

# Comprehensive Transportation Master Plan



City of  
Round Rock

March 2004

# Introduction

The City of Round Rock has experienced rapid growth in both population and employment over the past two decades. This growth resulted in increased traffic congestion on the City's roadway system. In order to maintain adequate mobility for the citizens of Round Rock, the Comprehensive Transportation Master Plan was initiated and subsequently amended by the City to support the transportation goals and objectives of the General Plan. The Transportation Master Plan encompasses the transportation system within the City limits as well as the Extra Territorial Jurisdiction (ETJ). The goals and objectives of the Transportation Master Plan are:

## **Goals:**

- Ensure that the citizens of Round Rock are afforded an adequate future transportation system.
- Ensure the efficient utilization of the dedicated 1/2 cent sales tax.
- Identify the major deficiencies in the existing transportation network.

## **Objectives:**

- Evaluate the existing transportation network.
- Identify current and future land uses and travel patterns, as well as, population and employment forecasts.
- Identify environmentally-sensitive areas.
- Develop roadway design standards.
- Incorporate citizen participation into the planning process.
- Identify the necessary transportation network improvements.
- Develop a short term (2010), a long term (2020) and an ultimate transportation network to serve the community needs.

## **Planning for Ultimate Growth**

The City of Round Rock is the 9th fastest growing city in the U.S. and the fastest growing city in the nation with a population over 25,000. To maintain the quality of life enjoyed by the Citizens' of Round Rock, extensive future planning for the City's transportation infrastructure is essential. An adequate transportation network is considered by many as the backbone to organized growth in any community.

The total development of land within the present city limit, as well as, the Extra Territorial Jurisdiction (ETJ) at a certain time in the future is a reasonable conclusion from studying the development of communities that are similar to Round Rock. By planning for the ultimate growth of the city, the Transportation Master Plan establishes the ultimate roadway network and protects adequate rights-of-way to meet future transportation needs. The plan also provides property owners with a tool to minimize conflicts during development.

## **Land Use and Demographic Information**

The City's adopted existing and future land use plan was used as the basis for forecasting future demographic information needed for the Transportation Master Plan. Adjustments were made to the city's land use plan in response to newly approved or anticipated development projects. Based on future land use, population and employment forecasts were made for the ultimate growth scenario, as well as, the years 2007 and 2017. The forecasted totals were then disaggregated to Traffic Analysis Zones (TAZs). These zones were used in the travel demand modeling process.

## **Traffic Demand Modeling**

Using the population and employment data, computer models were used to forecast future travel on a transportation network between the various TAZs in the study area. The model generated traffic volumes for existing, as well as, forecasted trips. By studying the traffic volumes and the capacity of the roadways, the level of congestion was determined. A volume to capacity (V/C) ratio greater than one (1) normally reflected a need for roadway improvement. The modeling process was used as a tool to determine needed major transportation improvements. However, some recommended improvements were based on professional judgment.

## **Environmental Issues**

During development of the Transportation Master Plan, consideration was given to Neighborhood and Community Resources, Water Quality, Air Quality, Historical Meteorology, Hazardous Materials, Threatened and Endangered Species, Natural Areas and Ecosystems, Parklands, Wetlands, Floodplains, and Historic and Cultural Resources. Identifying environmentally-sensitive areas early during the planning process reduces the risk of cost overruns, schedule delays and design complexity.

## **Public Involvement**

The development of the Transportation Master Plan utilized several approaches to receive citizen input. The public was provided with an e-mail address to submit comments relating to the plan developments and recommendations. Public input was also solicited through three (3) public meetings, which were held at the City Council Chamber, and several neighborhood meetings.

## **Financial Analysis**

In 1997, the Citizens of Round Rock authorized the adoption of a ½ cent sales and use tax dedicated to roadway improvements. In 2001, the City of Round Rock voters approved General Obligation Bonds including authorization of \$37.1

million for streets, sidewalks, landscaping and traffic signal projects. The transportation project list was developed based on the City leveraging available funds to obtain additional funding from State, County and private sources, the City directly funding transportation system improvements and a future bond to be approved prior to 2020.

### **Transportation Plan**

To meet the transportation demands of population, employment and economic growth, the City developed the Transportation Master Plan, which consists of two basic elements, a roadway element and a bicycle/pedestrian element. The feasibility of a transit element was considered by researching the transit operations at several comparable size Texas cities. The operations were limited to either a single fixed bus route or demand/response type of transit activities. Either type of operation will not contribute significantly to the relief of the anticipated future traffic congestion. Future updates of the transportation plan will consider all transportation modes including roadway expansion, high-occupancy vehicles (HOV), which include regional/commuter rail, light rail, bus transit, limited shuttle service and van/car pools, and bicycle/pedestrian facilities. The transportation plan is presented as an Ultimate Roadway Network and a Roadway Table. The network shows existing and planned arterials, which includes bicycle facilities, for the ultimate growth of the City. The table shows the current section of all City arterials and roadway improvements planned for 2010, 2020 and the ultimate growth scenario. The table also shows the estimated cost, length and ultimate right-of-way width.

# METHODOLOGY FOR PREPARATION OF THE LAND USE DATA BASE FOR THE TRANSPORTATION MASTER PLAN

City of Round Rock, Texas

prepared by  
Dunkin, Sefko & Associates, Inc.  
August 27, 1998

## PURPOSE

The purpose of this technical report is to describe the process and methodology used, as well as the results achieved, during preparation of the Transportation Plan Data Base for the City of Round Rock and its extraterritorial jurisdiction (ETJ). The land area involved in this planning process included that area within the City's corporate limits and within the City's ETJ (the "planning area").

## METHODOLOGY

Early in the planning process, it was determined that the informational needs of the City pertaining to short- and long-range transportation planning would necessitate the development of locally originated land use projections for the City and its ultimate planning area. The land use projections were prepared in a format that makes them suitable for use in computerized transportation planning and analysis which is achieved through transportation modeling.

The transportation model used for the Round Rock study requires socioeconomic demographic data in the form of population and employment estimates. Estimated population and employment projections were prepared for 1997, 2007, 2017, and for an ultimate, or "build-out", scenario for the City and its ETJ. Based upon existing 1997 land use data that was available on the City's geographic information system (GIS), estimates were prepared for each of the planning area's (City and its ETJ) traffic analysis zones (TAZs). TAZs are geographic areas usually bounded by existing or future major roadways, railroads or other physical features. TAZs exist for all of the Austin metropolitan area, including Round Rock, and are shown on maps that are available at the City and are also included on exhibits within Appendix "A" of this report. The population and employment estimates (as well as the projections) were prepared for the following categories:

- Population -- number of persons (i.e., residents)
- Households -- number of occupied dwelling units
- Basic employment -- industrial and heavy commercial uses
- Retail employment -- retail uses

- Service employment -- office, government and other service-related uses

Population was calculated using the number of occupied dwellings (single-family and multi-family). Employment was estimated using several factors, or multipliers. If employment data was available and verifiable from other sources, such as the Austin Transportation Study (ATS), actual employment records from companies or the Texas Workforce Commission, then that data was used. If actual employment figures were not available from these sources, then multipliers were used to estimate the number of employees per square footage of building area. The following multipliers were used to estimate current employment and to make projections on future employment:

- Basic -- 20 employees per acre
- Retail -- 17 employees per acre
- Service -- 35 employees per acre

These multipliers were adjusted for each TAZ, depending upon factors such as access, terrain, developable area, or other factors which would impact the type or amount of development within each TAZ.

Ultimate, or "build-out", estimates were calculated using the City's latest adopted Master Plan. Future land uses were based upon the Future Land Use Plan map within the Master Plan report, and were converted into population or employment (basic, retail or service) data. Adjustments were made in response to newly approved or anticipated development projects that were made known to the consultants. If no known development plans were available for a particular area, then employment multipliers were used to determine the future potential employment for that area. Population estimates and projections were generated using an average density of four (4) dwelling units per acre for future low density residential areas. Population estimates and projections for multi-family residential areas were calculated using an average density of twenty (20) dwelling units per acre. The formulas used in calculating population and employment estimates are shown below:

- Population estimate =  $\text{developable acres} \times \text{number of dwelling units per acre} \times 2.9 \text{ persons per household}$
- Employment estimate =  $\text{developable acres (basic, retail and/or service)} \times \text{number of employees per acre}$

Ultimate build-out estimates for Round Rock are based upon the assumption that the planning area is developed at 95% capacity.

Projections for 2007 and 2017 were developed using reasonable growth rates for Round Rock, from which control totals were established. Woods and Poole Economics, Inc. (a national economic forecasting firm) has projected average annual growth rates for Williamson County through the year 2020 of approximately 3.2% for residential (i.e., population) and 2.5% for

employment. These growth rates were used as a comparison for establishing the growth rates for Round Rock. The following average compounded growth rates were determined to be reasonable for planning purposes in Round Rock:

	<u>1997-2007</u>	<u>2007-2017</u>
▪ Population	2.7%	2.0%
▪ Employment	2.6%	2.0%

Based upon the above assumptions, the following estimates and projections were used in the Transportation Plan data base:

	<u>1997</u>	<u>2007</u>	<u>2017</u>	<u>Ultimate Build-Out</u>
▪ Population	71,782	93,500	114,300	236,000
▪ Employment	29,017	37,600	45,800	129,700

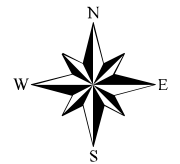
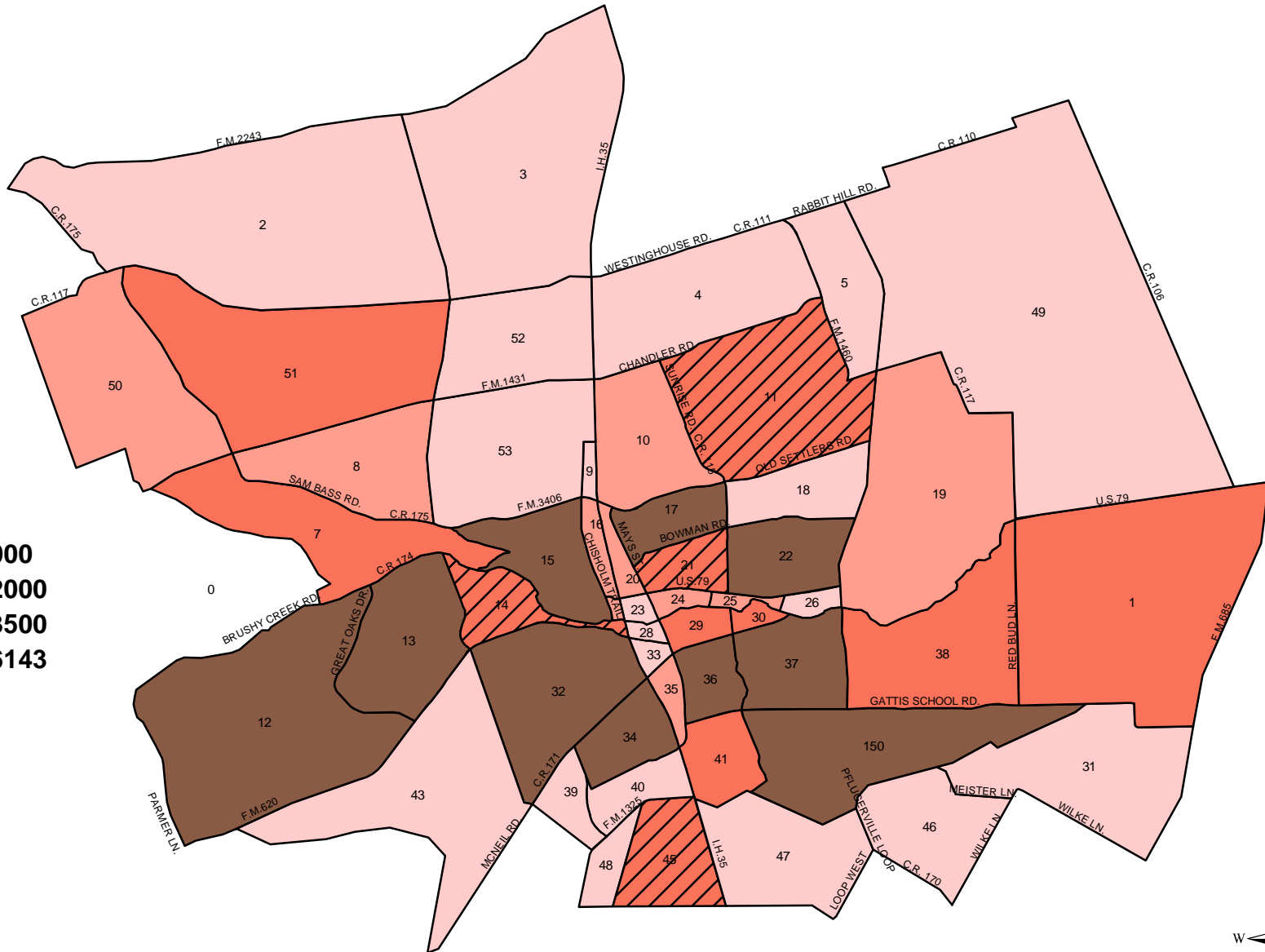
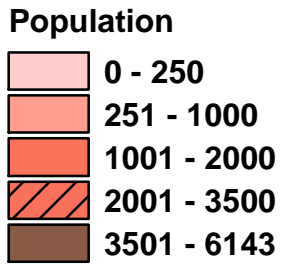
Appendix "A" shows the growth allocation for each TAZ, as well as exhibits that graphically show the above estimates and projections. Growth was allocated to each TAZ for 2007 and 2017 based upon assumptions of anticipated development. A development percentage was applied to each TAZ, and the population and employment projections were calculated based upon that percentage. For example, if a particular TAZ was anticipated to be predominantly built out in 2017, then the assumed multiplier would have been 100%. Similarly, if a particular TAZ was assumed to be halfway built out in 2017, then the assumed multiplier would have been 50%.

# APPENDIX "A"



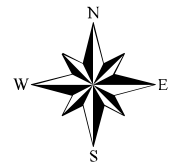
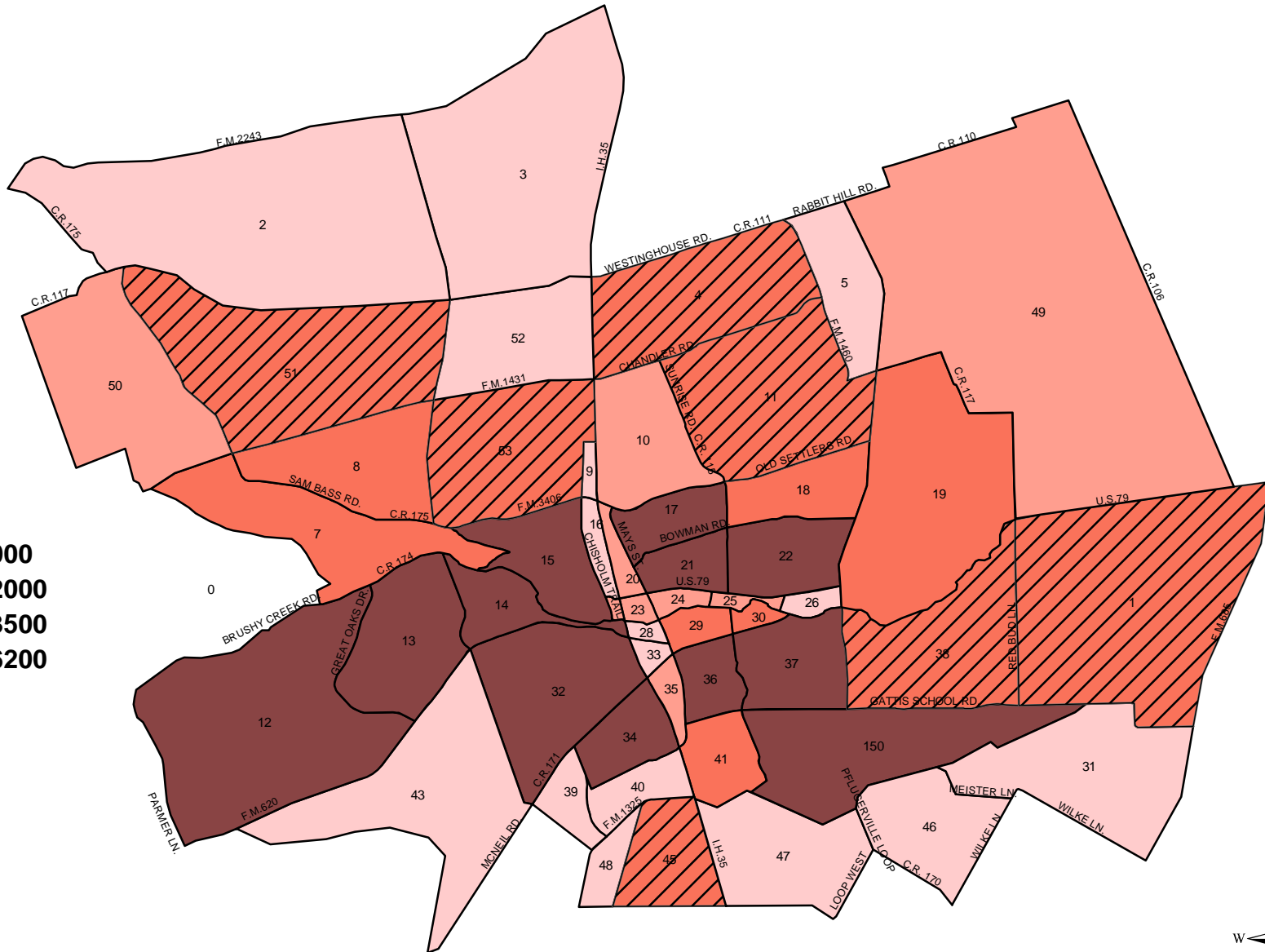
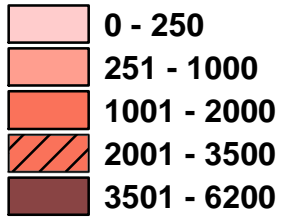


**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Population 1997**  
**71,782**



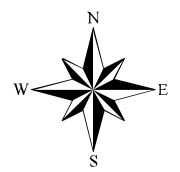
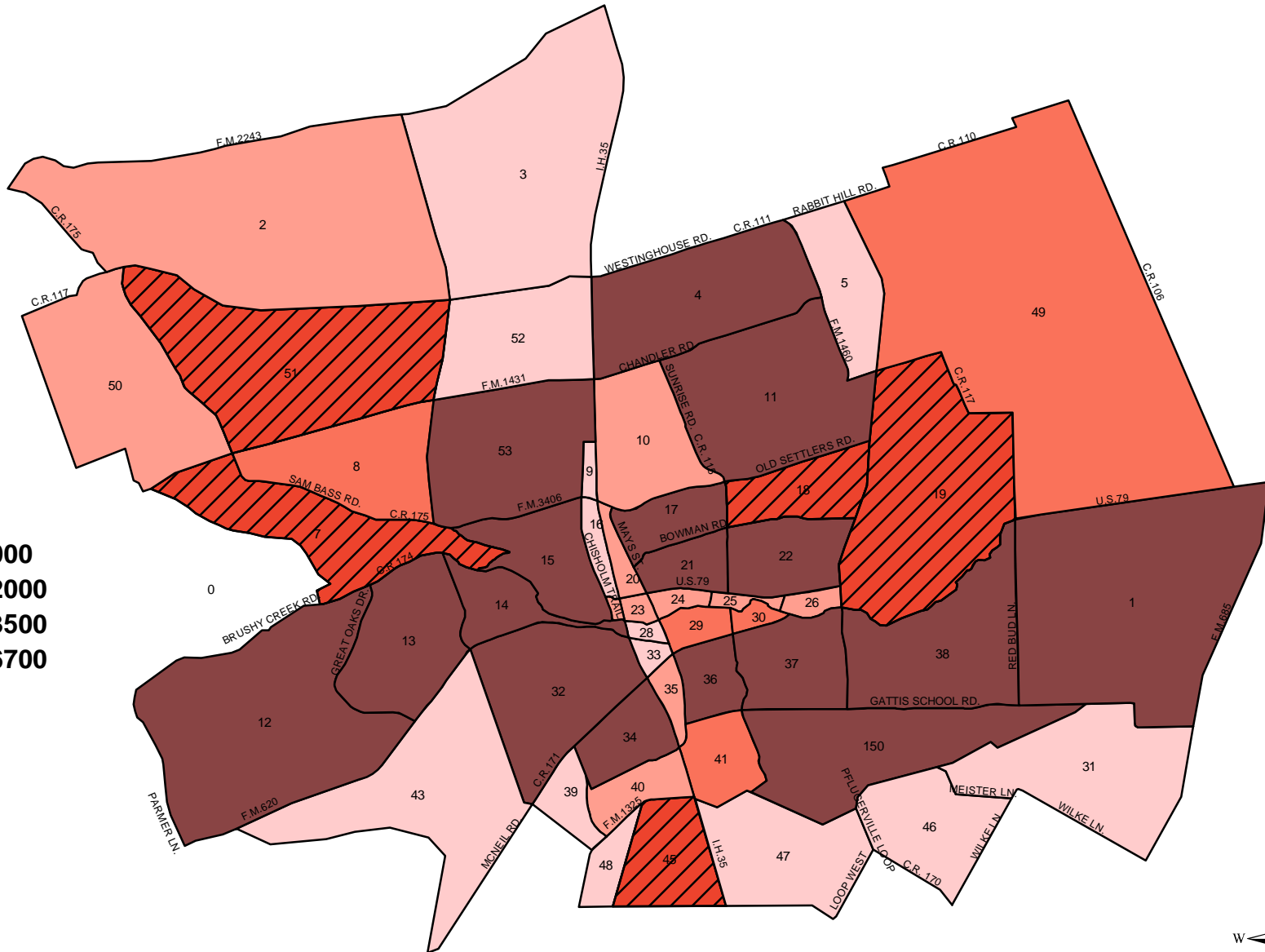
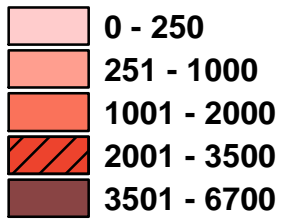
**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Population 2007**  
**93,500**

**Population**



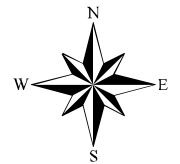
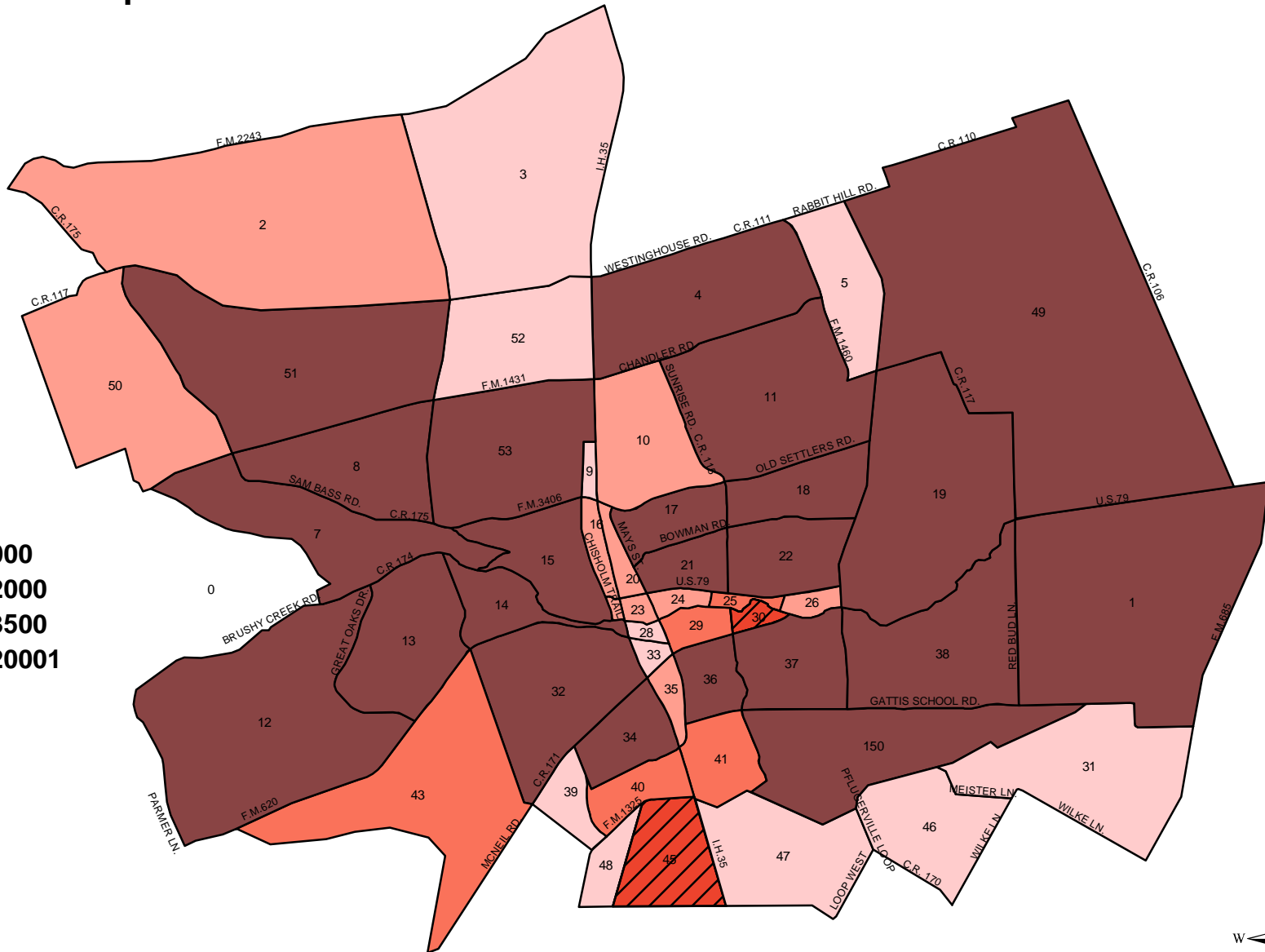
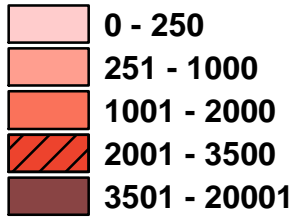
**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Population 2017**  
**114,300**

**Population**



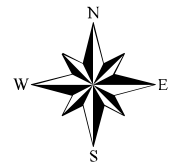
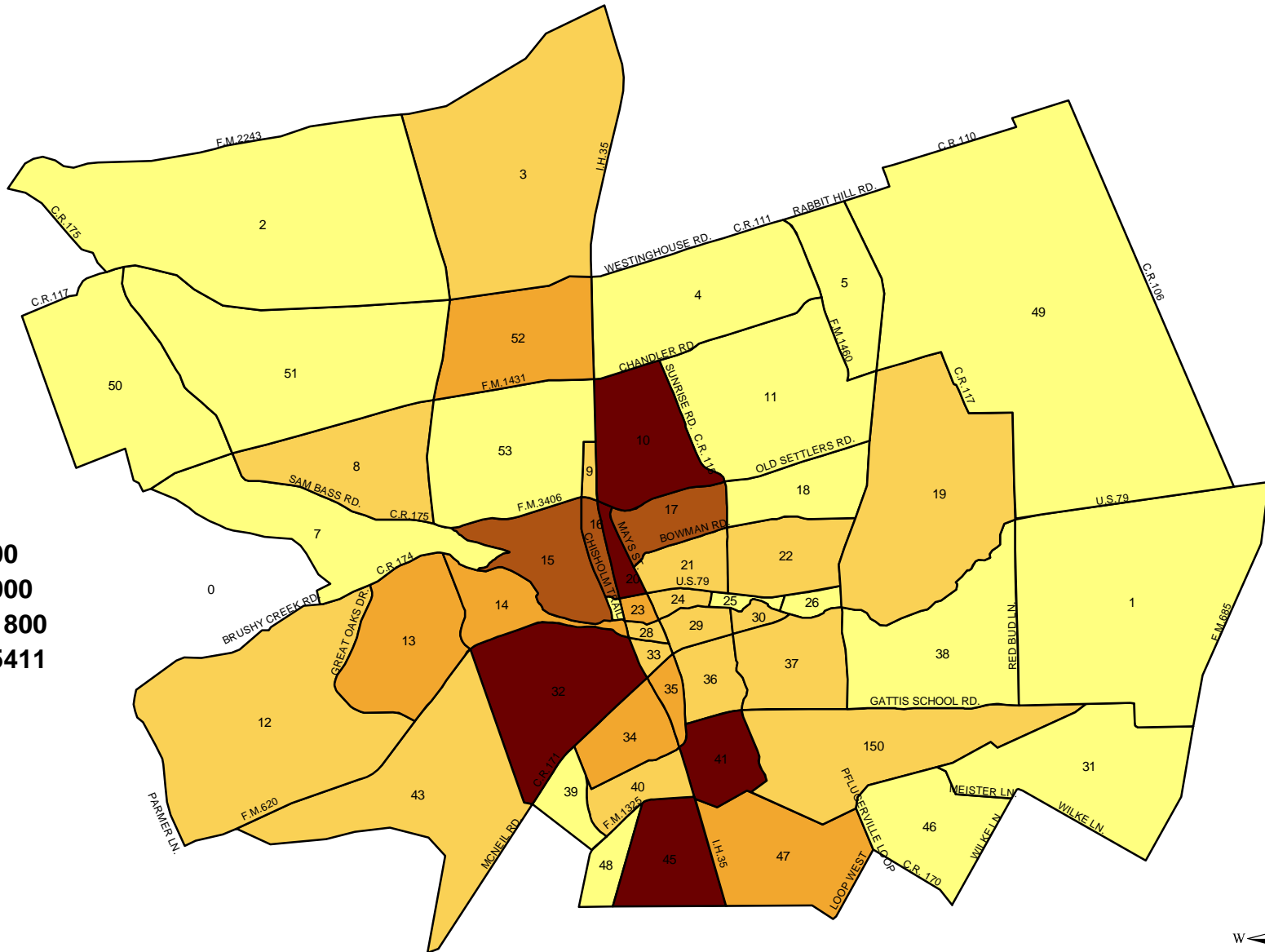
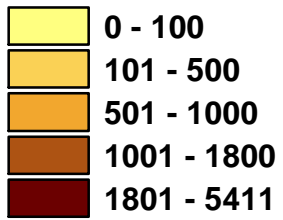
**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Total Ultimate Population**  
**236,000**

**Population**



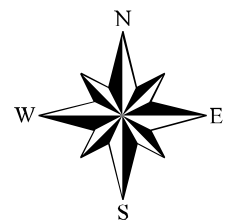
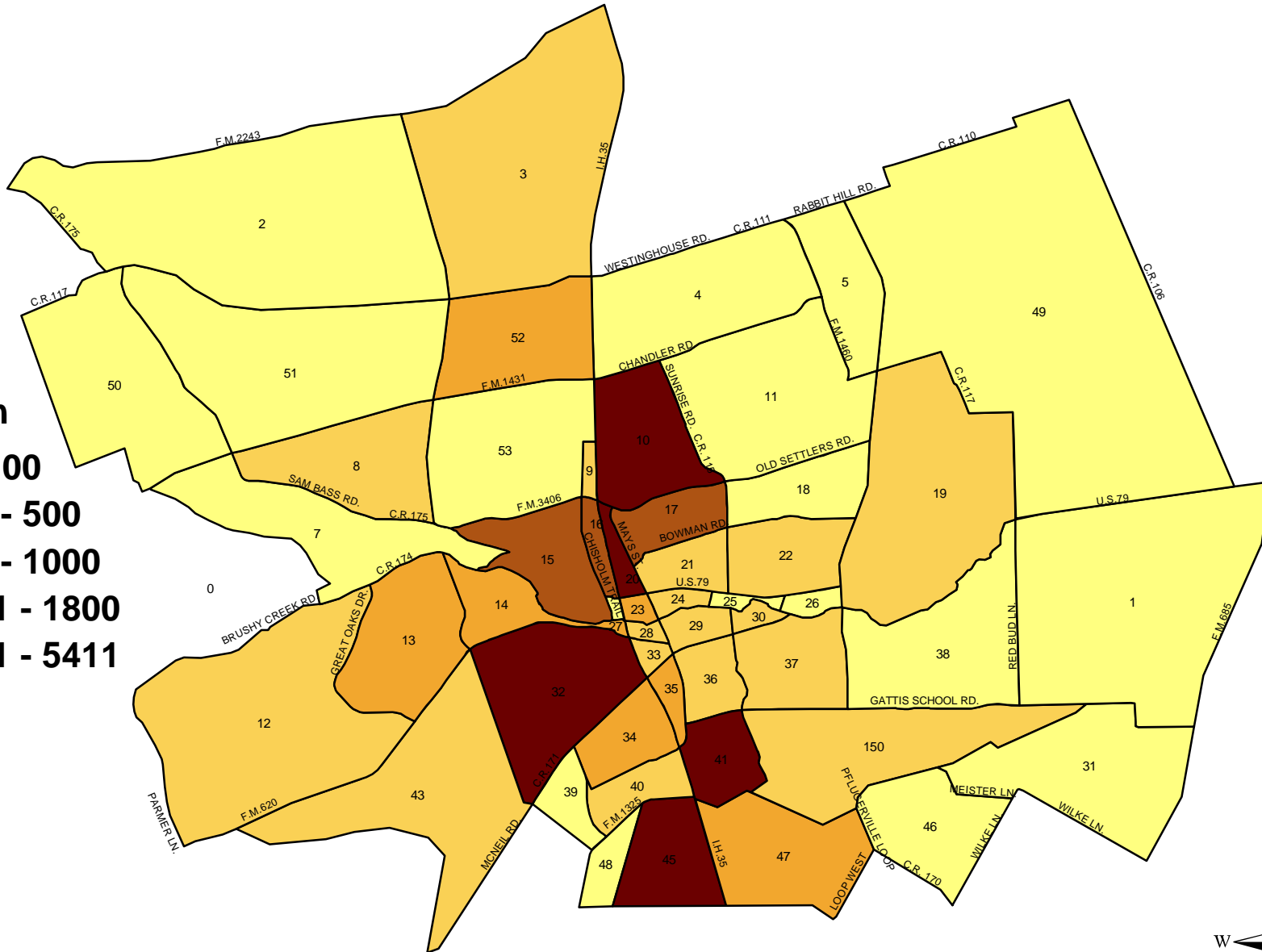
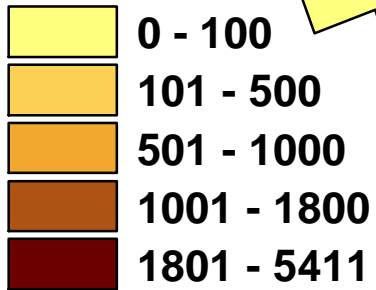
**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Employment 1997**  
**29,017**

**Population**



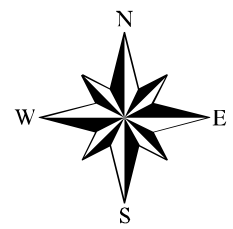
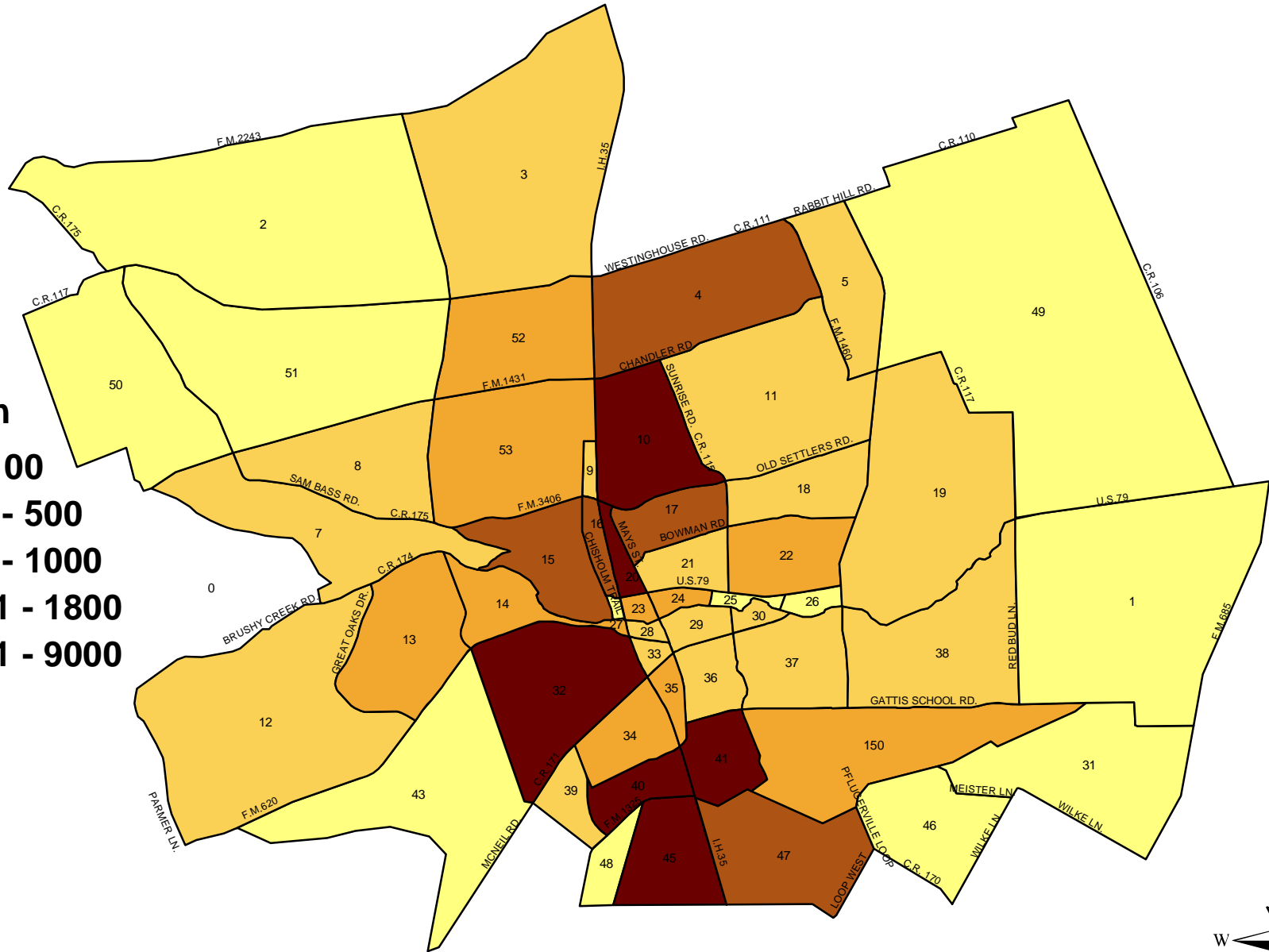
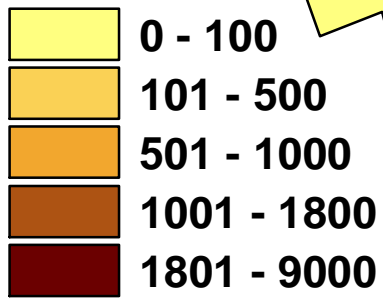
**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Employment 2007**  
**37,600**

**Population**



**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Employment 2017**  
**45,800**

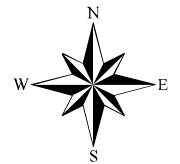
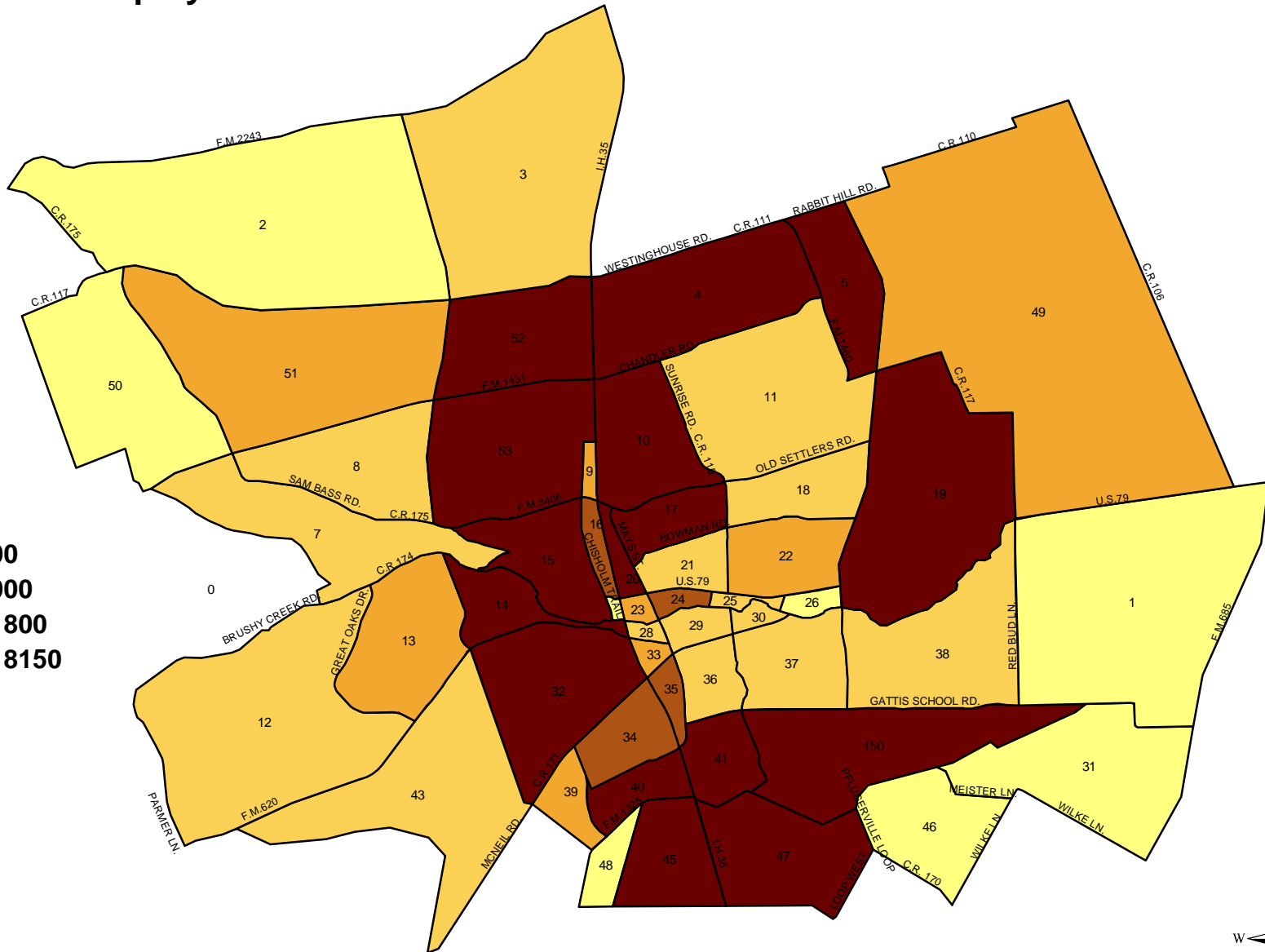
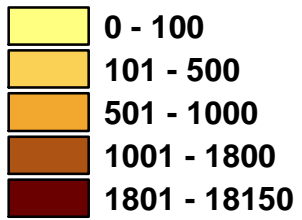
**Population**





**City of Round Rock, Texas**  
**TRANSPORTATION PLAN DATABASE**  
**Total Ultimate Employment**  
**129,700**

**Population**



# **METHODOLOGY FOR PREPARATION OF THE TRAVEL DEMAND FORECASTING FOR THE TRANSPORTATION MASTER PLAN**

**City of Round Rock, Texas**

Prepared By  
**Rust Lichliter / Jameson**  
1998

This report summarizes the development and calibration of the travel demand model utilized to represent existing and future year traffic volumes for the Round Rock Transportation Plan. This methodology follows generally accepted transportation planning practices and Transportation Research Board Report NCHRP 225.

To aid the long range planning required by the Round Rock Transportation Master Plan, a series of computerized planning models were developed to perform traffic forecasting for different scenarios. Travel demand modeling can be divided into three steps: trip generation, trip distribution and traffic assignment.

Trip generation estimates the number of trip ends produced in and attracted to each traffic analysis zone based on the land uses in each zone. Trip distribution is accomplished by a mathematical gravity model that distributes the generated trips to all possible zones. The gravity model mathematically relates the trip interchange between zones to the number of origins and destinations in each zone, and inversely relates the number of trips to the travel time between zones. The traffic assignment step assigns vehicle trips to the roadway network based on selecting the route with the lowest travel time. Trip distribution and traffic assignment was accomplished using TRANPLAN, an integrated set of computer programs used to forecast travel demand on roadway networks.

## **Traffic Analysis Zones**

The Round Rock study area, which encompasses the City of Round Rock and its Extra Territorial Jurisdiction (ETJ), was divided into traffic analysis zones that match those described in the Austin Transportation Study. These zones were used to relate population and employment with travel demand and to develop travel patterns within the study area. The model included a total of 53 internal traffic zones with an additional 21 external zones. The external zones serve to connect the Round Rock roadway network to major facilities crossing the ETJ. Trips generated from external zones represent those trips that either begin or end outside the Round Rock study area, or that pass completely through the study area.

## **Existing Population and Employment**

Existing (1997) population and employment were estimated for the entire study area by individual traffic zone. This data is available separately in a report by Dunkin Sefko &

Associates, Inc., "Methodology for Preparation of the Land Use Database for the Transportation Plan." These 1997 population and employment estimates were used as input for the travel demand model to estimate the number of vehicle trips produced by or attracted to each traffic analysis zone.

### **Existing Roadway Network**

The roadway network is used in two steps of the modeling process. It is used to determine the total zone to zone travel times for trip distribution and it is used to assign traffic to the Round Rock roadways. The roadway network developed for this study was derived from the Austin Transportation Study and supplemented to include new roadways. Generally the network consisted of IH 35, US 79, farm to market highways, county roads, major and minor city arterials and selected city collector facilities. Committed improvements to the existing roadway network (improvements for which funding has been identified), as identified by TxDOT and the City of Round Rock, were included in all models except the original existing conditions roadway network.

### **Traffic Model Development**

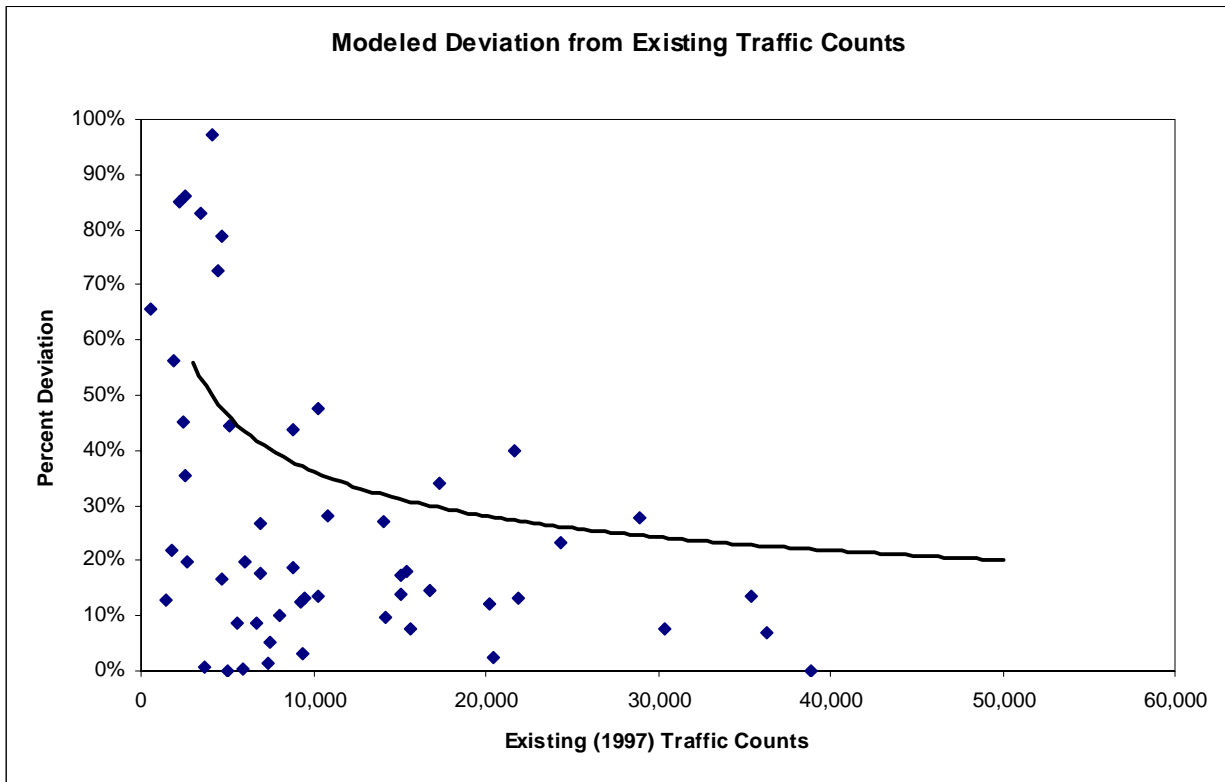
The existing Round Rock population and employment data were used as input to develop trip generation for each analysis zone. The trip generation was used to estimate the number of trips that begin or end in a traffic analysis zone.

Once the number of trips produced from each zone was estimated, a distribution model was utilized to distribute them among attractions in the other zones. This produced a trip table that is a matrix of origins and destinations. These trips were then assigned by the model to the roadway network to develop traffic volumes.

### **Model Calibration**

The intended use of travel demand modeling is to create a computerized model that faithfully represents existing conditions so that future scenarios can be studied. To accomplish the task of creating an accurate representation of existing conditions, the model is calibrated. After the 1997 vehicle trip table was assigned to the existing roadway network, 52 locations were identified where modeled traffic volumes could be compared to actual traffic counts. The initial assignment did not completely replicate the existing traffic counts. Therefore, the trip generation rates were adjusted until the modeled traffic counts represented the existing traffic counts.

The deviation between modeled traffic volumes and the actual traffic counts is shown in the graph on the following page. The maximum desirable deviation is shown as the curved line on the graph. While a few points fall above the line, overall the modeled traffic volumes represent actual counts within 3 percent (574,066 versus 596,774).



## Summary and Conclusion

The comparison of modeled trips with observed traffic counts throughout the study area confirms that the traffic model closely represents 1997 conditions, and it was concluded that the Round Rock traffic model can be used to forecast future travel patterns reliably. The next steps in this process are to identify the future demand on the existing plus committed roadway network and test alternative solutions to the predicted traffic congestion.

## **Amendment to Environmental Issues**

During development of the Transportation Master Plan, which was adopted in 1999, Neighborhood and Community Resources, Water Quality, Air Quality, Historical Meteorology, Hazardous Materials, Threatened and Endangered Species, Natural Areas and Ecosystems, Parklands, Wetlands, Floodplains, and Historic and Cultural Resources were considered sensitive areas. These areas are still considered sensitive and the findings of the investigation continue to be valid. This amendment addresses the most recent developments regarding Air Quality.

Air Quality has become a primary regional concern due to the unhealthy ozone air quality levels measured in 1997-2002. The 5-county Austin/San Marcos MSA, now known as the Austin-Round Rock MSA, may be designated nonattainment of the federal 8-hour ozone air quality standard by the US Environmental Protection Agency (EPA). A nonattainment designation means that the area does not meet the health-based standard and will be required to implement emission reduction strategies to clean up the air. Failure to clean up the region's air, as required, can result in restrictions on industrial growth and a partial loss of federal highway funding. Nonattainment designations are expected to occur in 2004 and a state generated emission reduction plan is expected to be due in 2007.

In response to these air quality problems in the Austin-Round Rock MSA, the Clean AIR Force was formed. The Clean AIR Force is an independent, non-profit coalition comprised of representatives from government, environmental, and business organizations. It formulates and promotes a community-wide campaign for air quality improvement. The City of Round Rock is a member of the Clean AIR Force, along with Austin, Bastrop, Elgin, Lockhart, Luling, San Marcos, and five county commissioner courts.

Optimally, the Clean AIR Force hopes to reduce vehicle emissions voluntarily to avoid designation as a nonattainment area. There is also a "transitional" classification for areas that met the previous one-hour standard for ozone of 125 parts per billion, but that violate the new eight-hour standard of 85 parts per billion. The transitional designation would be in lieu of a nonattainment designation and promises more flexibility in developing plans to come into compliance with the new ozone standard.

Both the EPA and the Texas Commission on Environmental Quality (TCEQ) have endorsed the concept of early action plans to improve air quality. These plans allow local selection of emission reduction strategies, result in clean air sooner than otherwise required and are an alternative to the standard nonattainment process.

Instead of waiting for a nonattainment designation, the 5-county MSA is proactively developing and implementing early action plans to clean up the air now. The MSA has developed the O<sub>3</sub> Flex Agreement, which addresses the 1-hour ozone standard and implementation is underway. The MSA is now developing a Clean Air Action Plan (CAAP) as part of the Early Action Compact (EAC), which addresses the 8-hour ozone standard. Successful implementation of the CAAP will result in compliance with the 8-hour ozone standard in 2007, sooner than otherwise required.

# ENVIRONMENTAL SUMMARY MEMORANDUM

Prepared By  
**Rust Lichliter / Jameson**  
1998

In order to fully understand and evaluate the potential environmental limitations associated with the Transportation Master Plan which is being prepared for the City of Round Rock, the following environmental parameters were investigated.

- Neighborhoods and Community Resources
- Water Quality
- Air Quality
- Historical Meteorology
- Hazardous Materials
- Threatened and Endangered Species
- Natural Areas and Ecosystems
- Wetlands
- Floodplains
- Historic and Cultural Resources

The Study Area of this project includes the City of Round Rock as well as the City's Extraterritorial Jurisdiction (ETJ). The following sections describe the findings of the environmental investigation associated with this project. The discussions of neighborhoods and community resources, natural areas and ecosystems, parklands, wetlands, floodplains, and cultural resources pertain to the Study Area only, while the discussions of hazardous materials and threatened and endangered species include the Study Area as well as a one-mile buffer surrounding the Study Area. The discussions of water quality, air quality, and historical meteorology are relatively regional in nature.

## **Neighborhoods and Community Resources**

The U.S. Department of Housing and Urban Development (HUD), San Antonio District Office, was contacted for the locations of any HUD housing which may exist within the Study Area, as well as any other related concerns which HUD may have as they pertain to the Master Transportation Plan which is being prepared.

According to the Department of Housing and Urban Development, the following HUD developments exist within the Study Area:

- Bowman's Walk Apartments  
101 Bowman Drive
- Chisolm Trail Apartments  
1525 Chisolm Trail
- Chisolm Valley Apartments  
1338 Christopher Avenue
- Main Street Apartments  
1201 East Main Street
- Trinity Place Apartments  
1203 Cushing Drive

## Water Quality

### *Surface Water Quality*

The Study Area lies within the Brazos River Basin, which, for water quality monitoring purposes, has been divided into 55 segments. Brushy Creek, Segment 1244 of the Brazos River Basin, traverses the Study Area from west to east and roughly parallels Brushy Creek Road west of Interstate Highway 35 and U.S. Highway 79 east of Interstate Highway 35. Based on the State of Texas Water Quality Inventory (11th and 12th editions), 17 permitted domestic outfalls occur within this creek segment which stretches from the confluence of South Brushy Creek in Williamson County to the confluence with the San Gabriel River in Milam County.

One of the three designated water uses for this stream segment is contact recreation (i.e., swimming); however, according to the Water Quality Inventory, this segment of the Brazos River Basin does not meet contact recreational use in the area downstream (east) of the City of Round Rock to approximately F.M. 685 due to elevated fecal coliform levels. Any designation of contact recreation is not a guarantee that the water is completely free of disease-causing organisms. Contact recreation is a use that is assigned to each water body except in cases where elevated fecal coliform bacteria densities are recurrent and caused by pollution which cannot be reasonably controlled (or in areas where ship or barge traffic makes the use unsafe). Additionally, phosphorous and nitrogen levels are elevated within this segment of Brushy Creek, which contributes to excessive growth of attached algae. Average levels of chloride and total dissolved solids greater than the standard stream criteria are also common within this segment. The other two designations for this creek include public water supply and high quality aquatic habitat.

The following table details the water quality information for this segment of Brushy Creek as determined by ongoing water quality monitoring. Information for seven measured parameters, including dissolved oxygen, temperature, pH, chloride, sulfate, total dissolved solids, and fecal coliform, is provided in this table.

<p align="center"><b>Table 1:</b>  <b>Water Quality Information for Brushy Creek Segment 1244</b>  <b>from September 1, 1987 through August 31, 1991 (11th Edition)</b>  <b>and from January 1989 through December 1992 (12th Edition)</b>  <b>from the <u>State of Texas Water Quality Inventory</u></b></p>												
Parameter	Criteria Level		Number of Samples		Minimum Observed		Maximum Observed		Mean		Number of Values Outside the Criteria Level	
	1987 to 1991	1989 to 1992	1987 to 1991	1989 to 1992	1987 to 1991	1989 to 1992	1987 to 1991	1989 to 1992	1987 to 1991	1989 to 1992	1987 to 1991	1989 to 1992
Dissolved Oxygen (milligrams per liter-mg/l)	5.0	5.0	33	25	6.0	6.0	13.3	16.8	8.90	9.1	0	0
Temperature in °F (°C)	91.0 (37.2)	90.0 (32.8)	33	25	52.7 (34.9)	54.68 (12.6)	86.0 (68.2)	87.4 (30.8)	70.4 (52.2)	76.82 (24.9)	0	0
pH	6.5 to 9.0	6.5 to 9.0	33	25	7.5	7.5	8.9	8.9	7.9	8.0	0	0



**Table 1:  
Water Quality Information for Brushy Creek Segment 1244  
from September 1, 1987 through August 31, 1991 (11th Edition)  
and from January 1989 through December 1992 (12th Edition)  
from the State of Texas Water Quality Inventory**

	Criteria Level		Number of Samples		Minimum Observed		Maximum Observed		Mean		Number of Values Outside the Criteria Level	
Chloride (mg/l)	125.0	125.0	34	26	1.0	1.0	209.0	180.0	118.0	106.8	169	12
Sulfate (mg/l)	150.0	150.0	34	26	5.0	6.0	146.0	146.0	62.0	59.9	0	0
Total Dissolved Solids (mg/l)*	600.0	600.0	31	23	177.0	230.1	662.0	861.3	458.0	92.6	636	12
Fecal Coliform (# colonies/100 ml)	200.0	400.0	28	23	1.0	1.3	1060	1060	66.0	215.4	460	4

\* Total dissolved solids were estimated by multiplying specific conductance by 0.50 for samples collected in 1987-1991.

Any construction activities located within the Study Area should be analyzed for potential impacts to Brushy Creek as well as several smaller creeks which are located within the Study Area. Water quality and riparian impacts should be minimized within the Study Area according to the TNRCC. Best Management Practices should be used during construction activities in order to prevent and/or decrease pollution from storm water runoff entering receiving streams and creeks.

### *Ground Water Quality*

Portions of the Study Area lie within the Recharge Zone of the Edwards Aquifer. Although the extreme southern, northern, and western portions of the Study Area are located within the Contributing Zone of the Edwards Aquifer, the majority of the Study Area which is located west of Interstate 35 and a portion of the Study Area located east of Interstate 35 and west of FM 1460 lies within the Recharge Zone of the Edwards Aquifer (see Floodplains, Wetlands and Edwards Aquifer Boundaries Exhibit).

The Edwards Aquifer is defined as that portion of an arcuate belt of porous, water bearing, predominantly carbonate rocks known as the Edwards and Associated Limestones in the Balcones Fault Zone trending from west to east to northeast in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, and Williamson Counties. This aquifer system is composed of the Salmon Peak Limestone, McKnight Formation, West Nueces Formation, Devil's River Limestone, Person Formation, Kainer Formation, Edwards Formation, and Georgetown Formation. The permeable aquifer units generally overlie the less-permeable Glen Rose Formation to the south, overlie the less-permeable Comanche Peak and Walnut Formations north of the Colorado River, and underlie the less-permeable Del Rio Clay regionally (30 TAC §213.3).

Under the authority of the Texas Water Code, the Texas Natural Resource Conservation Commission (TNRCC) enacted regulations to preserve and protect the quality of water available from the Edwards Aquifer. The State's policy is therefore to maintain the quality of water consistent with public health and welfare, the propagation and protection of terrestrial and aquatic life, the

protection of the environment, the operation of existing industries, and the maintenance and enhancement of the long-term economic health of the State (30 TAC §213.1).

The goal of the Edward's Aquifer regulations are to regulate activities having the potential for polluting the Edward's Aquifer and hydrologically connected surface streams in order to protect existing and potential uses of groundwater and maintain Texas Surface Water Quality Standards.

Development applications must be submitted to the TNRCC for approval before any construction can begin within the Edwards Aquifer Recharge Zone (EARZ). Construction activities often provide conduits between the ground surface and aquifer zones which may lead to contamination of the aquifer. Regulated activities include any construction-related activities within the recharge zone of the Edward's Aquifer, such as, but not limited to:

- the construction of buildings, utility stations, roads, highways, or railroads;
- clearing, excavation, or any other activities which alter or disturb the topographic, geologic, or existing recharge characteristics of a site;
- any installation of aboveground or underground storage tank facilities on the recharge or transition zone of the Edward's Aquifer; or
- any other activities which may pose a potential for contaminating the Edward's Aquifer and hydrologically connected surface streams.

Regulated developments are defined as, but are not limited to, construction of the following:

- any residential subdivision or any public or private industrial, commercial, or multi-family subdivision,
- any sewage collection system (i.e., public and private gravity line, lift station and force main, or wastewater treatment facility), and/or
- any petroleum and hazardous substance storage facilities.

Prior to the construction of any new transportation facilities or expansion of existing facilities, the City of Round Rock will need to submit the appropriate development application and associated required information to the TNRCC.

According to State of Texas Edwards Aquifer regulations (30 TAC §213.4), no person shall commence the construction of any regulated activity until an Edwards Aquifer protection plan or modifications to the plan as required by 30 TAC §213.5 has been filed with the appropriate regional office of the TNRCC, and the application has been reviewed and approved by the executive director.

According to the regulations, copies of all submittals shall be provided by the TNRCC to affected incorporated cities, groundwater conservation districts, and counties having jurisdiction over the area potentially affected by proposed regulated activity, for the purpose of considering timely comment from local government entities. Such comments must be received within 30 days from the date the submittal is distributed to appropriate entities in order to be considered by the TNRCC.

Proposed changes to the Edwards Aquifer regulations were published in the Texas Register on March 27, 1998. The proposed new rules were open for public comment for 30 days from the date of publication in the Texas Register. Modifications will be made to the proposed rules and final rules will be published in the coming months. Therefore, prior to submitting development applications to the TNRCC for the proposed transportation improvements, the new rules should be reviewed to determine the correct permitting procedures at the time the application is made.

## Air Quality

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. Such pollutants include nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), lead, and ozone (40 CFR §81.344). These standards were established to protect the public from exposure to harmful amounts of pollutants. When the pollutant levels in an area have caused a violation of a particular standard, the area is classified as “nonattainment” for that pollutant. The EPA then imposes federal regulations on pollutant emissions and designates a time period in which the area must again attain the standard. The Study Area is unclassified or in attainment of the National Ambient Air Quality Standard (NAAQS) for all six criteria air pollutants.

Ozone is the most common criteria pollutant for which most industrial U.S. cities achieve non-attainment. In July 1997, the U.S. EPA announced a new NAAQS for ground-level ozone. The EPA is phasing out and replacing the previous one-hour standard with a new eight-hour standard to protect public health against longer exposures to the air pollutant.

Under the one-hour standard, ozone concentrations of 0.125 parts per million (125 parts per billion) or above are considered to exceed the standard. The standard is not to be exceeded in an area more than three times in three consecutive years at the same monitoring site. If the standard is exceeded four times in three years at one site, then the area is in violation of the standard and no longer in “attainment.” This standard still applies to communities that were not in attainment of that standard in July 1997. Once these communities meet the one-hour standard, the EPA will judge them by the new, eight-hour standard.

Under the new eight-hour standard, the air quality assessment of communities which are currently in attainment will be based upon measurements taken during the three-year period from 1997 through 1999. A community will meet the new standard when the three-year average of the fourth-highest daily maximum eight-hour concentration measured at each monitoring site is less than 85 parts per billion. The EPA will announce those communities which are not in attainment in 2000.

Since the Round Rock area is in attainment, the air quality of this area is currently judged by the new eight-hour standard. According to the Texas Natural Resource Conservation Commission, Mobile Sources Section, the Round Rock Area will almost certainly be included with Austin as a nonattainment area for the eight-hour ozone standard, based on 1997 monitoring data. However, this designation will not be made until the year 2000.

Two TNRCC monitoring stations are located within the Austin area. These stations include C03, located at 3724 North Hills Drive, and C38, located on Lime Creek Road. The following table details the four highest eight-hour ozone concentrations in 1997 as monitored from these stations.

<b>Monitoring Site</b>	<b>Site Address</b>	<b>Highest 8-Hour</b>	<b>2nd Highest 8-Hour</b>	<b>3rd Highest 8-Hour</b>	<b>4th Highest 8-Hour</b>
Northwest: C03	3724 North Hills Drive	83	82	75	75

Audubon: C38	Lime Creek Road	96	91	90	87
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The control strategy for attainment of the ozone NAAQS focuses on reductions in emissions of volatile organic compounds and nitrogen oxides which react together in the presence of sunlight to form ozone, the main component of photochemical smog. A large portion of these ozone precursors are contributed by mobile sources, particularly from automobile emissions during the early morning hours.

It is anticipated that infrastructure improvements will better the overall air quality of the area since air pollution from mobile sources is greatest during periods of heavy congestion. Infrastructure improvements will most likely lessen traffic congestion within the area, therefore reducing air pollution.

### Historical Meteorology

The climatic description for the Round Rock area is regional in nature. Data from the City of Austin has been synthesized in this description of the general meteorological conditions of the Study Area.

The Study Area has subtropical weather during all parts of the year, especially the summer. This is primarily due to the general proximity of the Study Area to the Gulf of Mexico which pumps moisture into the area. During the late fall, winter, and early spring, cold fronts frequently move through the area allowing for cooler and often drier conditions. The mean relative humidity ranges from a minimum of 53% at 6:00 p.m. to a maximum of 83% at 6:00 a.m. (The Climates of Texas Counties, 1987).

According to climate data from the National Oceanic and Atmospheric Administration, National Weather Service web site, the Study Area has a mean annual rainfall total of 31.8 inches. The distribution of rainfall throughout the year is somewhat bimodal with the months of May and June having the highest rainfall and the months of September and October having the second highest amount of rainfall. The monthly rainfall averages range from a minimum of 1.71 inches in January to a maximum of 4.78 inches in June. Monthly rainfall and temperature data for Travis County are detailed in the following table.

Month	Average Daily Minimum Temperature		Average Daily Maximum Temperature		Average Monthly Precipitation	
	(°F)	(°C)	(°F)	(°C)	(in.)	(cm.)
January	39	4	59	15	1.71	4.34
February	42	6	63	17	2.17	5.51
March	51	11	72	22	1.87	4.75
April	60	16	79	26	2.56	6.50
May	67	19	85	29	4.78	12.14

<p align="center"><b>Table 3:</b>  <b>Summary of Climatic Data for Travis County, Texas</b>  <b>(Latest 30 Year Normals, 1961-1990)</b></p>						
Month	Average Daily Minimum Temperature		Average Daily Maximum Temperature		Average Monthly Precipitation	
	(°F)	(°C)	(°F)	(°C)	(in.)	(cm.)
June	72	22	91	33	3.72	9.45
July	74	23	95	35	2.04	5.18
August	74	23	96	36	2.05	5.21
September	70	21	91	33	3.30	8.38
October	60	16	82	28	3.41	8.66
November	50	10	72	22	2.37	6.02
December	41	5	62	17	1.88	4.78

The average daily maximum temperature is 80°F (27°C) and the average daily minimum temperature is 58°F (14°C). There are an average of 23 days per year in which the temperature falls below freezing and an average of 105 days per year when the temperature reaches at least 90°F, or 32°C (The Climates of Texas Counties, 1987).

The predominant wind direction is southerly throughout the year, except in April and May when winds shift to the south-southeast. Winds switch to northerly accompanying air masses in winter and soon shift to the south as these air masses move over the Gulf of Mexico (National Oceanic and Atmospheric Administration, National Weather Service web site).

Individual pollutants are affected by different meteorological factors. Carbon monoxide levels are greatest with light or calm winds and are minimized with strong or gusty winds. Ozone levels are lowest on cloudy days when photochemical reactions are limited due to reduced solar insolation. Conversely, ozone levels are highest on sunny days when photochemical reactions are more likely to occur. Particulate matter in the atmosphere is at lowest levels after frontal passage and/or rainfall events. Particulate matter levels are highest during extended periods of dry weather and when wind speeds are high.

Pollutants are dispersed based on thermal and mechanical mixing in the atmosphere. The mixing layer is the layer next to the earth's surface in which mixing of the air occurs. Above the mixing layer, the air is relatively stable and very little mixing occurs. The height of the mixing layer is determined by a variety of factors including the amount of solar insolation, the wind speed, and the amount of moisture in the atmosphere. Thermal mixing occurs when the earth's surface is warmed by solar insolation. Buoyant parcels of air rise until cooled. Thus, insolation assists vertical dispersion. Mechanical mixing occurs due to the wind. The combination of the wind speed and the height of the mixing layer determine the volume into which pollutants can be dispersed. In general, the higher the mixing layer height and the wind speed, the more pollution is diluted and thus, dispersed. The height of the mixing layer is generally lower in the morning and higher in the afternoon. For the Study Area, the average annual morning mixing layer height is about 2,215 feet (675 meters) and the average annual afternoon mixing layer height is about 4,593 feet (1,400 meters)

(Holzworth, 1972). These values are higher than those found in many locations around the country and thus, the pollution dispersion potential of the Study Area is frequently good.

Cold fronts are followed by air which is colder and usually drier. These cold, dry air masses are high pressure systems which are characterized by subsiding air. Due to the subsiding air, high pressure is stable and often leads to the formation of temperature inversions, especially in the early morning hours. Temperature inversions are layers of atmosphere which are cold at the bottom and warm at the top. These layers are very stable and act as limits for the vertical mixing of pollutants in the atmosphere. Thus, when inversions are present, stagnation can occur and smog can develop.

Overall, the Study Area possesses meteorological conditions which allow it to have significantly better dispersion characteristics than the national average.

## Hazardous Materials

A regulatory database search of potentially hazardous material sites located within the Study Area was completed by Environmental Risk Information and Imaging Services (ERIIS), Herndon, Virginia on February 13, 1998. In addition to the Study Area, a one mile buffer surrounding the Study Area was also included in the regulatory search. This database information may not reflect unregistered sites or sites which were not mappable based on regulatory agency information. Sites registered or reported to federal or state regulatory agencies after the regulatory database search was conducted will not be included in this report. Additionally, the extent of the migration of contaminants, if any, into and within the Study Area, can not be determined by this regulatory search. Database information utilized in the evaluation of potential hazardous material sites located within the Study Area is summarized in the following table. Each of the regulatory databases reviewed during this investigation is defined in the glossary of this report.

<b>Table 4: Regulatory Databases Reviewed Within the Study Area</b>			
<b>Regulatory Database</b>	<b>Number of Sites Within the Study Area Only</b>	<b>Number of Sites Within One-Mile Buffer Only</b>	<b>Total Number of Database Sites</b>
Federal Databases			
National Priorities List (NPL) sites	0	0	0
Resource Conservation and Recovery Information System (RCRIS) Treatment, Storage and Disposal (TSD) Facilities list	0	0	0
RCRIS - Large Quantity Generators list	6	0	6
RCRIS - Small Quantity Generators list	26	0	26
RCRIS - Corrective Action list	0	0	0
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list	0	0	0
No Further Remedial Action Planned (NFRAP) list	0	0	0

<b>Table 4: Regulatory Databases Reviewed Within the Study Area</b>			
<b>Regulatory Database</b>	<b>Number of Sites Within the Study Area Only</b>	<b>Number of Sites Within One-Mile Buffer Only</b>	<b>Total Number of Database Sites</b>
Emergency Response Notification (ERNS) list - January 1, 1997 to June 11, 1997	1	0	1
Emergency Response Notification (ERNS) list - 1987 to 1986	2	1	3
State Databases			
Texas Petroleum Storage Tanks (RST) list	43	2	45
Texas Leaking Petroleum Storage Tanks (LRST) list	53	2	55
Texas State Superfund (HWS) list	0	0	0
Texas Permit Application File (SWL) list	0	2	2
Total All Sites	131	7	138

There may be a potential for the above listed regulatory database sites to pose environmental constraints on proposed infrastructure improvements. During the planning stages of the proposed projects, additional studies may be required to determine the nature (i.e., type of facility, whether environmental problems are associated with the site, cleanup actions taken, etc.) of any regulatory site which is located within one-half mile of the proposed improvements. See Potential Hazardous Materials Sites Exhibit for the locations of these sites.

### **Threatened and Endangered Species**

The Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Service were contacted for information on threatened and endangered species which may occur within the Round Rock, Travis and Williamson County area. According to the USFWS, the Study Area is not currently located within the designated critical habitat of any federally listed species; however, suitable habitat for two federal and state listed endangered birds, the black-capped vireo (*Vireo atricapillus*) and the golden-cheeked warbler (*Dendroica chrysoparia*), may be found within the portion of the Study Area located west of Interstate Highway 35.

The black-capped vireo and the golden-cheeked warbler each require a very specific habitat to survive. The preferred nesting habitat for the black-capped vireo consists mid-successional brushy areas (i.e., before development of mature woodland) where the dominant woody species are oaks, sumacs, persimmon, and other broad-leaved shrubs. This species requires foliage reaching from approximately 6 feet to the ground level for nesting cover. Typical habitat is composed of a shrub layer extending from the ground to about 6 feet, covering about 35 to 55 percent of the total area, combined with a tree layer that may reach to 30 feet or more. Open areas of bare ground, rock, grasses, or forbs separate the clumps of trees and shrubs. Plant species commonly used as a nest substrate include evergreen sumac and shin oak. Other plant species used for nest building include junipers, Texas oak, live oak, wafer ash, silktassel, sophora, Mexican buckeye, American elm, and deciduous holly. Many black-capped vireo territories are located on steep slopes, such as the heads of ravines or along the sides of arroyos. On level terrain, vireo habitat tends to change through

succession, from prairie grass to cedar brakes. Optimum shrub conditions are essential to the habitat of this bird species. The reasons for the decline of the black-capped vireo include habitat loss due to urbanization and human disturbance, browsing by herbivores, brush clearing, natural succession, and nest parasitism by the brown-headed cowbird (*Molothrus ater*).

The preferred habitat for the golden-cheeked warbler consists of mature (at least 12 feet tall) oak-juniper woodlands, with 50 percent or greater canopy cover, although warblers have been found in habitat with as little as 30 percent canopy cover. Steep, narrow canyons, with deciduous trees along the drainage bottoms and juniper on the side slopes, provide an ideal mix of vegetation for this species. Suitable habitat may also occur on hilltops or other relatively flat areas. Mature ashe junipers (commonly known as “cedar”) provide nest substrate, and various oaks provide essential foraging substrate. Strands of ashe juniper bark are a specific nest-building material required by the warbler. Since this bird is insectivorous, the primary foraging substrates include woody shrub and tree species such as live oak, Texas oak, scaly bark oak, cedar elm, Mexican persimmon, hackberry, Texas ash, bald cypress, Arizona walnut, big-tooth maple, Lacey oak, and sycamore. The reasons for the decline of the golden-cheeked warbler species include habitat loss and fragmentation due to urban encroachment and juniper clearing as a range management practice, as well as nest parasitism by the brown-headed cowbird.

Additional sensitive migratory bird species which have been sighted within Travis or Williamson counties include the following:

- mountain plover (*Charadrius montanus* - Federal Candidate)
- white-face ibis (*Plegadis chihi* - Federal Species of Concern, State Threatened)
- Texas olive sparrow (*Arremonops rufivirgatus rufivirgatus* - Federal Species of Concern)
- whooping crane (*Grus americanus* - Federal Endangered, State Endangered)
- interior least tern (*Sterna antillarum athalassos* - Federal Endangered, State Endangered)
- brown pelican (*Pelecanus occidentalis* - Federal Endangered, State Endangered)
- peregrine falcon (*Falco peregrinus* - Federal Endangered due to similarity of appearance)
- wood stork (*Mycteria americana* - State Threatened)
- white-tailed hawk (*Buteo albicaudatus* - State Threatened)

Other species which may occur as migrants within Travis and Williamson County, but for which sightings have not necessarily been reported, according to TPWD and USFWS, include the American peregrine falcon (*Falco peregrinus anatum* - Federal Endangered, State Endangered), arctic peregrine falcon (*Falco peregrinus tundrius* - Federal Threatened due to similarity of appearance, State Threatened), least tern (*Sterna antillarum* - Federal Endangered), bald eagle (*Haliaeetus leucocephalus* - Federal Threatened, State Endangered), piping plover (*Charadrius melodus* - Federal Threatened, State Threatened), and loggerhead shrike (*Lanius ludovicianus* - Federal Species of Concern).

According to TPWD, karst habitats preferred by cave-dwelling wildlife are also of particular concern within the Study Area. The Study Area is located within an area of potential karst geology, and accordingly, may provide suitable habitat for federally listed endangered cave invertebrates. “Karst” is a type of terrain in which the rock is dissolved by water so that much of the drainage occurs into the subsurface rather than as runoff. This leads to passages or other openings within the underground rock formations. Some of the surface features that develop in karst areas include cave openings, holes in rocks, cracks, fissures, and sinkholes. The majority of karst features are too small to permit human entry; however, some caves are large enough for human entry into certain areas.



The habitat required by seven endangered invertebrate species consists of limestone caves and smaller karst features with high humidity and stable temperatures. The surface environment of karst areas is an integral part of the habitat needed by the invertebrates which inhabit the underground areas. Openings to the surface allow energy and nutrients, in the form of leaf litter, surface insects and other animals, and animal droppings to enter the underground ecosystem. The native vegetation and topography of the surrounding surface areas help protect the internal environment from fluctuations in temperature and moisture.

Flint Wash Cave exists approximately 100 feet east of Wyoming Springs Road, located on the west side of the City of Round Rock. Special design considerations will be required if the city decides to widen this roadway in order to avoid impacts to this cave and the cave invertebrates which inhabit the cave. During the planning stages of the Wyoming Springs improvements, extensive coordination with the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department as well as extensive studies will be required to determine if it will be possible to widen this roadway without impacting the cave invertebrates which inhabit Flint Wash Cave.

Maps were obtained from the TPWD's Texas Biological and Conservation Data System which illustrate known locations of sensitive plant and animal species populations, sensitive vegetation types, caves, and bird rookeries, as well as other natural areas of concern. According to these maps several caves, including Elm Cave, Easter Cave, Beck Bridge Cave, Flint Wash Cave and McNeil Quarry Cave, exist within the Study Area.

Seven federally endangered invertebrate species are found in caves and other karst features in the Austin and surrounding area. These species of endangered karst invertebrates include the following:

- Tooth Cave pseudoscorpion (*Tartarocreagris texana*)
- Tooth Cave spider (*Neoleptoneta myopica*)
- Tooth Cave ground beetle (*Rhadine persephone*)
- Bee Creek Cave harvestman (*Texella reddelli*)
- Bone Cave harvestman (*Texella reyesi*)
- Kretschmarr Cave mold beetle (*Texamaurops reddelli*)
- Coffin Cave mold beetle (*Batrisodes texanus*)

In addition, the Warton's Cave spider (*Cicurina wartoni* - Federal Candidate), the Balcones Cave amphipod (*Stygobromus balconis* - Federal Species of Concern), and the Bifurcated Cave amphipod (*Stygobromus bifurcatus* - Species of Concern), may also exist within the caves and other karst features within the Austin and surrounding area.

According to the Texas Biological and Conservation Data System maps, several populations of the Bone Cave Harvestman and the Bee Creek Cave Harvestman are known to exist, or have existed, within the Study Area. Because some species are especially sensitive to collection or harassment, information provided on the TPWD maps and in TPWD occurrence records is not allowed to be reproduced in any documents available to the general public. This information will be used for future planning purposes only.

Additional sensitive species which may occur within the Study Area, according to the Texas Parks and Wildlife Department or the U.S. Fish and Wildlife Service, include the following:

#### Animals

- Barton Springs salamander (*Eurycea sosorum* - Federal Endangered)
- Jollyville Plateau salamander (*Eurycea* sp. 1 - Federal Species of Concern)
- Buttercup Creek salamander (*Eurycea* sp. - Federal Species of Concern)
- Georgetown salamander (*Eurycea* sp. 5 - Federal Species of Concern)
- Pedernales River Springs salamander (*Eurycea* sp. 6 - Federal Species of Concern)
- Edwards Plateau Spring salamander - (*Eurycea* sp. 7 - Federal Species of Concern)
- timber/canebrake rattlesnake (*Crotalus horricus* - State Threatened)
- Texas garter snake (*Thamnophis sirtalis annectans* - Federal Species of Concern)
- Texas horned lizard (*Phrynosoma cornutum* - Federal Species of Concern, State Threatened)
- blue sucker (*Cycleptus elongatus* - Federal Species of Concern, State Threatened)
- Guadalupe bass (*Micropterus treculi* - Federal Species of Concern)
- plains spotted skunk (*Spilogale putorius interrupta* - Federal Species of Concern)
- cave myotis bat (*Myotis velifer* - Federal Species of Concern)

## Plants

- big red sage (*Salvia penstemonoides* - Federal Species of Concern)
- bracted twistflower (*Streptanthus bracteatus* - Federal Species of Concern)
- canyon mock orange (*Philadelphus ernestii* - Federal Species of Concern)
- Correll's false dragon head (*Physostegia correllii* - Federal Species of Concern)
- Glass Mountain coral-root (*Hexalectris nitida* - Federal Species of Concern)
- Texabama (Fort Hood) croton - (*Croton alabamensis* var. *texensis* - Federal Species of Concern)
- little bluestem-indiangrass series (*Schizachyrium scoparium-Sorghastrum nutans* series)

According to the Texas Biological and Conservation Data System Maps, the Jollyville Plateau salamander and the little bluestem-indiangrass vegetation series are both known to exist, or have existed, within the Study Area. In addition, a nesting colony of great egrets, snowy egrets, little blue herons, and cattle egrets was shown to exist on the southeast side of the City of Round Rock; however, this rookery was last observed in 1990.

When considering the alignment of new transportation routes, or improvements to existing routes within the Study Area, efforts should be made to minimize impacts to potential sensitive species habitat areas. The habitat that is to be cleared or modified by the project should be evaluated by a qualified biologist to determine if it is suitable for endangered or threatened species which may be present within the Study Area. In addition, proposed route locations should be surveyed for karst features. Proposed projects should be modified, to the extent possible, to avoid impacts to endangered species and their habitat. However, in the event that avoidance is not possible, a permit will be required by the U.S. Fish and Wildlife Service. Compensation, in the form of habitat mitigation, will also be required.

## Natural Areas and Ecosystems

According to correspondence from the Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service, no managed areas (i.e., state parks, wildlife management areas, wildlife refuges, etc.), administered by either of these agencies, are known to exist within the Study Area. Aside from the little bluestem-indiangrass series, the karst features, and the possible golden-cheeked warbler and black-capped vireo habitat discussed in the above section, no other natural areas or special ecosystems are expected to exist within the Study Area.

## Wetlands

Waters of the United States, including wetlands, are specifically protected under Section 404 of the Clean Water Act because of their ability to filter runoff prior to reaching the receiving waters, thus enhancing the water quality of the receiving water bodies (i.e., lakes, bayous, rivers, streams, etc.). As defined by Section 404 of the Clean Water Act, wetlands include those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 CFR 328.3)

In addition to enhancement of water quality, wetlands generally provide the following functions and benefits:

- Ground Water Recharge
- Ground Water Discharge
- Flood Storage
- Flood Velocity Reduction
- Shoreline Anchoring
- Sediment Trapping
- Nutrient Retention
- Food Chain Support
- Fishery Habitat
- Wildlife Habitat
- General Diversity
- Active Recreation
- Passive Recreation
- Natural Heritage

National Wetlands Inventory (NWI) maps were evaluated as a screening tool for the purpose of identifying potential wetlands within the Study Area. These maps indicated that wetlands primarily exist as adjacent wetlands located along creeks and streams (i.e., Lake Creek, Rattan Creek, Brushy Creek, Dry Branch, South Brushy Creek, Spanish Oak Creek, and Dry Fork, as well as several unnamed tributaries), as impounded water bodies located along these creeks and streams, and as small isolated wetlands (less than 5 acres in size) throughout the Study Area (See Floodplain, Wetland, and Edwards Aquifer Boundaries Exhibit). Typical wetland areas detailed on the NWI maps include the following wetland designations:

<b>NWI Wetland Designation</b>	<b>System</b>	<b>Class</b>	<b>Subclass</b>	<b>Water Regime</b>	<b>Special Modifiers</b>
PSS1A	Palustrine	Scrub/Shrub	Broad-leaved Deciduous	Temporary	-----
PSS1Ah	Palustrine	Scrub/Shrub	Broad-leaved Deciduous	Temporary	Diked/Impounded
PUSAh	Palustrine	Unconsolidated Shore	-----	Temporary	Diked/Impounded
PEM1Ch	Palustrine	Emergent	Persistent	Seasonal	Diked/Impounded
R4SBC	Riverine Intermittent*	Streambed	-----	Seasonal	-----
R4SBC	Riverine Intermittent*	Streambed	-----	Seasonal	-----
PEM1A	Palustrine	Emergent	Persistent	Temporary	-----

**Table 5:  
National Wetlands Inventory Map  
Wetland Designations Located within the Study Area**

<b>NWI Wetland Designation</b>	<b>System</b>	<b>Class</b>	<b>Subclass</b>	<b>Water Regime</b>	<b>Special Modifiers</b>
PEM1Ah	Palustrine	Emergent	Persistent	Temporary	Diked/Impounded
POWHh	Palustrine	Open Water	-----	Permanent	Diked/Impounded
PEM1Ah	Palustrine	Emergent	Persistent	Temporary	Diked/Impounded
POWH	Palustrine	Open Water	-----	Permanent	-----
PFO/EM1A	Palustrine	Foerested/ Emergent	Broad-leaved Deciduous Persistent	Temporary	-----
R2OWH	Riverine *Lower Perennial	Open Water	-----	Permanent	-----
PEM1Fh	Palustrine	Emergent	Persistent	Semipermanent	Diked/Impounded
PEM1C	Palustrine	Emergent	Persistent	Seasonal	-----
L1OWHh	Lacustrine *Limnetic	Open Water	-----	Permanent	Diked/Impounded
PEM1Ch	Palustrine	Emergent	Perisitent	Seasonal	Diked/Impounded
PFO1Ah	Palustrine	Forested	Broad-leaved Deciduous	Temporary	Diked/Impounded
PSS1C	Palustrine	Scrub/Shrub	Broad-leaved Deciduous	Seasonal	-----
PEM1C	Palustrine	Emergent	Persistent	Seasonal	-----
PEM1Fh	Palustrine	Emergent	Persistent	Semipermanent	Diked/Impounded
PFO1A	Palustrine	Forested	Broad-leaved Deciduous	Temporary	-----

\* Ecological Subsystem in the Riverine and Lacustrine Systems.

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: 1) area less than 20 acres (8 hectares); 2) active wave-formed or bedrock shoreline features lacking; 3) water depth in the deepest part of basin less than 2 meters at low water; and 4) salinity due to ocean-derived salts less than 0.5%.

The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and 2) habitats with water containing ocean-derived salts in excess of 0.5%. A channel consists of “an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water” (Langbein and Iseri, 1960).

The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: 1) situated in a topographic depression or a dammed river channel; 2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and 3) total area exceeds 20 acres (8 hectares). Similar wetland and deepwater habitats totaling less than 20 acres are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin

exceeds 6.6 feet (2 meters) at low water. Lacustrine Systems may be tidal or nontidal, but ocean-derived salinity is always less than 0.5%.

Two riverine subsystems and one lacustrine subsystem were identified within the Study Area. These subsystems include the following:

- Lower Perennial Riverine Subsystem
- Intermittent Riverine Subsystem
- Limnetic Lacustrine Subsystem

No subsystem designations exist for Palustrine wetland systems. Wetland classes identified during the evaluation of the Study Area include the following:

- Scrub/Shrub
- Unconsolidated Shore
- Emergent Wetlands
- Forested
- Streambed
- Open Water

Subclasses of the above six wetland classes which were identified within the Study Area include the following:

- Broad-leaved Deciduous (subclass of Scrub/Shrub and Forested wetland classes)
- Persistent (subclass of Emergent class)

Definitions for the above mentioned wetland subsystems, classes, and subclasses are provided in the glossary of this report.

## **Floodplains**

According to the Texas Natural Resource Conservation Commission, National Flood Insurance Program State Coordinator's Office, the City of Round Rock, as well as Travis and Williamson Counties, are participants in the National Flood Insurance Program. Therefore, these entities have approval authority for projects that affect their respective floodplains. The floodplain administrators for Travis and Williamson Counties were contacted for information on floodplain concerns within the Study Area. The floodplain administrators had no comments or concerns regarding this project from a floodplain perspective. According to the floodplain administrator of Williamson County, any plans for construction activities within the floodplain would need to be submitted to the Office of the Floodplain Administrator with proper documentation in order to satisfy the Federal Emergency Management Agency (FEMA) requirements. See Floodplain, Wetland, and Edwards Aquifer Boundaries for locations of the 100-year floodplain areas within the Study Area.

Flood Insurance Rate Maps (FIRM) for Travis and Williamson Counties, published by FEMA, were reviewed to assess flood prone areas within the Study Area. Within the boundary of the Study Area, flood prone areas were limited to Brushy Creek, the primary creek which flows east through the Study Area, as well as several tributaries of Brushy Creek including South Brushy Creek, Lake Creek, Dry Branch, Dyer Branch, Block House Creek, Spanish Oak Creek, Dry Fork, Onion Branch, Chandler Branch, McNutt Creek, and two tributaries of Lake Creek including Spring Branch and

Rattan Creek. Flood prone areas were also associated with several unnamed tributaries within the Study Area.

The FIRM zone designations identified within the Study Area include the following:

- Zone A consists of special flood hazard areas inundated by 100-year floods in which base flood elevations and flood hazard factors have not been determined.
- Zone AE consists of special flood hazard areas inundated by 100-year floods in which base flood elevations and flood hazard factors have been determined.
- Zone X (Flood Areas) consists of areas of the 500-year flood, areas of the 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from the 100-year flood.
- Zone X (Other Areas) consists of areas determined to be outside the 500-year floodplain.

### **Historic and Cultural Resources**

The National Historic Preservation Act (16 U.S.C. 470) states the national policy of preserving, restoring, and maintaining cultural resources (i.e., historic buildings, sites, districts, structures, or objects as well as archaeological sites, artifacts, records, or remains, etc.) within the United States. The National Register of Historic Places is the mechanism by which historic properties can be protected. Any property or building, etc., found in the National Register, or eligible for inclusion in the National Register, is expressly protected from certain types of activities and can receive federal funding for restoration and maintenance operations. Although the National Park Service is responsible for determining the eligibility of National Register sites, the State Historic Preservation Officer is responsible for enforcement of the National Historic Preservation Act within the State.

The Texas Historical Commission (THC), Austin, Texas, and the Texas Archaeological Research Laboratory (TARL), Austin, Texas, were contacted for information on archaeological and historical resources which are located within the Study Area. Given the sensitive nature of many of the historic/archaeological sites documented by the Texas Historical Commission and the TARL, locational information of historic, archaeological, and other cultural resources is considered confidential and is not allowed to be reproduced in any documents available to the general public. Therefore, although archaeological/historical site locations will be utilized as a tool in future planning activities, this information is not provided in this document.

According to information provided by TARL, approximately 90 archaeological/historical sites exist within the Study Area. Many of the archaeological sites are located near or adjacent to several creeks which flow through the Study Area.

During the planning phase of proposed projects, prior to the expansion of existing facilities or construction of new facilities, the Texas Historical Commission should be contacted, and additional studies may be required to determine if the proposed improvements will impact cultural resources within the area.

### **Conclusions**

This environmental investigation is very general in nature. Prior to the construction of any new facilities or the upgrading of existing facilities, additional studies will need to be done in order to determine the exact environmental constraints and environmental impacts associated with the planned improvements.

## GLOSSARY

### Regulatory Database Terms

**Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)** - The CERCLIS database is a comprehensive listing of known or suspected uncontrolled or abandoned hazardous waste sites. These sites have either been investigated, or are currently under investigation by the EPA for the release, or threatened release of hazardous substances. Once a site is placed in CERCLIS, it may be subjected to several levels of review and evaluation and ultimately placed on the National Priorities List. As of February, 1995, CERCLIS sites designated “No Further Remedial Action Planned (NFRAP)” have been removed from the CERCLIS database.

**Emergency Response Notification System (ERNS); 1997** - ERNS is a national computer database system that is used to store information on the sudden and/or accidental release of hazardous substances, including petroleum, into the environment. The ERNS reporting system contains preliminary information on specific releases including the spill location, the substance released, and the responsible party. This information pertains only to those releases that occurred between January 1, 1997 and June 11, 1997.

**Emergency Response Notification System (ERNS); 1987 to 1996** - ERNS is a national computer database system that is used to store information on the sudden and/or accidental release of hazardous substances, including petroleum, into the environment. The ERNS reporting system contains preliminary information on specific releases including the spill location, the substance released, and the responsible party. This information pertains only to those releases that occurred between 1987 and 1996

**National Priorities List (NPL)** - The NPL Report, also known as the Superfund List, is an Environmental Protection Agency (EPA) listing of uncontrolled or abandoned hazardous waste sites. The list is primarily based upon a score which the site receives from the EPA’s Hazardous Ranking System. These sites are targeted for possible long-term remedial action under the Superfund Act.

**No Further Remedial Action Planned Sites (NFRAP)** - The NFRAP contains information pertaining to sites which have been removed from the EPA’s CERCLIS database. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without need for the site to be placed on the NPL, or the contamination was not serious enough to require federal Superfund action or NPL consideration.

**Resource Conservation and Recovery Information System - Corrective Action report (RCRIS-CA)** - The RCRIS-CA Report contains information pertaining to hazardous waste treatment, storage, and disposal Facilities (RCRIS-TSDs\_ which have conducted, or are currently conducting, a corrective action(s) as regulated under the Resource Conservation and Recovery Act.

**Resource Conservation and Recovery Information System; Small Quantity Generators** - The RCRIS-SG Report contains information pertaining to facilities which either generate between 100 kg and 1,000 kg of hazardous waste per month or meet other applicable requirements of the RCRA. Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS; dated 03/03/95) is included in the RCRIS-SG Report.



**Resource Conservation and Recovery Information System (RCRIS); Large Quantity Generators** - The RCRIS-LG Report contains information pertaining to facilities which either generate more than 1,000 kilograms (kg) of hazardous waste per month or meet other applicable requirements of the Resource Conservation and Recovery Act (RCRA). Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS; dated 03/03/95) is included in the RCRIS-LG Report.

**Resource Conservation and Recovery Information System (RCRIS); Treatment, Storage, and Disposal Facilities** - The RCRIS-TSD Report contains information pertaining to facilities which either treat, store, or dispose of hazardous waste. Information pertaining to the status of facilities tracked by the Resource Conservation and Recover Act (RCRA) Administrative Action Tracking System (RAATS; dated 03/03/95) is included in the RCRIS-TSD Report.

**Texas Petroleum Storage Tank (RST) list** - The Texas Petroleum Storage Tank report is a comprehensive listing of all registered aboveground and underground storage tanks located within the State of Texas.

**Texas Leaking Petroleum Storage Tank (LRST) list** - The Texas Leaking Petroleum Storage Tank report is a comprehensive listing of all reported leaking aboveground and underground storage tanks located within the State of Texas.

**Texas State Superfund (HWS) list** - The Texas State Superfund report contains information pertaining to sites that have been placed on the State Priorities List by the Texas Natural Resource Conservation Commission.

**Texas Permit Application File (SWL) list** - The Texas Permit Application File is a comprehensive listing of all facilities that have filed for a permit with the Texas Natural Resource Conservation Commission for the operation of a solid waste landfill.

### **Wetland Classification Terms**

**Broad-leaved Deciduous** - Plant habitat in which species include woody trees or shrubs with relatively wide, flat leaves that are shed during the winter season.

**Emergent Wetlands** - This class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

**Forested** - This class is characterized by woody vegetation that is 6 meters tall or taller. Forested Wetlands are most common where moisture is abundant, particularly along streams or rivers.

**Intermittent** - A subsystem of the Riverine system in which the channel contains flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

**Limnetic** - A subsystem of the Limnetic system which includes deepwater habitats within the Lacustrine System; many small Lacustrine Systems have no Limnetic Subsystems.

**Lower Perennial** - A subsystem of the Riverine Subsystem in which the gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate primarily consists of sand and mud.

**Open Water** - This class is characterized by open water wetlands with an unknown bottom.

**Persistent** - Describes emergent wetlands which are dominated by species that normally remain in standing water until the beginning of the next growing season.

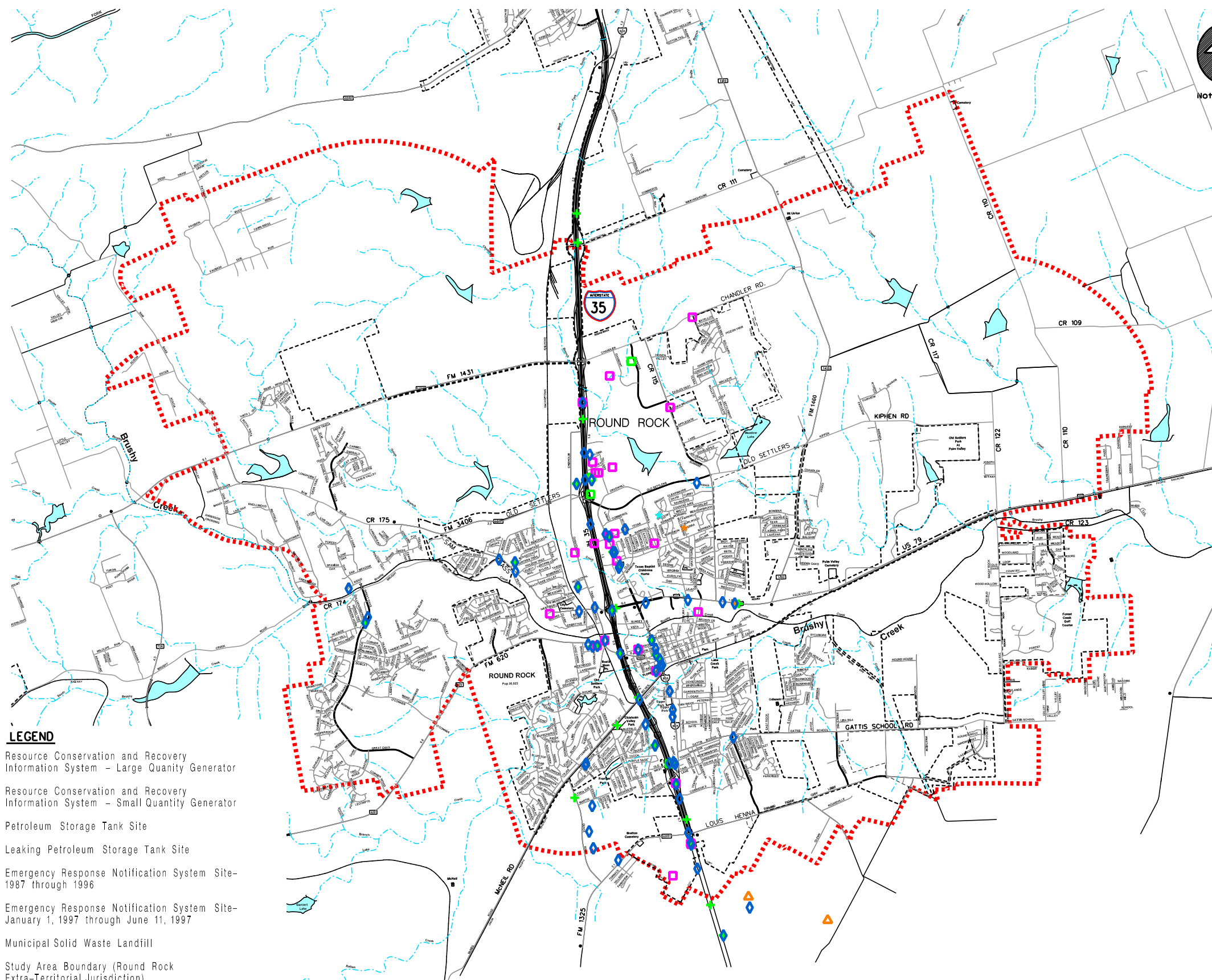
**Scrub/Shrub** - This class includes areas dominated by woody vegetation less than 6 meters (20 feet) in height. Species in this area include shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions. Scrub/Shrub wetlands may represent a successional stage leading to Forested Wetlands, or may represent stable communities of their own.

**Streambed** - This class includes all wetlands contained within the Intermittent Subsystem or the Riverine System. Streambeds vary a great deal in substrate and form depending on the gradient of the channel, the velocity of the water, and the sediment load.

**Unconsolidated Shore** - This class includes all wetland habitats having three characteristics: 1) unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock; 2) less than 30% areal cover of vegetation other than pioneering plants; and 3) any of the following water regimes: seasonally flooded, temporarily flooded, etc. Unconsolidated Shores are characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable.



Not To Scale



**LEGEND**

-  Resource Conservation and Recovery Information System - Large Quantity Generator
-  Resource Conservation and Recovery Information System - Small Quantity Generator
-  Petroleum Storage Tank Site
-  Leaking Petroleum Storage Tank Site
-  Emergency Response Notification System Site- 1987 through 1996
-  Emergency Response Notification System Site- January 1, 1997 through June 11, 1997
-  Municipal Solid Waste Landfill
-  Study Area Boundary (Round Rock Extra-Territorial Jurisdiction)
-  Round Rock City Limit

Hazardous Materials Source: ENVIRONMENTAL RISK AND IMAGING SERVICE, February 13, 1998.

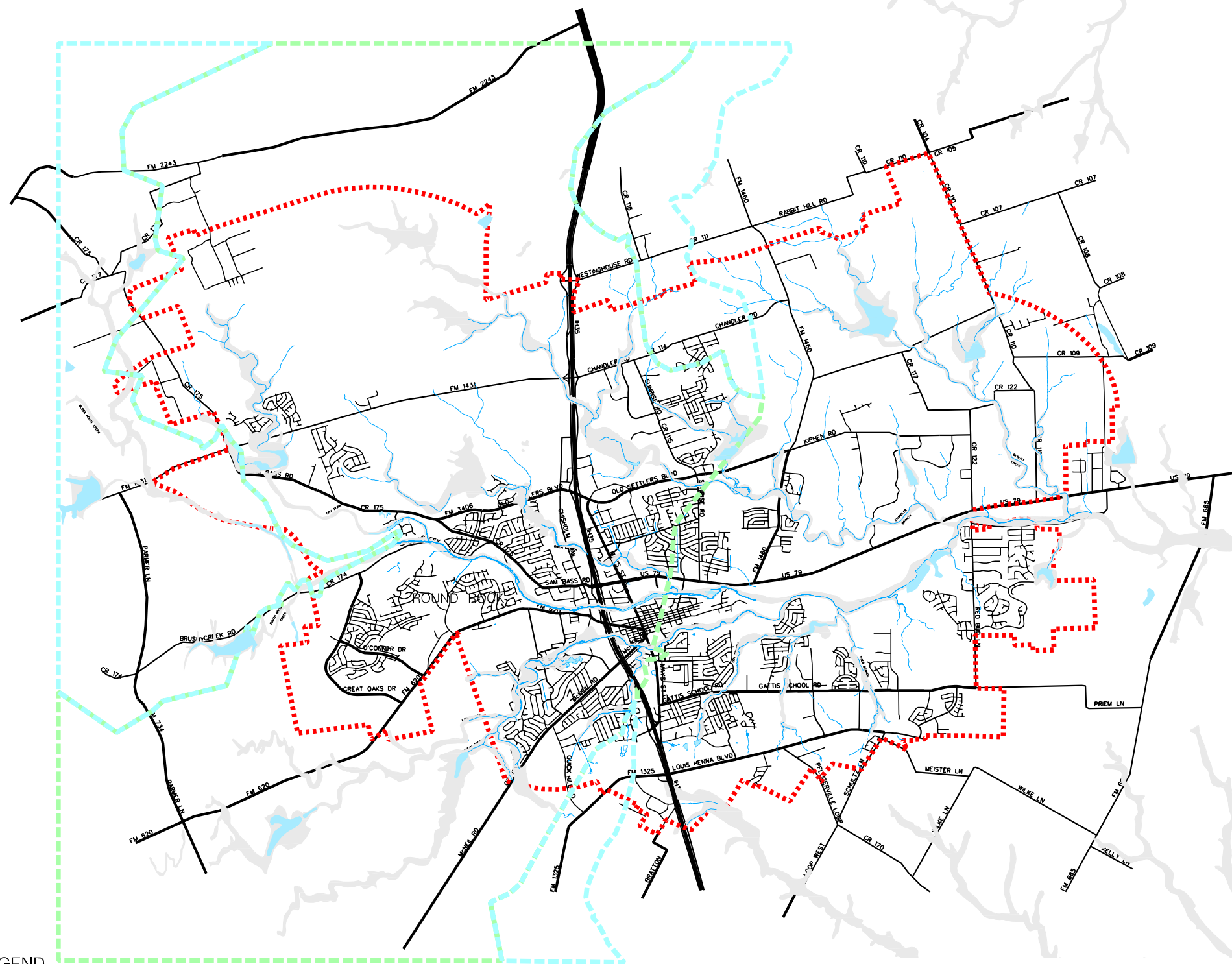
# POTENTIAL HAZARDOUS MATERIALS SITES








**RUST** LICHLITER/JAMESON



Not To Scale



LEGEND

-  Potential Significant Wetland Area
-  100 Yr. Flood Plain Boundary
-  Edwards Aquifer Recharge Zone
-  Edwards Aquifer Contributing Zone
-  Study Area Boundary  
Round Rock Extra-Territorial Jurisdiction

Wetland Source: National Wetlands Inventory Maps, Hutto, Jollyville, Leander, Pflugerville East, Pflugerville West, and Round Rock Quadrangles, 1993.

Floodplain Source: National Floodplain Insurance Program, Flood Insurance Rate Maps, Travis County, June 16, 1993 and Williamson County, September 27, 1991.

Edwards Aquifer Source: Location Map, Austin, Texas, Hill Country Foundation, 1995

# FLOODPLAINS, WETLANDS AND EDWARDS AQUIFER BOUNDARIES



**RUST** LICHLITER/JAMESON

# Financial Analysis

To evaluate the feasibility of meeting the future transportation needs for the Round Rock area, an analysis of present and anticipated future revenues was performed. The costs of anticipated transportation improvements were compared to projected revenues. The various sources of funding for transportation projects were also evaluated.

## **Sources of Funds**

Funding for roadway expansion projects can be obtained from the Texas Department of Transportation (TxDOT), the Texas Turnpike Authority (TTA), the Central Texas Regional Mobility Authority (CTRMA), the Capital Area Metropolitan Planning Organization (CAMPO), Williamson County, private developers, the Round Rock Transportation Development Corporation and the City. The source of funding depends on the classification of the roadway.

### State Funds

Texas Department of Transportation (TxDOT) financing is provided by dedicated federal and state highway funds, but the City must compete state-wide for these funds. Even though the City has competed successfully for funding on projects like the Interstate Highway 35 (IH 35) turnarounds, which were completed in 2003, competition for funding is increasing. In 1999, TxDOT had funds available for approximately 50 percent of the State's need. In 2003, funding could only accommodate 36 percent of the need. Successfully competing for state financing is improved by matching part of the state financing with City contributions. The City is leveraging City funds for projects like the US 79 Roadway Expansion and the Greenlawn/IH 35 Interchange.

Another entity controlling State funds is the Texas Turnpike Authority (TTA), which is a division of TxDOT. As stated previously, the State has less funding available to meet statewide transportation needs. This means the traditional tax-based method of financing roads is no longer sufficient to meet the state's mobility needs in a timely manner. Developing roads as turnpikes/tollways will stretch limited taxpayer dollars and accelerate construction of highway projects, resulting in congestion relief for motorists, sooner rather than later. To improve regional mobility of the residents of Round Rock, the City has participated financially in the acquisition of right-of-way for State Highway 45 (SH 45 N), which is under construction and due to be complete in 2007. The City also actively participated in the planning of SH 130, which is also under construction and due to be complete in 2007.

In 2002, Williamson and Travis County joined together to create the Central Texas Regional Mobility Authority (CTRMA). The Texas Legislature authorized the creation of Regional Mobility Authorities for the purpose of constructing,

operating and maintaining turnpike projects in the state. In the face of sharp decreases in traditional funding sources and the great number of critical mobility improvements needed, the CTRMA can step in and provide more flexibility by focusing local dollars to leverage revenue bonds for major projects and construct them sooner, rather than later. The CTRMA's first project in Williamson County is US 183-A and SH 45 (SE) is under consideration as the second. The CTRMA will provide the City with another source of funds to leverage City funds.

### Capital Area Metropolitan Planning Organization Funds

The Federal Government mandates that states sub-allocate an amount of federal highway dollars, based on population, to the Metropolitan Planning Organizations. Capital Area Metropolitan Planning Organization (CAMPO) receives approximately \$13 million per year for local/regional roadway projects having a classification of collector or higher. The CAMPO Transportation Policy Board has total discretion over projects funded by this program. In the past, the City has leveraged CAMPO funds to obtain funding for roadway safety improvements on McNeil Road at County Road 172 and the Union Pacific Railroad and sidewalk construction on N. Mays Street. Of all the funding sources available, competition for the CAMPO funds is the strongest. CAMPO received 74 project proposals totaling approximately \$195 million for fiscal years 2005, 2006 and 2007. After all other obligations are met, CAMPO will have approximately \$26 million available for FY 2005 through 2007.

### County Funds

Williamson County has developed a Multi-Corridor Transportation Plan to accommodate the fast paced growth experienced in the County, which includes the City of Round Rock. The City is working closely with the County to improve roadways located within both the County and the City's extra territorial jurisdiction. The City and the County have successfully leverage local funds to demonstrate a commitment to the State for expansion of US 79 and the construction of SH 45. The City and County will continue to leverage funds in the future for roadway improvements like the expansion of Kiphen Road (County Road 113).

### Private Funds

Due to the rapid growth in the study area, many of the land developers cannot wait for the city to provide the entire transportation infrastructure. The land development community is presently building many of the new arterial roadway facilities. It is anticipated that this trend will continue in the future.

### Round Rock Transportation System Development Corporation Funds

In August 1997, the Citizens of Round Rock authorized the adoption of an additional sales and use tax within the City at the rate of one-half of one percent, with the proceeds thereof to be used for streets, roads, drainage and other

related transportation system improvements. The additional sales and use tax became effective January 1, 1998. The additional revenue is not part of the City's general operating budget but is budgeted and spent by a non-profit industrial development corporation established expressly for the above purposes with the approval of the Round Rock City Council.

Since 1998, the Round Rock Transportation System Development Corporation (RRTSDC) and the City have utilized the sales tax revenue stream to leverage a maximum number of transportation projects in the City of Round Rock. The RRTSDC obtained \$31 million in loans from the State of Texas Infrastructure Bank (SIB) and in 2001, issued \$25.8 million in sales tax revenue bonds. Approximately \$5 million of the ½ cent sales tax revenue stream is designated annually for the repayment of the SIB loans and the debt service on the bond issuance through 2022.

The following table reflects the actual sales tax revenue through FY 2003. Due to the economic sensitivity of sales tax revenue, anticipated future revenues through 2020 are shown at a flat rate with no percentage increase.

<b>Year</b>	<b>½-cent Sales Tax</b>	<b>Year</b>	<b>½-cent Sales Tax</b>
1998	2,990,319	2011	11,300,000
1999	6,722,247	2012	11,300,000
2000	8,380,752	2013	11,300,000
2001	10,456,599	2014	11,300,000
2002	10,012,965	2015	11,300,000
2003	11,255,918	2016	11,300,000
2004	11,300,000	2017	11,300,000
2005	11,300,000	2018	11,300,000
2006	11,300,000	2019	11,300,000
2007	11,300,000	2020	11,300,000
2008	11,300,000		
2009	11,300,000		
2010	11,300,000		
<b>Totals</b>	<b>\$ 128,918,800</b>		<b>\$ 113,000,000</b>

### City Funds

In 2001, the City of Round Rock voters approved General Obligation Bonds including authorization of \$37.1 million for streets, sidewalks, landscaping and traffic signal projects. These projects will improve the citizens' overall mobility by renovating existing streets, adding new sidewalks and traffic signals. These projects are funded through the City of Round Rock's issuance of General Obligation bonds and are not funded by the ½ cent additional sales tax for transportation.

## Transportation Plan Cost Estimates

The following table shows the estimated cost to complete the plan roadway improvements for the 2010 and 2020 planning horizons.

<b>Plan Year</b>	<b>Total Project Cost</b>	<b>Participation By Others</b>	<b>Round Rock's Share</b>
2010	\$ 492,226,348	\$ 321,583,745	\$ 170,642,603
2020	<u>\$ 231,014,778</u>	<u>\$ 74,092,506</u>	<u>\$ 156,922,272</u>
Total	\$ 723,241,126	\$ 395,676,251	\$ 327,564,875



**City of Round Rock Transportation Master Plan Roadway Table**

Round Rock Roadway	Limits	Existing Typical Section	2010 Proposed Typical Section	2010 Total Cost	2020 Proposed Typical Section	2020 Total Cost	Ultimate Proposed Typical Section	Ultimate Right-of-Way	Bicycle Facility
Arterial A	Westinghouse Rd./CR 111 - CR 112/CR 117	---			MAD 4	\$ 4,938,322		110 <sup>3</sup>	Yes
Arterial A	CR 112/CR 117 - US 79		MAD 4	\$ 14,205,850				110 <sup>3</sup>	Yes
Arterial A	US 79 - Forest Creek	---	1/2 of MAD 6	\$ 3,558,056	1/2 of MAD 6	\$ 3,030,042		130 <sup>3</sup>	Yes
Arterial A	Forest Creek - Louis Henna/Meister/SH 45(N)	---			MAD 6	\$ 7,688,151		130 <sup>3</sup>	Yes
Arterial C	Sam Bass Rd. - RM 620 (at Deep Wood Dr.)	---			MAD 4	\$ 2,626,805		100	Yes
Arterial C	Deep Wood Dr. - SH 45 (N)	---			MAD 4	\$ 10,595,785		100	Yes <sup>1</sup>
Arterial H	Sam Bass Rd - Wyoming Springs Dr.	---					MAD 4	110 <sup>3</sup>	Yes
Arterial H	Wyoming Springs Dr. - IH 35	---					MAD 4	110 <sup>3</sup>	Yes
Arterial S	Westinghouse Rd./CR 111 - Chandler Rd./CR 114	---	MAD 4	\$ 3,230,000				100 <sup>3</sup>	
AW Grimes Blvd.	US 79 - Lake Creek	---	MAD 6	\$ 23,550,000				120	Yes
AW Grimes Blvd.	Lake Creek - Gattis School Rd.	MAD 6							Yes
AW Grimes Blvd.	Gattis School Rd. - Louis Henna Blvd./SH 45 (N)	MAD 6							Yes
Bowman Rd.	IH 35 - N. Mays St./BR IH 35	MAU 4							
Bowman Rd.	N. Mays St./BR IH 35 - Sunrise Rd.	MAU 4							
Bowman Rd.	Sunrise Rd. - FM 1460	MAD / MAU 4							
Chandler Rd. / CR 114	IH 35 (N) - Sunrise Rd./CR 115	MAD 4			MAD 6	\$ 5,591,621		120 <sup>3</sup>	
Chandler Rd. / CR 114	Sunrise Rd./CR 115 - FM 1460	MAD 4			MAD 6	\$ 7,272,803		120 <sup>3</sup>	
Chandler Rd. / CR 114	FM 1460 - CR 110	---	MNR 2	\$ 3,844,497	MAD 4	\$ 9,351,429	MAD 6	120 <sup>3</sup>	
Chandler Rd. / CR 114	CR 110 - SH 130 (N)	---	MAD 4	\$ 5,200,000			MAD 6	120 <sup>3</sup>	
Chisholm Trail Rd.	FM 1431 - Existing Chisholm Trail	---			MAD 4	\$ 4,255,218		90	
Chisholm Trail Rd.	Existing Chisholm Trail - W. Old Settlers Blvd./FM 3406	MAU 2			MAD 4	\$ 3,118,720		90	
Chisholm Trail Rd.	W. Old Settlers Blvd./FM 3406 - Sam Bass Rd	MAU 2	MAD 4	\$ 5,598,496				90	
Chisholm Pkwy.	Chisholm Trail Rd. - IH35 SBFR	---	MAD 4	\$ 909,993				80	
CR 109	CR 122 - CR 110	---					MAD 4	100 <sup>3</sup>	
CR 109	CR 110 - CR 108	MAU 2					MAD 4	100 <sup>3</sup>	
CR 110	Westinghouse/CR 111 - CR 109	MNR 2			MAD 4	\$ 10,273,689		100 <sup>3</sup>	
CR 110	CR 109 - US 79	MNR 2			MAD 4	\$ 11,349,994		100 <sup>3</sup>	
CR 112	FM 1460 - CR 110	MNR 2			MAD 4	\$ 9,436,262		100 <sup>3</sup>	
CR 122	CR110 - Kiphen Rd./CR 113	MNR 2			MAD 4	\$ 3,430,773		100	
CR 122	Kiphen Rd./CR 113 - US 79	MNR 2			MAD 4	\$ 4,103,900		100	
CR 170 / Grand Avenue Parkway	Louis Henna Blvd./SH 45 (N) - Pflugerville Loop	MAU 2	MAD 4	\$ 5,958,367				100 <sup>3</sup>	
Creek Bend Blvd.	FM 1431 - FM 3406	MAU 0 / 2			MAD 4	\$ 6,799,478		100 <sup>3</sup>	
Creek Bend Blvd.	FM 3406 - Sam Bass Rd.	MAD 4							
Creek Bend Blvd.	Sam Bass Rd. - Creek Bend Circle	MAD 4							
Creek Bend Blvd.	Creek Bend Circle - Wyoming Springs Dr.	---	MAD 4	\$ 5,175,000				100	Yes
Brightwater Blvd.	Wyoming Springs Dr. - Great Oaks Dr.	MAD 4							
Double Creek Dr.	FM 1460 - Kiphen Rd./CR 113	---	MAD 4	\$ 1,034,212				100 <sup>3</sup>	
Double Creek Dr.	Kiphen Rd./CR 113 - US 79	---			MAD 4	\$ 7,235,881		100 <sup>3</sup>	
Double Creek Dr.	US 79 - Forest Creek Dr.	---			MAD 4	\$ 2,946,753		100 <sup>3</sup>	
Double Creek Dr.	Forest Creek Dr. - Gattis School Rd./CR 168	--- / MAU 2	MAD 4	\$ 2,850,000				100 <sup>3</sup>	
Double Creek Dr.	Gattis School Rd./CR168 - SH 45 (N)	MAD 4							
FM 1431	Sam Bass Rd./CR 175 - Wyoming Springs Dr	MAU 4			MAD 4	\$ 12,150,789	MAD 8		
FM 1431	Wyoming Springs Dr - IH 35	MAU 4			MAD 4	\$ 9,133,091	MAD 8	120	
FM 1460	Westinghouse Rd./CR 111 - Chandler Rd./CR 114	MNR 2	MAD 4	\$ 2,000,000				100 <sup>3</sup>	
FM 1460	Chandler Rd./CR 114 - US 79	MNR 2	MAD 4	\$ 16,220,000				100 <sup>3</sup>	
Forest Creek Dr.	Double Creek Dr. - Red Bud Ln./CR 122	--- / MAD 4	MAD 4	\$ 4,122,381				100 <sup>3</sup>	
Gattis School Rd.	BR IH 35/Mays Street - Greenlawn Blvd.	MAU 4			MAD 4	\$ 6,551,821	MAD 6	90	
Gattis School Rd.	Greenlawn Blvd. - AW Grimes Blvd.	MAU 4	MAD 4	\$ 2,500,000			MAD 6	130 <sup>3</sup>	Yes
Gattis School Rd.	AW Grimes Blvd. (Arterial B) - Red Bud Ln./CR 122	MAU 4			MAD 4	\$ 11,466,176	MAD 6	130 <sup>3</sup>	Yes
Gattis School Rd. / CR 168	Red Bud Ln./CR 122 - SH130	MAU 2 / 4			MAD 4	\$ 7,200,089			
Great Oaks Dr.	Brushy Creek Rd. - RM 620	MAD 4							
Great Oaks Dr.	RM 620 - Arterial C	---			MAD 4	\$ 1,952,571		100 <sup>3</sup>	

**City of Round Rock Transportation Master Plan Roadway Table**

Round Rock Roadway	Limits	Existing Typical Section	2010 Proposed Typical Section	2010 Total Cost	2020 Proposed Typical Section	2020 Total Cost	Ultimate Proposed Typical Section	Ultimate Right-of-Way	Bicycle Facility
Greenlawn Blvd.	Gattis School Rd./CR 168 - SH 45 (N)	MAD 4							
Greenlawn Blvd.	SH 45 (N) - IH 35 (N)	MAD 4					MAD 6	100	
Greenlawn Blvd.	IH 35 (N) - Quick Hill Rd./CR 172	---			MAD 4	\$ 2,718,706		100 <sup>3</sup>	
Hesters Crossing	CR 172 - IH 35	MAD 4							
IH 35	Westinghouse Rd./CR 111 - FM 1431	---	Ramps, Frontage Road & Turnarounds	\$ 6,000,000					
IH 35	Westinghouse Rd./CR 111 - FM 3406	FWY 6					FWY 8/HOV		
IH 35	FM 3406 - RM 620	FWY 6					FWY 8/HOV		
IH 35	RM 620 - SH 45 (N)	FWY 6					FWY 8/HOV		
IH 35	Between Hesters Crossing and SH 45	---	Collector/Distributor	\$ 7,650,000					
IH 35	At Greenlawn Blvd.	---	Interchange	\$ 17,000,000					
Kiphen Rd.	Double Creek Dr. - CR 122	MNR 2	MAD 4	\$ 8,590,000				110 <sup>3</sup>	Yes
La Frontera Blvd.	Hesters Crossing - SH 45 (N)	MAD 4							
Loop 1 / MOPAC Blvd.	SH 45 (N) - Parmer Ln.	MAU 4 / ---	Toll FWY 6				TOLL FWY 6/HOV		
Mays St.	E. Old Settler's Blvd./FM 3406 - Brushy Creek	MAD 4							
Mays St.	Brushy Creek - Lake Creek	MAU 4					MAU 4/MAD 4	90	
Mays St.	Lake Creek - IH 35 (N)	MAD 4							
Mays St.	At Hesters Crossing	---	Realign	\$ 300,000					
McNeil Rd.	SH 45 - CR 172/Quick Hill Rd.	MAU 2	MAD 4	\$ 3,907,996			MAD 6	90	
McNeil Rd.	Quick Hill Rd./CR 172 - IH 35 (N)	MAU 4			MAD 4	\$ 6,255,578	MAD 6	90	Yes
McNeil Rd.	IH 35 (N) - S. Mays St./BR IH 35	MAU 4 / 2					MAD 4	90	Yes
O'Connor Dr.	Avery Ranch Rd. - Great Oaks Dr.	MAD 4					MAD 6	120	
O'Connor Dr.	Great Oaks Dr. - RM 620	MAD 4					MAD 6	120	
O'Connor Dr.	RM 620 - Arterial C	---			MAD 4	\$ 1,921,572		100 <sup>3</sup>	
Old Settlers Blvd. (West) / FM 3406	Wyoming Springs Dr. (Sam Bass Rd.) - IH 35 (N)	MAU 4					MAD 6	120	Yes <sup>2</sup>
Old Settlers Blvd. (East)	IH 35 - Greenhill Dr. East	MAD 4	MAD 6	\$ 2,913,490				120	Yes
Old Settlers Blvd. (East)	Greenhill Dr. East - FM 1460	MAD 4	MAD 6	\$ 7,687,424				120	Yes
Palm Valley Blvd. / US 79	IH 35 (N) - N. Mays St./BR IH 35	MAD 6					MAD 8	150	
Palm Valley Blvd. / US 79	N. Mays St./BR IH 35 - FM 1460	MAD 4			MAD 6	\$ 9,091,958	MAD 8	150	
Palm Valley Blvd. / US 79	FM 1460 - CR 122	MAU 4 / MAD 4	MAD 4	\$ 8,240,000	MAD 6	\$ 13,121,194		185	
Palm Valley Blvd. / US 79	CR 122 - FM 685/SH 130 (N)	MAU 4 / MAU4	MAD 4	\$ 10,200,000			MAD 6	185	
Quick Hill Rd. / CR 172	McNeil Rd. - SH 45 (N)	MAU 4	MAD 4	\$ 3,101,323				100 <sup>3</sup>	
Quick Hill Rd. / CR 172	SH 45 (N) - FM 1325	MAU 4	MAD 4	\$ 1,560,133				100 <sup>3</sup>	
Quick Hill Rd. / CR 172	FM 1325 - Greenlawn Blvd.	---			MAD 4	\$ 3,641,062		100 <sup>3</sup>	
Red Bud Ln. / CR 122	US 79 - CR 123	MNR 2	MAD 4	\$ 3,625,272				100 <sup>3</sup>	
Red Bud Ln. / CR 122	CR 123 - Gattis School Rd./CR 168	MNR 2	MAD 2	\$ 4,750,000	MAD 4	\$ 2,847,124		100 <sup>3</sup>	
Red Bud Ln. / CR 122	Gattis School Rd./CR 168 - SH 45 (N)	MNR 2							
RM 620	SH 45 (N) - O'Connor Dr.	MAU 4					MAD 8	120	
RM 620	O'Connor Dr. - Wyoming Springs Dr.	MAU 4					MAD 8	120	
Round Rock Ave. / RM 620	Wyoming Springs Dr. - N. Lake Creek Dr.	MAD 4			MAD 6	\$ 3,316,693	MAD 8	120	
Round Rock Ave. / RM 620	N. Lake Creek Dr. - IH 35 (N)	MAD 4	MAD 6	\$ 6,500,000			MAD 8	120	
Round Rock Ave. / RM 620	At Union Pacific Railroad	---	Grade Separation	\$ 11,000,000					
Sam Bass Rd. / CR 175	New Hope Dr. - FM 1431	MNR 2 / MAD 4					MAD 4		
Sam Bass Rd. / CR 175	FM 1431 - FM 3406	MAU 2			MAD 4	\$ 10,960,958		100 <sup>3</sup>	
Sam Bass Rd. / CR 175	FM 3406 - Meadows Dr. East	MAU 2			MAD 4	\$ 5,646,500		80	
Sam Bass Rd. / CR 175	Meadows Dr. East - IH 35 (N)	MAU 4	MAD 4	\$ 3,820,000				100 <sup>3</sup>	
SH 130	CR 111 - US 79	---	Toll PKY 6						
SH 130	US 79 - Gattis School Rd./CR 168	---	Toll PKY 6						
SH 130	Gattis School Rd./CR 168 - SH 45 (N)	---	Toll PKY 6						
SH 45 (N)	RM 620 - FM 1325/Loop 1	---	Toll PKY 6						
SH 45 (N)	FM 1325/Loop 1 - IH 35 (N)	MAD 6	Toll FWY 6	\$ 90,858,970					
SH 45 (N) / Louis Henna Blvd.	IH 35 (N) - Greenlawn Blvd.	MAD 6	Toll FWY 6	\$ 90,858,970					
SH 45 (N) / Louis Henna Blvd.	Greenlawn Blvd. - AW Grimes Blvd/CR 170	MAD 6	Toll FWY 6	\$ 90,858,970					
SH 45 (N) / Louis Henna Blvd.	AW Grimes Blvd/Grand Avenue Parkway - SH 130 (N)	MAU 4 / ---	Toll FWY 6						
Sunrise Rd.	Chandler Rd./CR 114 - E. Old Settler's Blvd./FM 3406	MAD 4							Yes
Sunrise Rd.	E. Old Settler's Blvd./FM 3406 - US 79	MAU 4					MAD 4	90	

**City of Round Rock Transportation Master Plan Roadway Table**

Round Rock Roadway	Limits	Existing Typical Section	2010 Proposed Typical Section	2010 Total Cost	2020 Proposed Typical Section	2020 Total Cost	Ultimate Proposed Typical Section	Ultimate Right-of-Way	Bicycle Facility
Westinghouse Rd. / CR 111	IH 35 (N) - FM 1460	MNR 2							
Westinghouse Rd. / CR 111	FM 1460 - SH 130 (N)	MNR 2							
Wyoming Springs Dr.	Arterial H - FM 1431	---					MAD 4	100	
Wyoming Springs Dr.	FM 1431 - FM 3406	--- / MAD 4			MAD 4	\$ 6,842,427		110 <sup>3</sup>	Yes
Wyoming Springs Dr.	FM 3406 - Bright Water Blvd./Creek Bend Blvd.	---	MAD 4	\$ 9,156,146				110 <sup>3</sup>	Yes
Wyoming Springs Dr.	Bright Water Blvd./Creek Bend Blvd. - RM 620	1/2 of MAD 4	MAD 4	\$ 3,690,801				110 <sup>3</sup>	Yes
Wyoming Springs Dr.	RM 620 - Arterial C	---			MAD 4	\$ 2,150,843		100	

**Key To Typical Sections:**

FWY - Freeway

PKWY - Parkway

MAD - Major Arterial Divided

MAU - Major Arterial Undivided

MNR - Minor Arterial

--- - No Existing Typical Section

The number after the roadway classification indicates the number of lanes.

A "MAD" roadway is divided by a raised median, flush center left turn lane, or central drainage ditch. The selection is made during the roadway design process.

**Roadway Abbreviations:**

IH / BR IH - Interstate Highway / Business Route Interstate Highway

SH - State Highway

FM - Farm to Market Road

RM - Ranch to Market Road

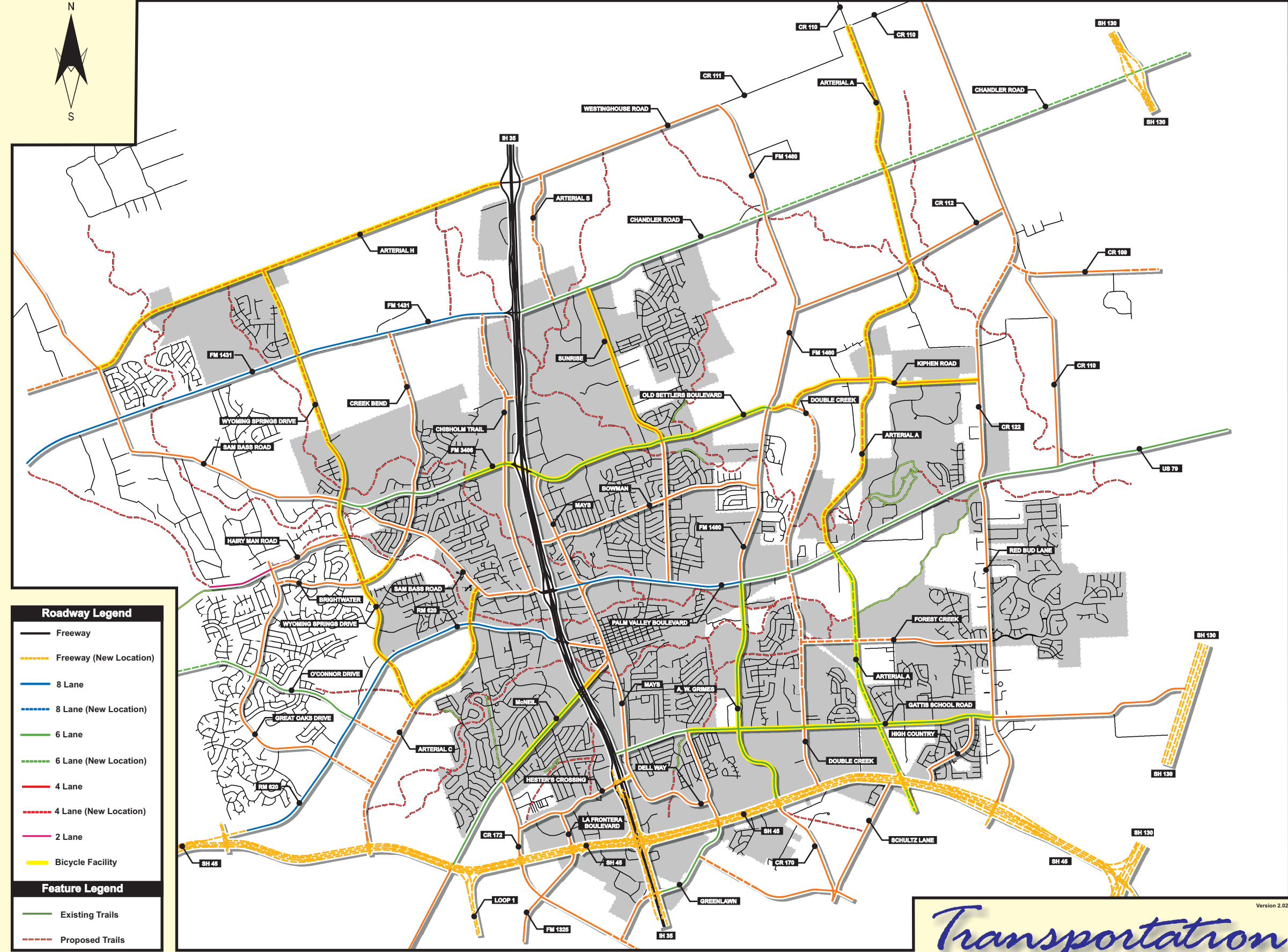
CR - County Road

**Notes:**

1. Bicycle facility from Wyoming Springs Dr. to Deep Wood Dr. only.

2. Bicycle facility from Onion Branch Creek to IH 35 only.

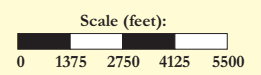
3. Ultimate right-of-way width can accommodate landscaping. Location of landscaping is determined by ordinance or during the roadway design process.



**NOTES:**

1. THE FOLLOWING ROAD SEGMENTS MUST BE COMPLETED IN SEQUENCE, AS DESCRIBED BELOW:
  - ① ARTERIAL C FROM RM 620 TO SH 45.
  - ② ARTERIAL C FROM SAM BASS ROAD TO RM 620.
  - ③ WYOMING SPRINGS DRIVE AND/OR GREAT OAKS DRIVE AND/OR O'CONNOR DRIVE FROM RM 620 TO ARTERIAL C.
2. THIS MAP REFLECTS PROPOSED CORRIDORS ONLY. FINAL ALIGNMENTS WILL BE DETERMINED IN THE SUBDIVISION PLATTING PROCESS.
3. TRAILS ARE SHOWN FOR REFERENCE PURPOSES ONLY AND MAY NOT REFLECT THE MOST RECENT VERSION OF THE TRAIL MASTER PLAN. TRAIL LOCATIONS SHOWN HEREON ARE FOR INFORMATION PURPOSES AND ARE NOT ADOPTED AS PART OF THE TRANSPORTATION MASTER PLAN.

MARCH 2004



**Roadway Legend**

- Freeway
- - - Freeway (New Location)
- 8 Lane
- - - 8 Lane (New Location)
- 6 Lane
- - - 6 Lane (New Location)
- 4 Lane
- - - 4 Lane (New Location)
- 2 Lane
- Bicycle Facility

**Feature Legend**

- Existing Trails
- - - Proposed Trails

*Transportation Master Plan*  
**Ultimate Roadway Network**

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**ROUND ROCK, TEXAS**  
PURPOSE. PASSION. PROSPERITY.

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