	Public streets that accumulate traffic from minor collectors and local streets and distribute to thoroughfares.	2 4	16,000 33,000
Minor Collector	Public streets that accumulate traffic from local streets and distribute to major collectors or thoroughfares.	2	16,000
Local Streets	Public streets that provide access to individual single family residences.	2	N/A

## 2.4 Mobility Challenges

Oak Ridge North has experienced a number of mobility challenges that will continue to affect the planning and implementation of the Master Thoroughfare Plan.

#### ***2.4.1 Lack of an effective Thoroughfare Grid***

The Union Pacific railroad tracks provide a barrier that divides the city and funnels regional traffic seeking access to IH 45 and destinations in The Woodlands to Rayford Road or Robinson Road. There is little regional connectivity on the east side that would provide alternative routes to the north such as Tamina Road or SH 242.

#### ***2.4.2 Jog in the Robinson Rd at Hanna Rd***

The jog in Robinson Road at Hanna Road increases traffic delays in both directions at one of the busiest intersections in the area. City staff has been working with regional officials to design and fund a solution to this problem to alleviate the congestion.

#### ***2.4.3 Limited Right-of-Way for Facilities***

Most of the road rights-of-way in the city are limited to 60-feet in width with development on both sides of the road. These rights-of-way must provide for utilities and drainage facilities in addition to transportation facilities for motor vehicles, bicycles, and pedestrians. In particular, thoroughfares such as Robinson Rd and Hanna Rd are limited. Hanna Rd is a challenge because it is constructed on a 60-foot right-of-way that is partly owned by the railroad (50 feet) and partly controlled by the County (10 feet). Further development of the road width or pathways would require additional land from the railroad.

#### ***2.4.4 Lack of Access to IH 45***

IH 45 has limited crossing location between Rayford Road and Research/ Tamina Road. The crossings that are in place have limited volume intersections. Since the frontage roads are one way (northbound), traffic moving south or west uses neighborhood streets as an alternate route.

#### ***2.4.5 Regional Cooperation***

Much of the traffic using the city streets is regional traffic that is passing through. Many of the solutions for regional mobility involve roadways that are owned and maintained by other agencies such as TxDOT, Montgomery County, or Union Pacific Railroad. Since Oak Ridge North does not control these facilities, solutions to the traffic problems in the city will require the action of these other entities with the city's cooperation.

### **2.5 Roadway Inventory**

Oak Ridge North is a mature community with an established roadway infrastructure. **Exhibit E - Roadway Inventory** documents the existing roads and rights-of-way utilized in the Oak Ridge North city and extraterritorial jurisdiction. The roadways are classified based on function and traffic volume. Right-of-way widths are based on information available on recorded plats.

# Section 3

## Projected Traffic Volumes

### 3.1 Projected Volume

Projected traffic volumes are obtained using a regional traffic model developed by the Houston Galveston Area Council (HGAC). The traffic volume is expressed in Average Daily Traffic (ADT) which is the number of trips generated in both directions in an average day. The trips are then assigned to roadways based on function and capacity. The volumes shown in **Exhibit B – 2040 Future Traffic Projections** are 2040 projections that have been adjusted to match the Montgomery County Thoroughfare Plan proposed roadway system. If the planned thoroughfares are not constructed, the traffic would choose other routes and increase or decrease the projections accordingly.

### 3.2 Results

A comparison of **Exhibit A – Existing Traffic Counts** and **Exhibit B - 2040 Future Projections** indicates that continuing regional growth is expected to dramatically increase traffic on thoroughfares in and around Oak Ridge North. Robinson Road, Hanna Road and Woodson Road daily traffic volumes will double by 2040. If regional mobility projects are not completed, the traffic will become even more congested.

# Section 4

## Proposed Thoroughfare Plan

### 4.1 Introduction

Oak Ridge North is a small but significant piece of a regional network of roads and thoroughfares. The proposed **Major Thoroughfare Plan (Exhibit C)** shows the location of various classification of streets needed to accommodate the 2040 traffic volumes and how the streets interact with regional thoroughfares planned by other agencies. The MTP will be an instrument of mobility planning and development policy when adopted by city officials.

### 4.2 Mobility Planning

The MTP identifies the classification, location, and general design requirements for future road systems within Oak Ridge North and its extraterritorial jurisdiction. City staff will compare growing traffic counts to existing roadway estimates to plan for facility expansions when needed to accommodate growth.

Identifying expansions well in advance provides time for public engagement with residents and businesses, acquisition of rights-of-way and permits, and budgeting financial resources to accomplish construction projects in a timely manner.

The MTP also provides information that is useful in the coordination with county and other local government officials to jointly determine regional mobility priorities and schedules for improvements.

The MTP is a living document that can be updated as new traffic generators or obstacles occur that change the need or location of future facilities.

### 4.3 Policy Implementation

The MTP will help shape development by identifying alignments for future roadways that must be preserved in the course of private development. The right-of-way width and location will be reserved and dedicated to the city during the development process. Also the geometry and construction of roadways may be required to meet criteria adopted in the MTP. The adoption of the MTP will set expectations for agencies and land owners alike for the location and connectivity of the roadway network.

### 4.4 Roadway Classifications

The MTP identifies proposed road classifications on **Exhibit C**. These classifications are listed in **Table 1** and described in more detail below.

#### 4.4.1 Principal Thoroughfares

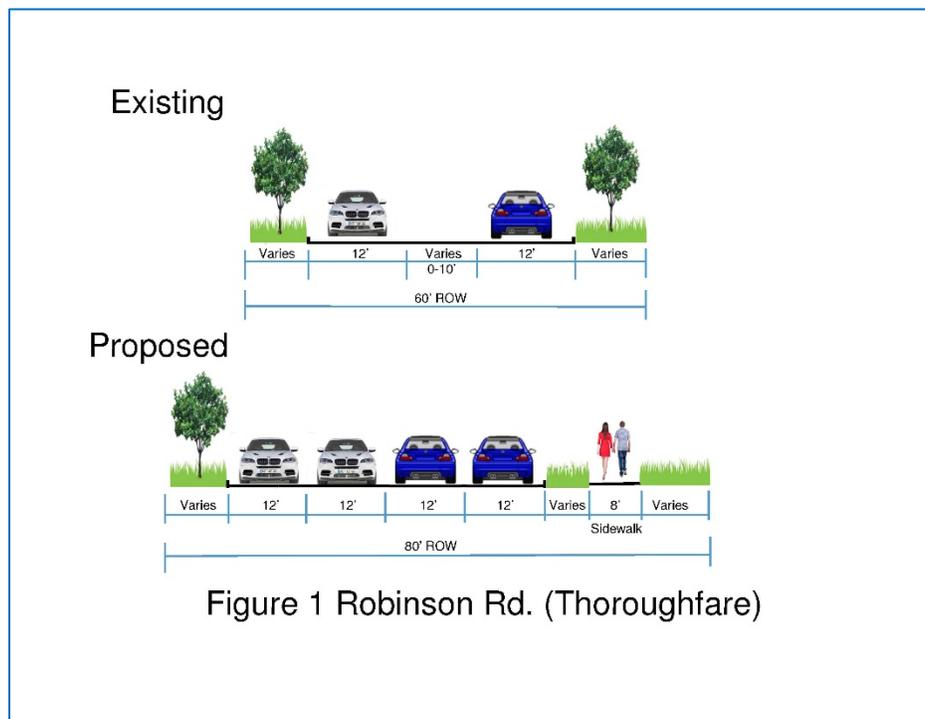
Principal thoroughfares are important roads that connect collectors and thoroughfares directly to freeways. They provide limited direct commercial access and are designed primarily for high traffic volume at moderate to high speeds. The principle thoroughfares serving Oak Ridge North are maintained by other agencies. The principal thoroughfares in the study area include the following.

- IH 45 Frontage Roads (TxDOT)
- Woodlands Parkway (west of IH 45) (County)
- Lake Woodlands Drive (west of IH 45) (County)

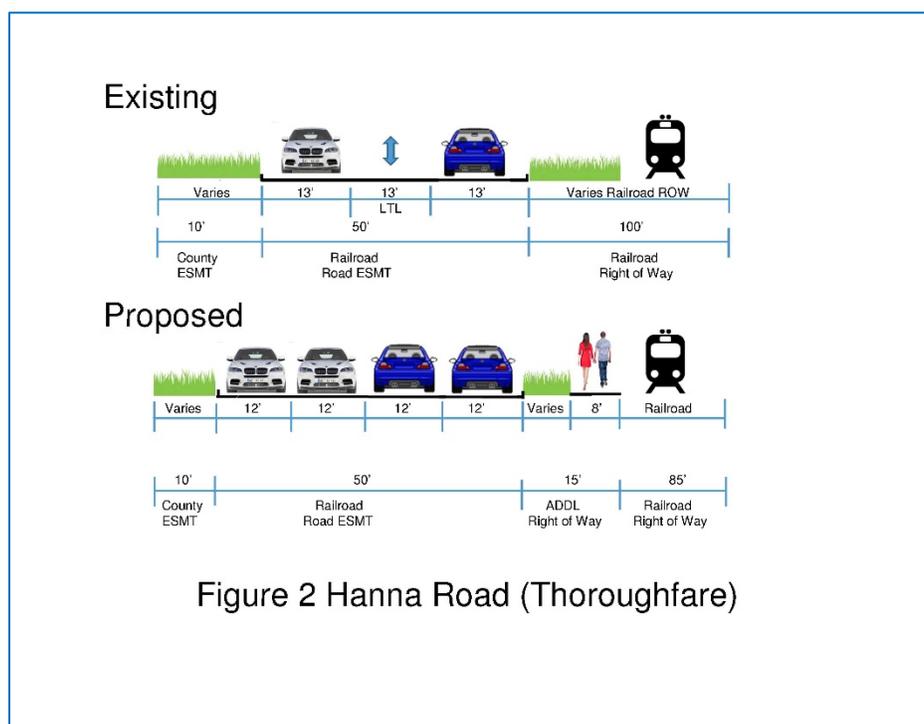
#### 4.4.2 Thoroughfares

Thoroughfares are roads that connect collectors to principal thoroughfares or freeways. They provide limited commercial access and are designed for high traffic volume at moderate speeds. The thoroughfares in the study area include the following.

- Robinson Road: Robinson Road is a local collector road that has become a thoroughfare as the local area has developed. Plans are currently in place to expand Robinson Road as shown in Figure 1 to better accommodate the traffic demand.



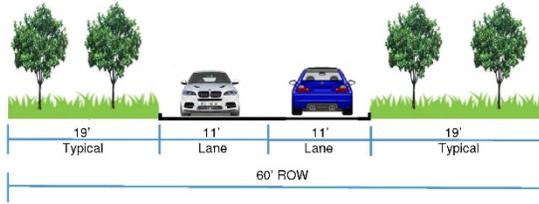
- Hanna Road: Hanna Road is a thoroughfare that provides regional mobility and access to educational and commercial community resources. The road is maintained by Montgomery County and is mostly located in Union Pacific railroad right-of-way. The county has acquired an easement and expanded the road to its existing configuration. However, traffic projections indicate that the road will need to be further expanded in the future as shown on **Figure 2**. The limited available right-of-way will require coordination with the railroad and property owners in the area in advance of design and construction of improvements.



#### 4.4.3 Collectors

Collectors are roads that connect local streets to thoroughfares and provide access to commercial properties. They provide limited residential access and are designed for a balance between moderate traffic volume at low to moderate speeds and accessibility. The existing collectors in the city are configured in two ways. Open ditch streets have drainage swales running along the pavement on both sides to convey storm water along the road easement. Curb and gutter streets convey storm water in the gutters of the streets and pipes under the streets. The main improvement needed for existing collectors is to provide pathways for pedestrians or bicycles where needed in the pathway plan. Figures 3 and 4 show existing and proposed cross sections of collectors with open ditch and curb & gutter configurations respectively.

Existing



Proposed

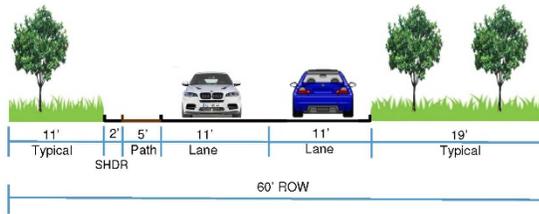
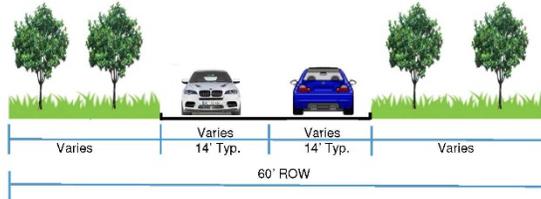


Figure 3 Open Ditch Collector (w/ Path )

Existing



Proposed

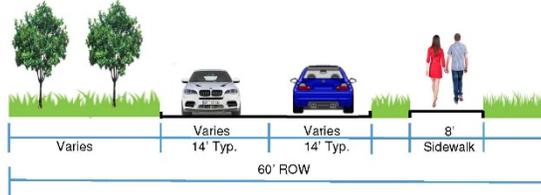


Figure 4 Curb & Gutter Collector

Collectors currently maintained by the city include:

- Woodson Road
- Maplewood Drive
- Geffert Wright Lane
- Westwood Drive
- Lane Lane
- Blueberry Hill Drive
- Oak Ridge Park Drive
- Patsy Lane
- S. Harlan Lane
- Hillside Drive
- Pine Manor Drive
- Alana Lane
- Ridgewood Drive
- All low volume commercial streets.

As the land in the extraterritorial jurisdiction (ETJ) continues to develop, collectors will be needed as shown in Exhibit C to provide adequate traffic circulation. These collectors will be provided by developers through the city's development codes and ordinances.

#### **4.4.4**      *Local Streets*

Local Streets provide direct access to residential lots. They are designed to provide access and low traffic volumes at low speeds. All the residential streets in the system that are not listed above are local streets.

#### **4.4.5**      *Pedestrian and Bicycle Improvements*

Transportation corridors in Oak Ridge North serve bicycles and pedestrians in addition to motor vehicles. **Exhibit D - Bicycle and Pedestrian Pathway Plan** identifies corridors that are needed to accommodate the increasing needs of pedestrians and bicyclists. Many of the corridors are identified based on need for pedestrian traffic. Sidewalks are shown in proposed cross sections (**Figures 1 – 6**) to accommodate pedestrians. These pathways provide links to important civic uses as well as schools and parks. Thoroughfares such as *Robinson Road* and *Hanna Road* are likely routes for bicycle traffic. Both of these routes are shown with four lanes in the future which will accommodate joint use for bicycles and motor vehicles. Dedicated bicycle lanes would require additional right-of-way acquisition.

## 4.5 Recommendations

The Major Thoroughfare Plan should be used by the city in its activities of planning and budgeting, capital improvements, and land development regulation to prepare for and implement the future transportation infrastructure identified in the plan both through public construction and private investment. Specifically, the following tasks are identified:

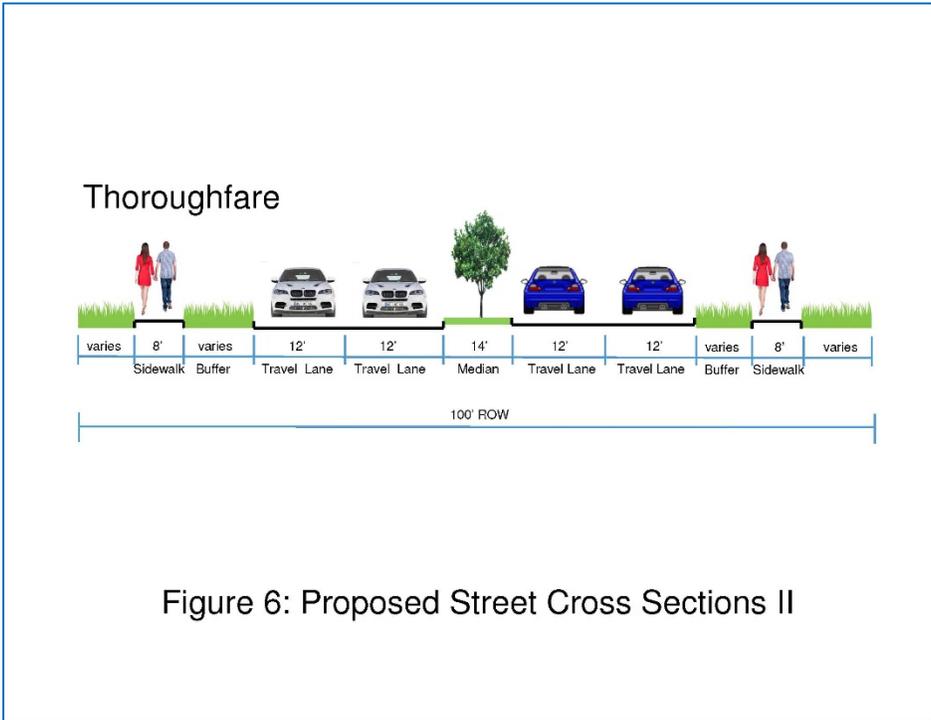
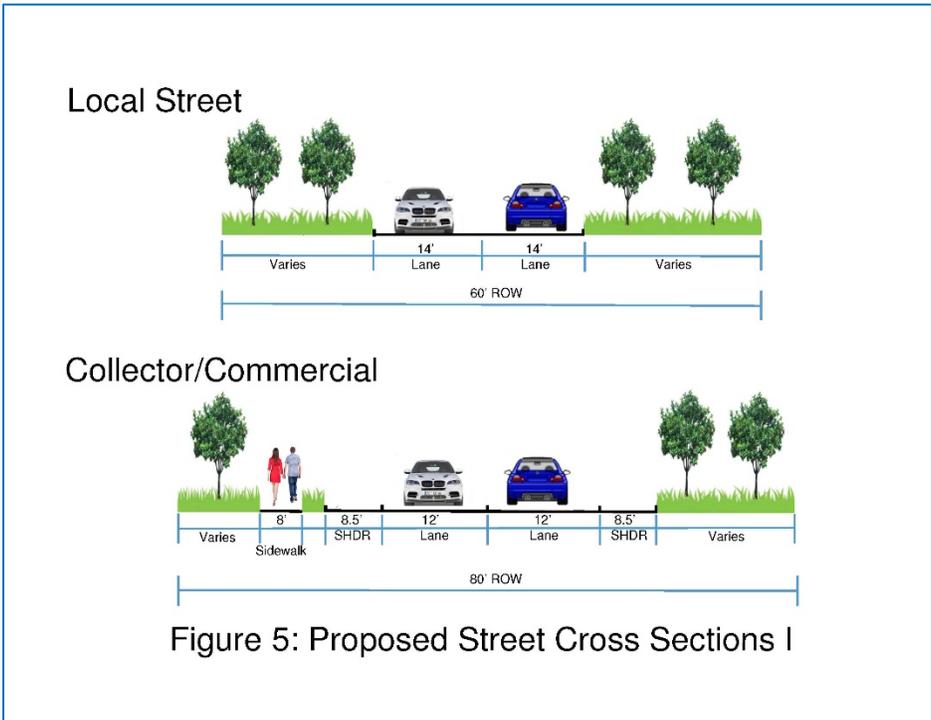
### 4.5.1 *Rights-of-way*

Future roadways and roadway expansions will require sufficient right-of-way to safely provide for transportation facilities as well as public and private utilities. This right-of-way should be dedicated by land owners when land in the city or extra-territorial jurisdiction (ETJ) is subdivided or improved. This is accomplished through consistent enforcement of effective development regulations. Additionally, the city may need to purchase right-of-way or work with other agencies to acquire right-of-way to accommodate essential public projects. The widths of right-of ways needed for future roadways are shown in **Figures 1 through 6**. The following alignments of future thoroughfares and collectors requiring right-of-way were identified.

- a. Robinson Road widening (Figure 1)
- b. Robinson Road extension to the east (Figure 6)
- c. Hanna Road expansion and extension to north (Figure 2)
- d. Hanna Road widening and sidewalk (Figure 2)
- e. Future Collectors in ETJ shown on Exhibit C (Figure 5)

### 4.5.2 *Roadway Design Criteria*

Roadway design criteria are determined based on function and traffic load. The information in the Major Thoroughfare Plan should be incorporated into city design criteria for applicable private and public infrastructure. Approximate lane widths for future roadways are shown in **Figures 1 through 6** based on curb & gutter cross sections. Other pavement designs may be approved by staff based on specific local traffic conditions.



**4.5.3 Capital Improvement Plan**

Capital projects on transportation facilities are planned years in advance to allow the city to budget and plan for these major expenditures. The MTP provides a snapshot of traffic in the city and a projection of future traffic growth. The city should continue to monitor traffic

growth and identify capital improvements that may be needed to accommodate growth in a Capital Improvement Plan. Projects that have currently been identified for future planning and implementation are as follows:

- a. Robinson Road widening and realignment
- b. Planning and implementation of bicycle and pedestrian improvements

#### **4.5.4      *Regional Cooperation***

Mobility is a regional concern and involves multiple agencies. The MTP provides a basis for conversation and coordination between the agencies responsible for transportation planning in the region. Regional transportation and multimodal improvements that affect Oak Ridge North are being planned by TxDOT, Montgomery County, The Woodlands Township, HGAC, and the City of Shenandoah. Engagement with these entities will help the city to prepare for and participate in regional transportation improvements. Some regional projects and studies that may affect Oak Ridge North mobility include:

- a. IH 45/ Robinson Road interchange improvements
- b. Robinson Road widening and realignment
- c. TxDOT IH 45 Preliminary and Environmental Linkage Study
- d. Rayford Road Widening and RR Overpass
- e. Aldine Westfield Road extension to Scarlet Trail
- f. Hanna Road widening and extension
- g. Lake Woodlands Road extension
- h. Tamina Road improvements
- i. The Woodlands Township Bicycle and Pathway Studies

#### **4.5.5      *Public Involvement***

The Major Thoroughfare Plan is a tool for the public to review and provide feedback to the city regarding future transportation improvements. The MTP should be available to the public during the acceptance process and after approval to allow for residents to prepare for future transportation improvements. The document should be revised periodically based on continual public feedback and changing conditions.

# Section 5

## Conclusions

The Major Thoroughfare Plan is a planning tool used to achieve the transportation objectives set forth by the city in its Comprehensive Plan which are restated in Section 1 of this document. Recommendations summarized below are provided considering the six objectives: regional cooperation, regional mobility, small town character, neighborhood traffic safety, and walking and bicycle pathways.

1. Support and implement capital improvements that are needed to improve regional and local mobility while preserving the small town character of Oak Ridge North.
  - a. IH 45/ Robinson Road interchange improvements
  - b. Robinson Road widening and realignment
  - c. TxDOT IH 45 Preliminary and Environmental Linkage Study
  - d. Rayford Road Widening and RR Overpass
  - e. Aldine Westfield Road extension to Scarlet Trail
  - f. Hanna Road widening and extension
  - g. Tamina Road improvements
  - h. The Woodlands Township Bicycle and Pathway Studies
2. Preserve and acquire right-of-way needed for future transportation infrastructure and bicycle/pedestrian pathways through development ordinances, planning, and capital improvement activities.
  - a. Robinson Road extension to the east (100 foot ROW)
  - b. Hanna Road expansion and extension to north (75 foot ROW)
  - c. Hanna Road widening and sidewalk (75 foot ROW)
  - d. Future Collectors in ETJ shown on Exhibit C.
3. Enforce and update ordinances requiring construction standards for transportation facilities that are consistent with the Major Thoroughfare Plan recommendations for both streets and pathways.
4. Work with local agencies including HGAC, TxDOT, the Woodlands Township, the City of Shenandoah, and Montgomery County to identify and support regional projects that meet the city's objectives.
5. Provide a process for public involvement in the acceptance of the Major Thoroughfare Plan and for updating the plan periodically based on feedback and changing conditions.