Final
Mobile Source Air Toxics Quantitative Analysis

Loop 1604 from SH 16 to I-35

Bexar County, Texas

CSJs: 2452-02-083, 2452-03-087, 2452-03-113, 2452-02-128, and 0072-08-144

June 2020

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT

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1.0 INTRODUCTION

The Texas Department of Transportation (TxDOT) San Antonio District is proposing improvements to Loop 1604 from State Highway (SH) 16 to Interstate Highway (I-) 35 in Bexar County, Texas. The project is approximately 23 miles in length and would not include any toll components. The proposed project is located in northern Bexar County as shown on **Figure 1**, **Project Location Map** in **Attachment A**.

1.1 EXISTING FACILITY

Loop 1604 exists within the project limits as a controlled-access, multi-lane, divided highway with continuous frontage roads (with the exception at the railroad crossing north of Nacogdoches Rd) within an existing right-of-way (ROW) that varies from 300 to 550 feet in width. Between the Loop 1604 main lanes is a grassy center median that is 40 to 60 feet in width, with a cable barrier or concrete barrier and center ditch. In three locations, the two inner paved shoulders meet and are separated by a concrete wall barrier just west and east of I-10, between Voigt Dr and US 281, and at the I-35 intersection. Each direction has 38 to 40 feet of existing main lane pavement configured with two 12-foot lanes, a 4- to 6-foot inside shoulder, and a 12-foot outside shoulder. The current posted speed limit is 70 miles per hour (mph) on the Loop 1604 main lanes from SH 16 to Nacogdoches and 65 mph from Nacogdoches Rd to I-35. The current posted speed limits for the frontage roads vary from 45 mph to 55 mph.

Within the project limits, nineteen grade-separated interchanges exist on Loop 1604, which have signalized frontage road intersections at Bandera Rd/SH 16, Hausman Rd, Kyle Seale Pkwy, Babcock Rd, Chase Hill Blvd/Brenan Ave, La Cantera Pkwy/John Peace Blvd, Vance Jackson Rd, Lockhill Selma Rd, NW Military Hwy, Rogers Ranch Pkwy/Bitters Rd, Huebner Rd, Blanco Rd, Stone Oak Pkwy/Voigt Dr, Gold Canyon Dr, Redland Rd, Bulverde Rd, Nacogdoches Rd, and Gateway Blvd/Point Pkwy. There are seven grade-separated interchanges along Loop 1604, without signalized frontage road intersections at Tradesman Dr, US 281, O'Connor Rd, Judson Rd, Green Mountain Rd, Lookout Rd, and I-35. Several minor, non-signalized "T" intersections and commercial driveways also exist throughout the project limits along the frontage roads in both directions.

1.2 PROPOSED FACILITY

The proposed project would expand Loop 1604 from a four-lane expressway to a ten-lane expressway. The proposed project would include two high-occupancy vehicle (HOV) special purpose lanes (one in each direction) and eight general-purpose lanes (four in each direction). The proposed improvements include continuous sidewalks and bicycle accommodations along the entire length of the project. No new ROW or permanent easements would be required.

The usual proposed typical main lane section of Loop 1604 in the western and eastern portions of the project limits would include 170 feet of pavement, with 85 feet in each direction separated by a 2-foot median with single-slope traffic rail (SSTR). Each direction would be configured with four 12-foot general-purpose lanes, one 12-foot HOV lane, a 4-foot HOV buffer, a 10-foot inside shoulder, and a 10-foot outside shoulder.

A slightly narrower overall pavement width is proposed in areas where cross-sectional elements cannot fit within the existing physical constraints (frontage roads, bridge abutments, etc.). The section of Loop 1604 between I-10 and generally Bulverde Rd contains many such constraints. In these highly constrained areas, the proposed typical main lane section would be reduced to have 140 feet of pavement, with 70 feet in each direction separated by a 2-foot median with concrete barrier. Each direction would be configured with four 11-foot general-purpose lanes, one 11-foot HOV lane, a 4-foot inside shoulder, and a 10-foot outside shoulder.

The improvements to the Loop 1604 frontage roads vary along the corridor. In general, an additional lane is proposed to be added along the frontage roads in locations where an exit ramp from the main lanes connects to the frontage road. This new lane would generally extend to the next cross-street

The proposed project will fully reconstruct the existing I-10/Loop 1604 interchange. New fly-over direct-connector (DC) ramps will provide all freeway to freeway movements. In order to facilitate traffic movements approaching and departing the new DC ramps, existing slip ramps that are in close proximity to the DC connection points will be eliminated.

Along Loop 1604, one HOV lane and three general-purpose lanes will be provided in each direction of travel through the I-10 interchange. Collector-distributor roads will be provided parallel to Loop 1604 which will allow access between Loop 1604 and the frontage roads.

Along I-10, three general-purpose lanes will be provided in each direction of travel through the Loop 1604 interchange. Collector-distributor roads will be provided parallel to I-10 which will allow access between I-10 and the frontage roads.

1.3 PROJECTS SUBJECT TO A QUANTITATIVE MSAT ANALYSIS

Projects may be subject to a quantitative mobile source air toxics (MSAT) analysis if the project is adding capacity, the design year annual average daily traffic (AADT) is over 140,000 vehicles per day (vpd), there is public concern over air quality, or the project will affect an intermodal facility. Since the project would add capacity and the design year traffic volume is above 140,000 vpd, a quantitative MSAT is required to assess the level at which MSAT would increase or decrease as a result of this project. A conference call to discuss the appropriate methodology and years of analysis (i.e., scenario years) was held on January 23, 2019 (see Attachment B). The call participants included representatives from TxDOT Environmental Affairs Division, TxDOT San Antonio District, and the consultant team.

2.0 MSAT QUALITATIVE ANALYSIS

2.1 BACKGROUND

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS)[1]. In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from the 2011 National Air Toxics Assessment (NATA)[2]. These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the Federal Highway Administration (FHWA) considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

2.1.1 Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty

[1] http://www.epa.gov/iris/

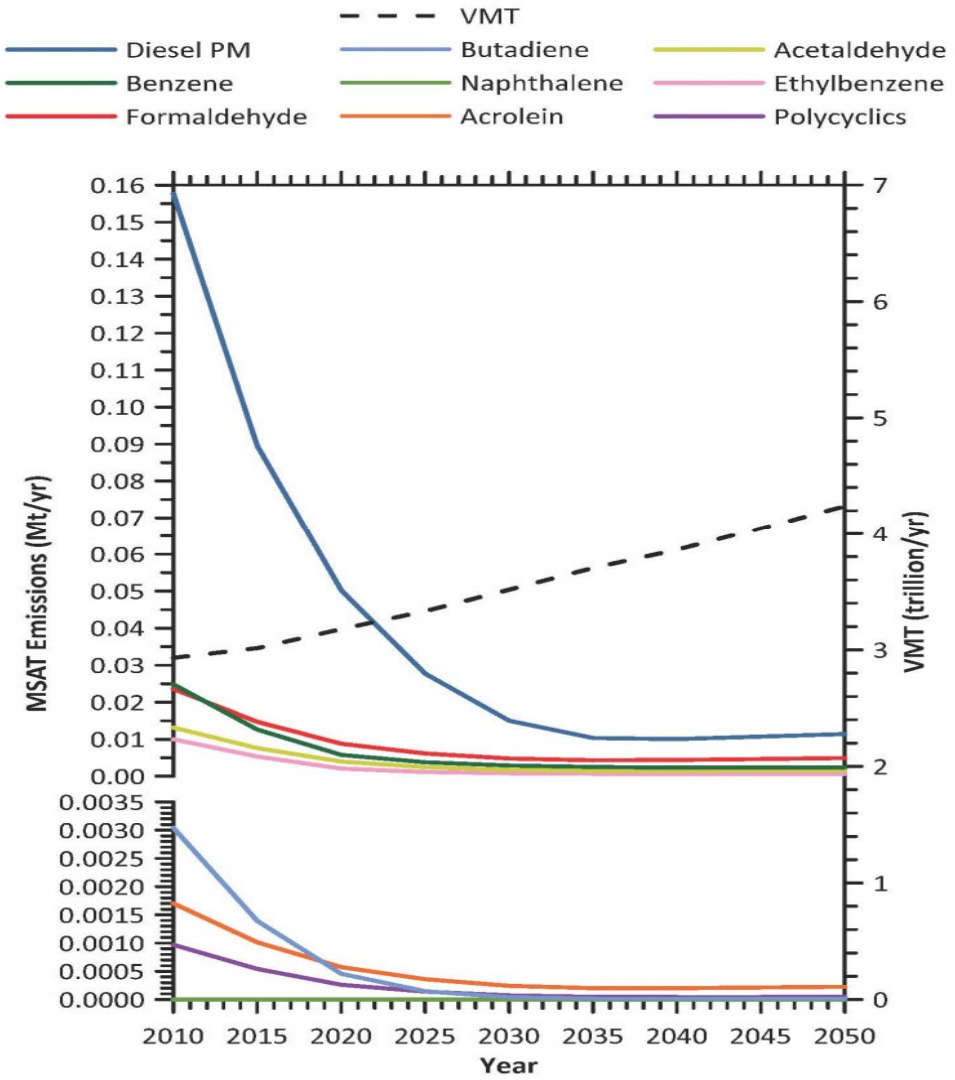
[2] https://www.epa.gov/national-air-toxics-assessment

vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide[3], EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

Using EPA's MOVES2014a model, as shown in **Graph 1**, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

[3] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNR0.txt

Graph 1. FHWA Projected National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model



Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.
Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorological, and other factors.

Diesel particulate matter (PM) is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

2.1.2 MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA). The FHWA, EPA, Health Effects Institute (HEI), and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

2.2 PROJECT SPECIFIC MSAT INFORMATION

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives[4].

The VMT estimated for the Build Alternative is slightly higher than that for the No-Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. The additional travel lanes contemplated as part of the project Build Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under the Build Alternative there may be localized areas where ambient concentrations of MSAT could be higher than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded frontage roadway sections near sensitive receptor locations including between Bandera Road and Hausman Road (both directions), between La Cantera Pkwy and I-10 (both directions), west of the WB Military Road offramp, between Redland Road and Bulverde Road (both directions), and the new frontage road bypass sections between Green Mountain Road and Lookout Road (both directions). However, the magnitude and the duration of these potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

2.3 INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action. Consistent with 40 CFR 1502.22 (regarding incomplete and unavailable information) FHWA does not conduct MSAT health impacts for the reasons described below.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is

[4] https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm

in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents[5]. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations[6] or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI[7]. As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, “[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk[8]”.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an “acceptable” level of risk due to

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[5] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm

[6] HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

[7] Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

[8] EPA IRIS database, Diesel Engine Exhaust, Section II.C. https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642_summary.pdf

emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable[9].

3.0 MSAT QUANTITATIVE ANALYSIS

The approach used in the analysis of MSATs within the NHHIP study area considers the on-road sources for the nine priority MSATs.

The EPA's Office of Transportation and Air Quality has developed the MOVES model. MOVES estimates emissions for mobile sources covering a broad range of pollutants and allows for multiple scale analysis. The latest version of MOVES is MOVES2014b. Per TxDOT MSAT policy, the MSAT quantitative analysis for the proposed project was completed using emission factors generated with MOVES2014 because MOVES2014b emission factors have not yet been developed by TxDOT for Texas MSAT emissions analyses. The MOVES2014 based MSAT emission rate lookup table (ERLT) emission factors for San Antonio available online on the TxDOT Air quality Toolkit web page were used. Since Year 2045 ERLT emission factors do not currently exist, Year 2040 ERLT factors for San Antonio are considered conservative and were thus used as a surrogate for the design year 2045.

The MSAT study area for the quantitative analysis is the same as the project study limits. Therefore, the affected transportation network roadway links include all roadways within the project study limits along both Loop 1604 and I-10 including mainlanes, high occupancy vehicle lanes, frontage roads, direct connectors, and ramps.

The emissions methodology and other modeling parameters (i.e., scenario years) were determined during an MSAT Coordination Call between TxDOT and the consultant team on January 23, 2019 (see **Attachment B**). For the purpose of this MSAT analysis the following scenarios were modeled:

- "Base" or existing condition (2018);
- "Build 2045" scenario; and
- "No-Build 2045" scenario

The MSAT affected transportation networks for 2018 and 2045 are depicted in the maps included in **Attachment A, Figure 2**.

3.1 ANALYSIS RESULTS

The total mass of MSAT emissions in the year 2018 (base) was higher than either the Build or No-Build alternatives in the year 2045. This is reflective of the overall national trend in MSATs as previously described. The mass of emissions associated with the base scenario and Build year are shown in **Table 2-2** and graphically represented in **Graph 2-2**.

For the Loop 1604 MSAT analysis, a base year of 2018 and a design year of 2045 were used; no interim year was chosen for analysis. Emissions were calculated for the Build (proposed project) and No-Build alternatives. In addition, MSAT emissions were also estimated for the base or existing conditions. The numeric results of the MSAT modeling are shown in **Table 1**. These results are

[9] https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf

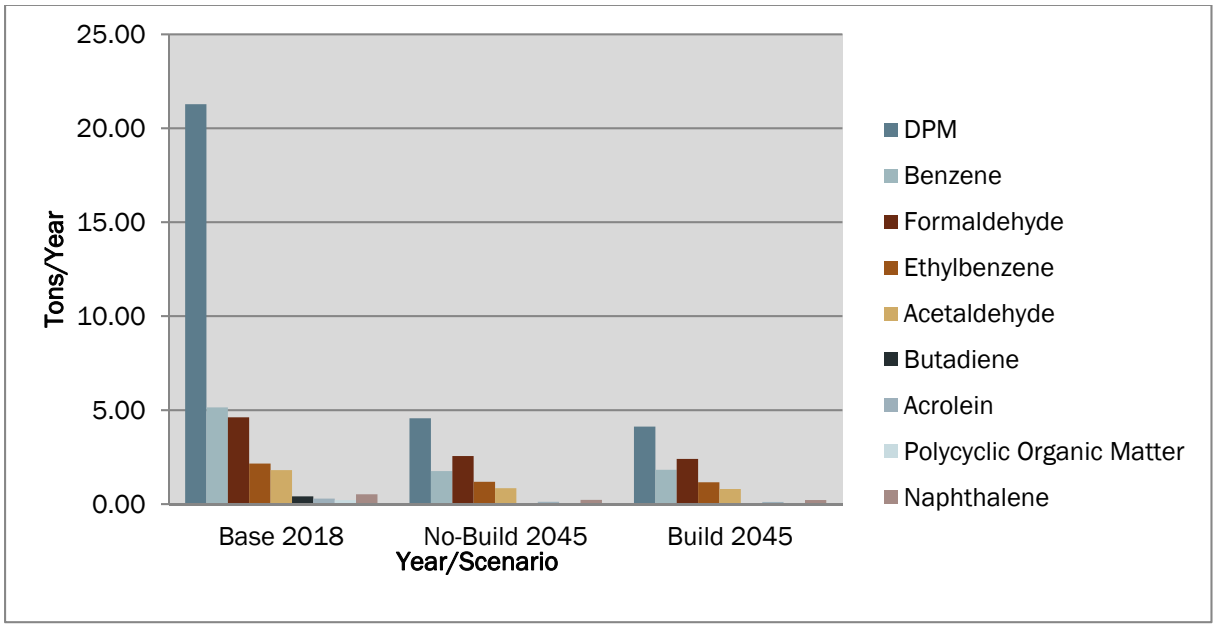
represented graphically in **Graph 2**, which shows emissions for each primary MSAT for each affected transportation network (i.e., base year and design year for build and no-build scenarios), and **Graph 3**, which shows total MSAT emissions as compared to total vehicle miles traveled (VMT) for each affected transportation network.

Table 1. MSAT Emissions by Alternative (Tons/Year)

Pollutant/VMT	Year/Scenario			% Change from 2018	
	2018 Base Year	2045 Design Year		No-Build	Build
		No-Build	Build		
Diesel Particulate Matter (DPM)	21.28	4.56	4.12	-78.6	-80.6
Benzene	5.14	1.75	1.82	-66.0	-64.6
Formaldehyde	4.61	2.55	2.40	-44.7	-47.9
Ethylbenzene	2.15	1.18	1.16	-45.1	-46.0
Acetaldehyde	1.80	0.84	0.80	-53.3	-55.6
Butadiene	0.41	0.02	0.01	-95.1	-97.6
Acrolein	0.29	0.12	0.11	-58.6	-62.1
Polycyclic Organic Matter	0.20	0.05	0.05	-75.0	-75.0
Naphthalene	0.52	0.22	0.21	-57.7	-59.6
Total MSAT (Tons)	**36.40**	**11.29**	**10.68**	**-69.0**	**-70.7**
Total VMT (Miles/Year)	**1,289,389,378**	**2,455,715,441**	**2,542,748,645**	**+90.5**	**+97.2**

Source: Consultant Team (2020). Note: VMT is based on weekday ADT traffic.

Graph 2. Projected Changes in Priority MSAT Emissions by Project Scenario Over Time



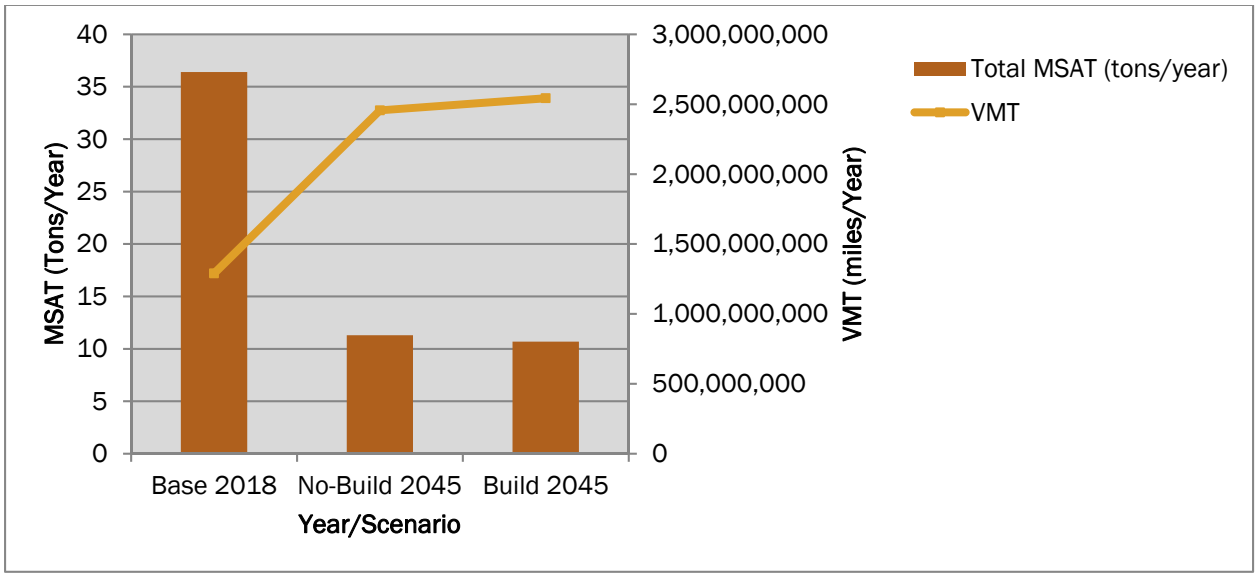
Source: Consultant Team (2020).

The analysis indicates a decrease in total MSAT emissions can be expected for both the Build and No-Build Alternatives (2045) relative to the base year (2018). Emissions of total MSAT are predicted to decrease by approximately 71 percent in the 2045 Build Alternative compared with 2018 levels.

Of the nine priority MSAT compounds, DPM contributes the most to the emissions total in 2018 as well as in 2045 (see **Table 1** and **Graph 2**). In future years, a substantial decline in DPM is anticipated (80.6% reduction from 2018 to 2045 Build Alternative; 78.6% reduction from 2018 to 2045 No-Build).

When total emissions are plotted over time, a decreasing level of MSATs can also be seen (**Graph 3**) while overall VMT continues to rise. The 2045 Build Alternative is expected to generate a 70.7% decrease in total MSAT emissions while the total VMT increases 97.2%; the 2045 No-Build Alternative has a 69.0% decrease in total MSAT and a 90.5% increase in VMT. Even though VMT is highest under the Build 2045 scenario, total MSAT emissions are lower because the additional capacity contemplated as part of the project would allow for higher vehicle speeds.

Graph 3. Total MSAT Emissions and Vehicle Miles Traveled by Alternative (Tons/Year)



Source: Consultant Team (2020).

4.0 CONCLUSION

The VMT for the proposed project Build alternative scenario would increase approximately 97 percent by 2045 when compared to 2018. This increase exceeds the national VMT estimates shown in **Section 2.0 MSAT Qualitative Analysis** of this report. However, **Graph 1** represents national trends of vehicles operating on the entire network of roadways (not project specific) over time. In addition, as disclosed in the same section, the emission trends for specific locations may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors. In the case of the proposed project, the 97 percent estimate represents the project specific network links affected by traffic changes resulting from implementation of the proposed project.

The total MSAT emissions for the Build scenario would decrease an estimated 70.7 percent by 2045. Under the No-Build scenario, the VMT would increase 90.5 percent by 2045 and the total MSAT emissions for the same scenario would decrease an estimated 69.0 percent by 2045. Therefore, total MSAT emissions are expected to decrease by 2045 regardless of whether the Build or the No-Build Alternative is implemented and mitigation strategies for further reductions are not proposed.

On a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be lower in the future. Furthermore, the Corporate Average Fuel Economy (CAFE) law, enacted by Congress in 1975, was designed to reduce energy consumption by increasing the fuel economy of cars and light trucks. The CAFE standards are fleet-wide averages that must be achieved by each automaker for its car and truck fleet, each year, since 1978. The CAFE federal controls are included in the MOVES2014 emission rates used in this analysis.

ATTACHMENT A: PROJECT LOCATION MAP, AFFECTED NETWORK MAPS

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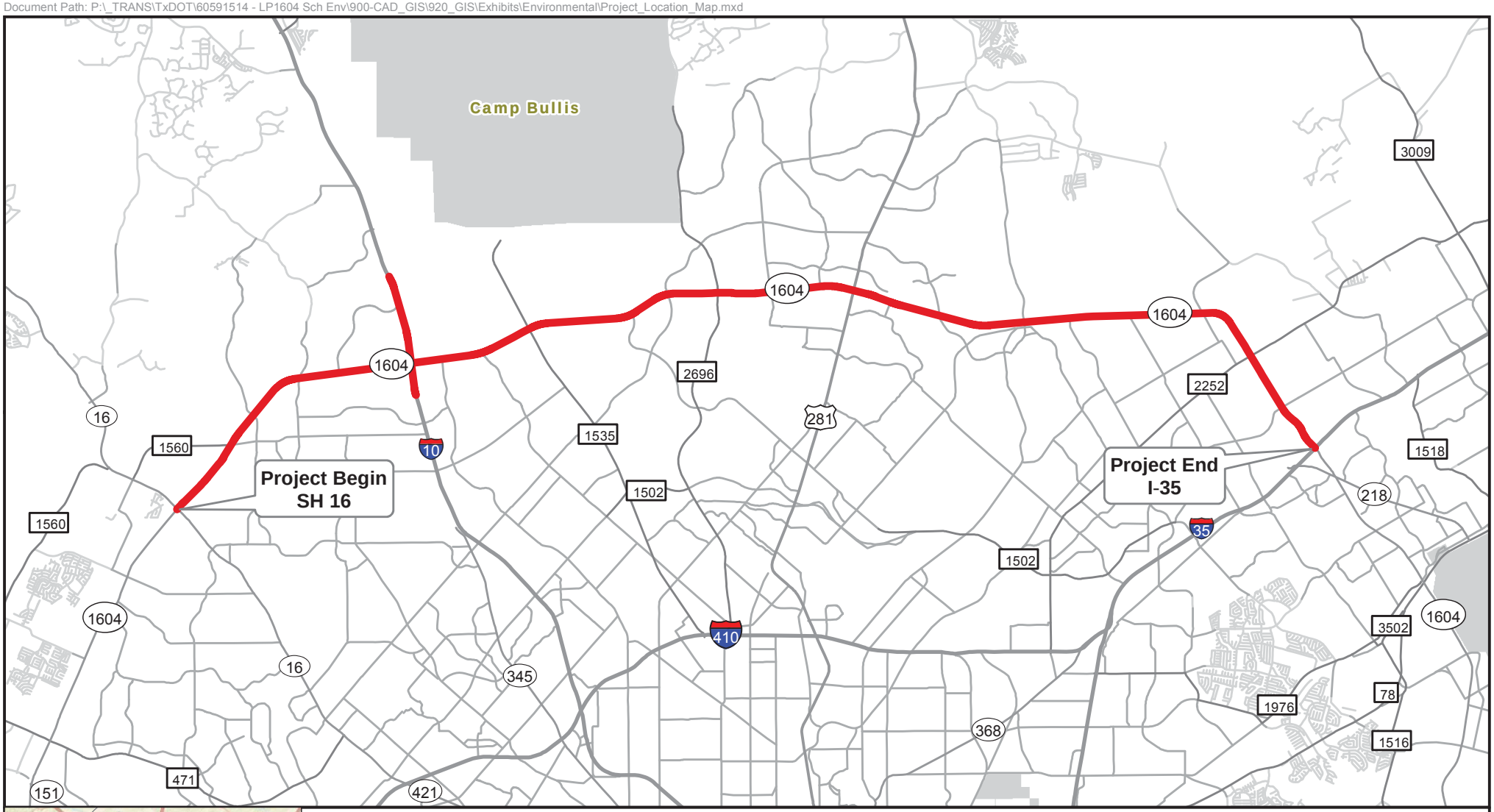

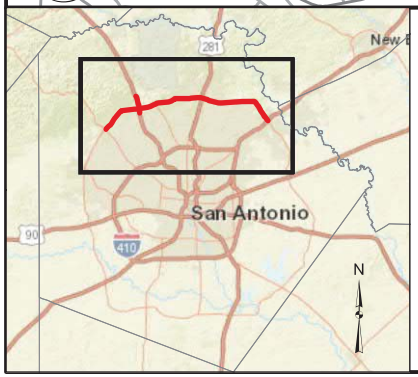

Legend

Project Location

Figure 1
Project Location Map
Loop 1604 from SH 16 to I-35

N

0 1.25 2.5 Miles

Texas Department of Transportation

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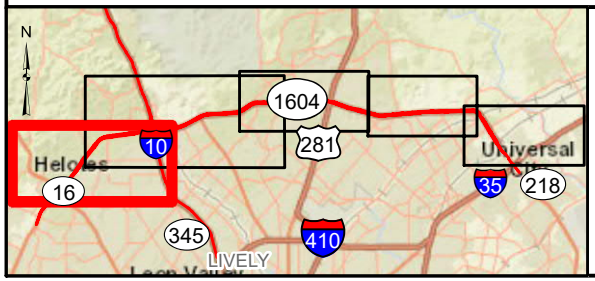

Figure 2a

Existing
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

Existing Roadway Links

N

0 1,700 3,400
Feet

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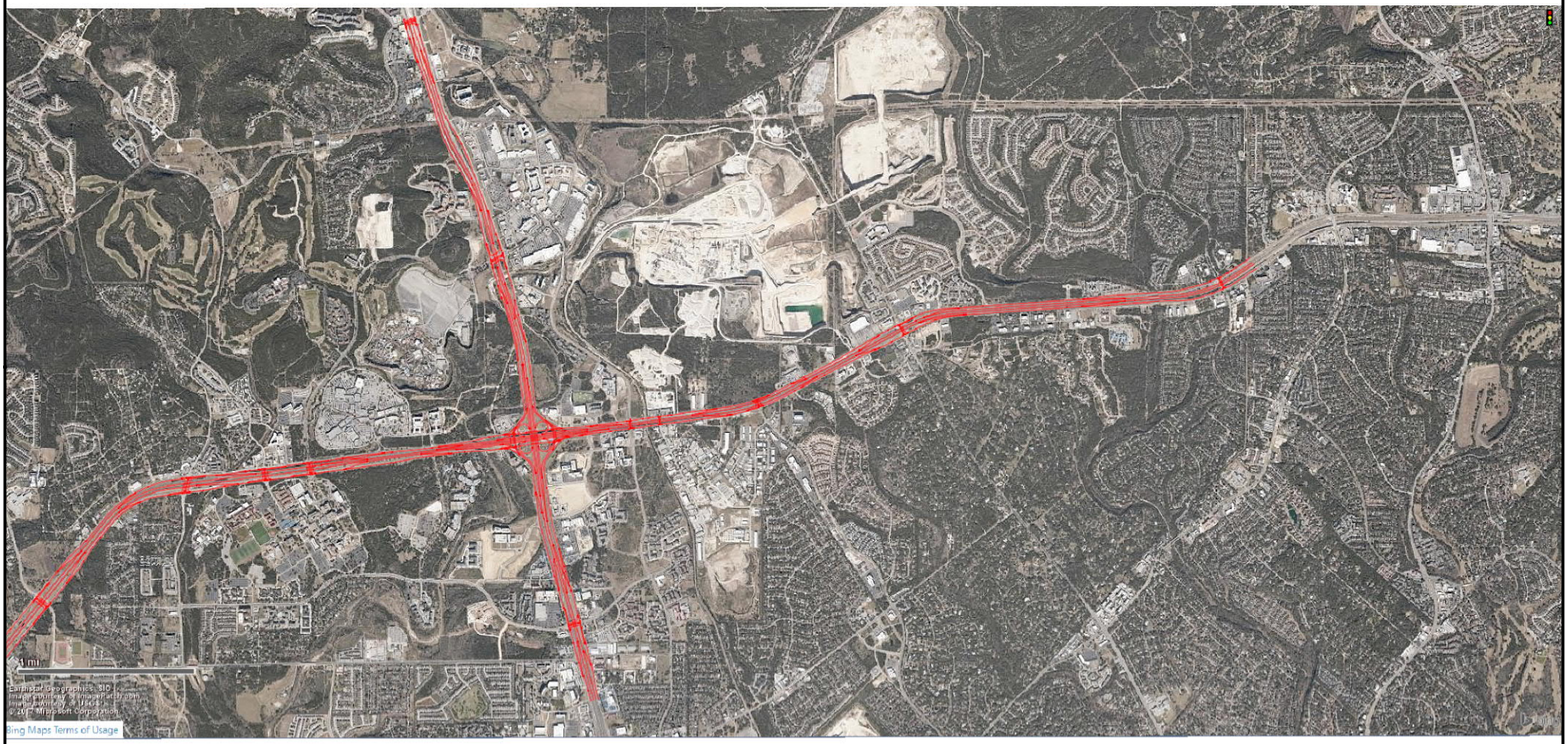

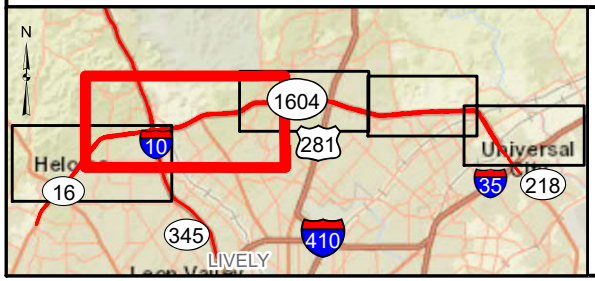

Figure 2a

Existing
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

Existing Roadway Links

N

0 2,125 4,250
Feet

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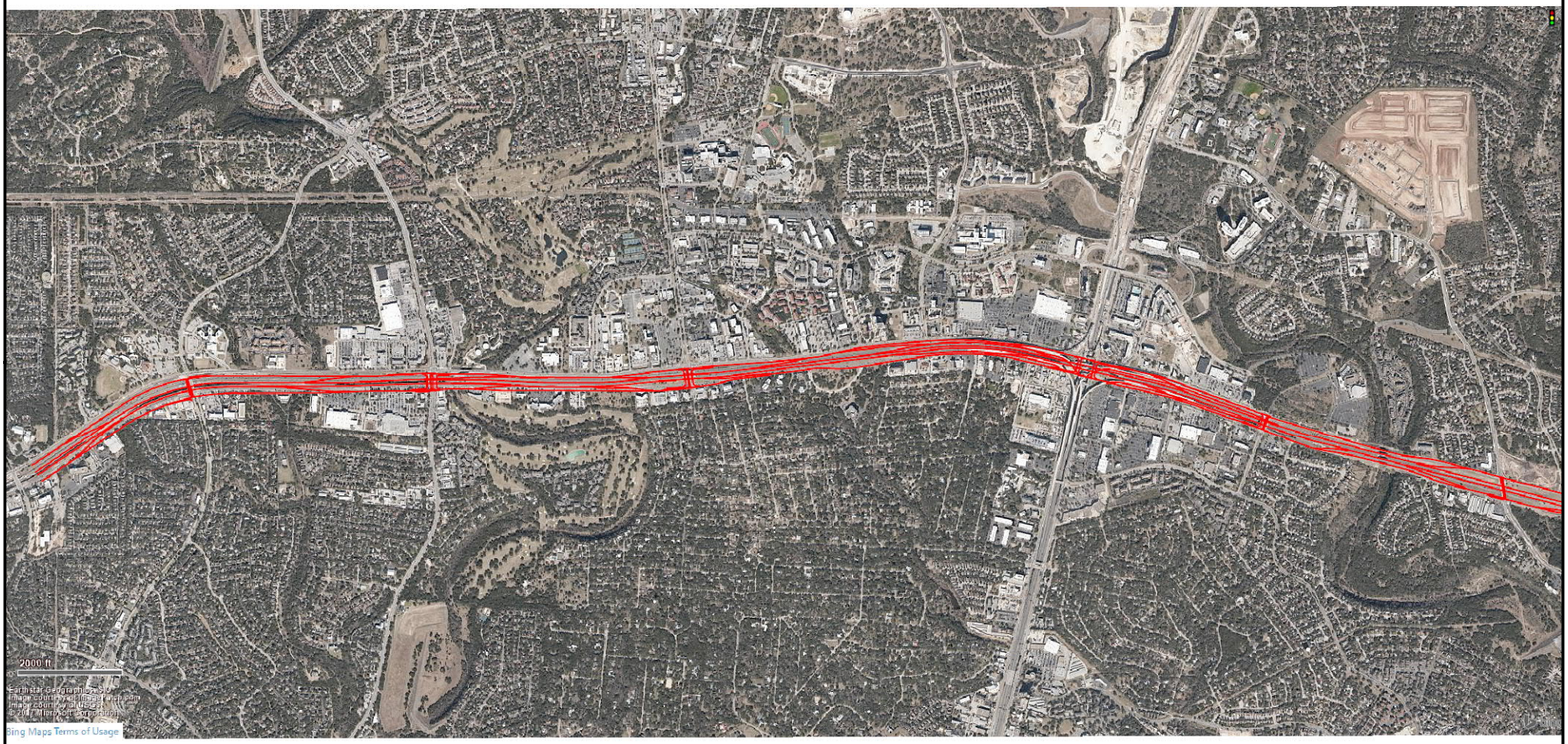

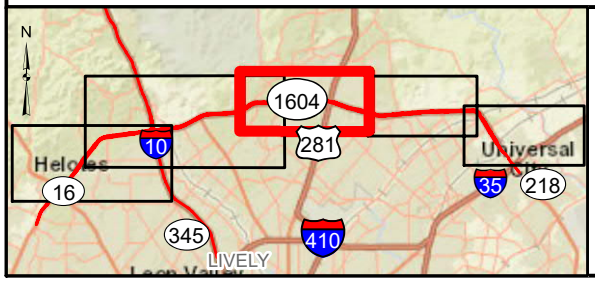

Figure 2a

Existing
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

Existing Roadway Links

N

0 1,375 2,750
Feet

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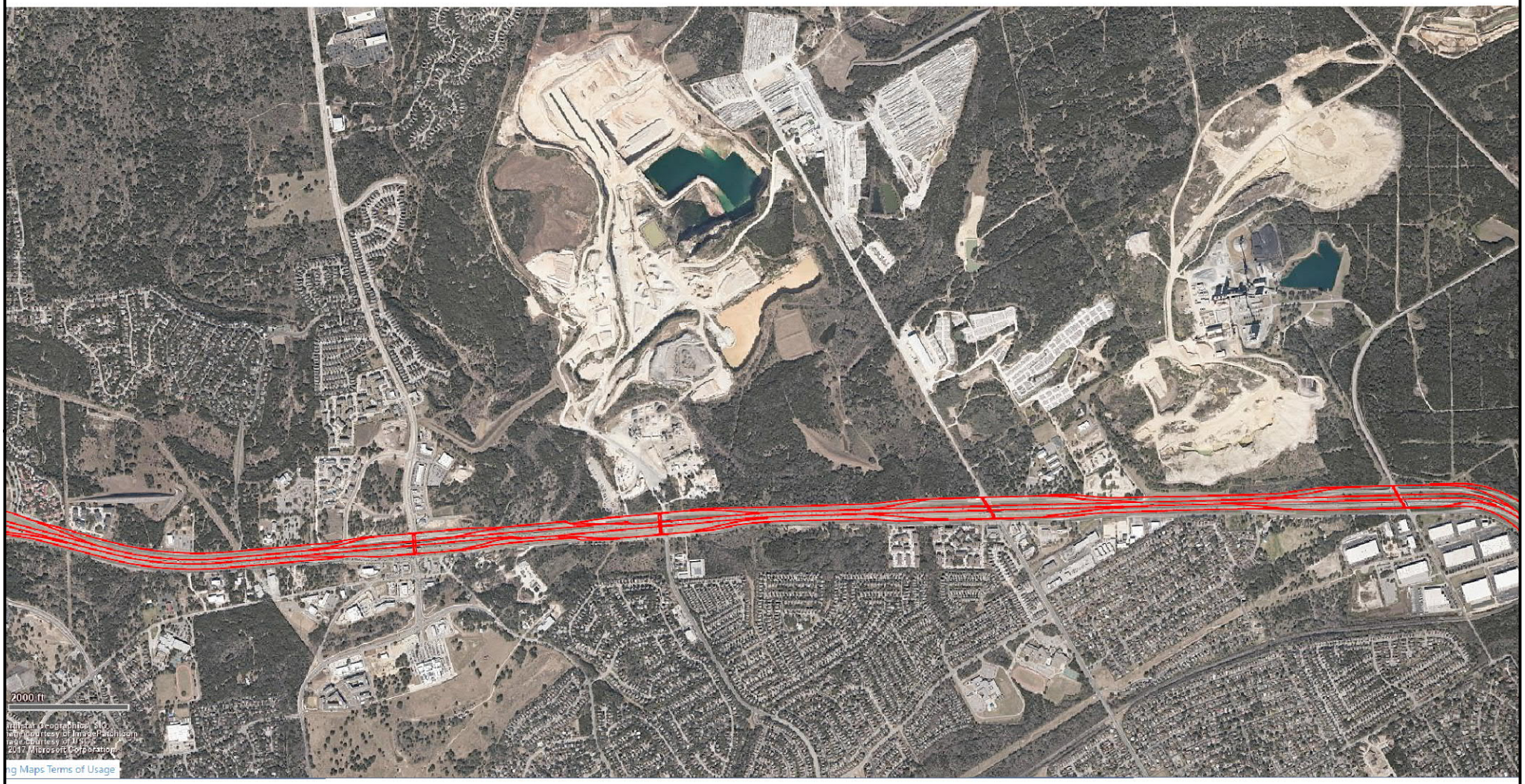

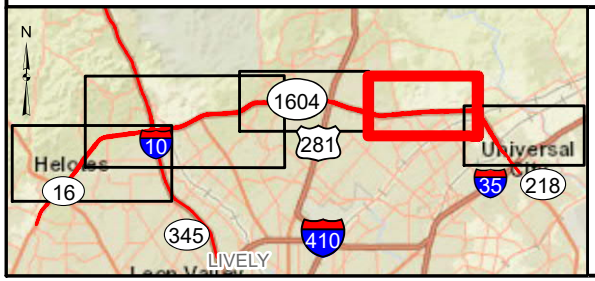

Figure 2a

Existing
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

Existing Roadway Links

N

0 1,150 2,300
Feet

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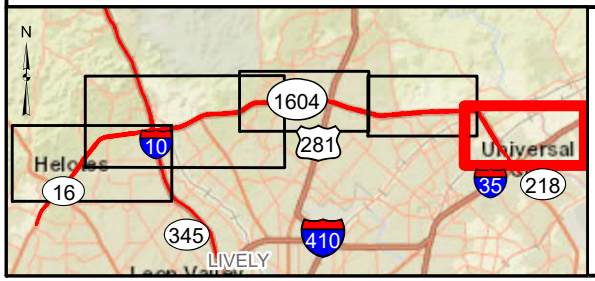


Figure 2a

Existing
Affected Transportation Network

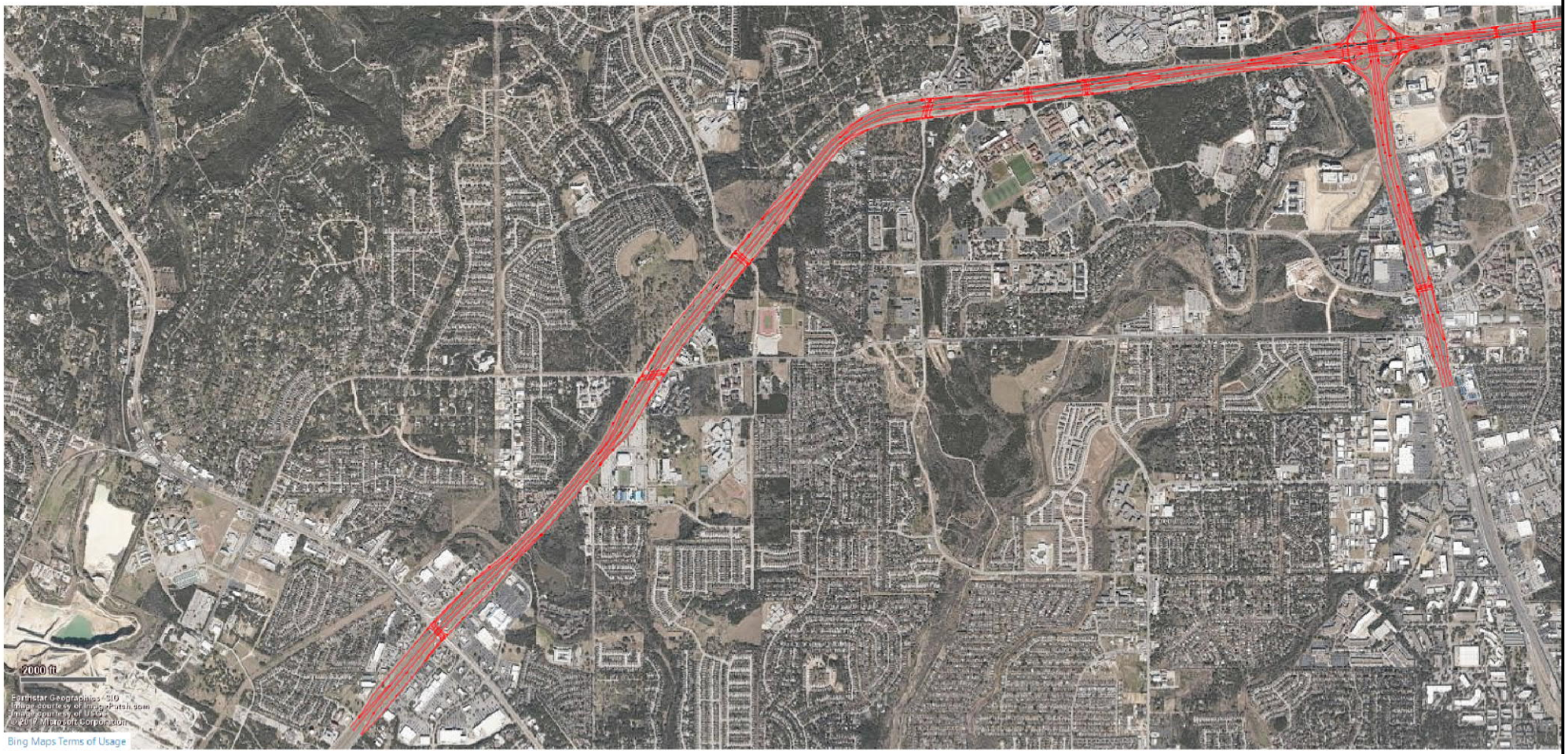
Loop 1604 from SH 16 to I-35

Legend

Existing Roadway Links

N

0 1,250 2,500
Feet



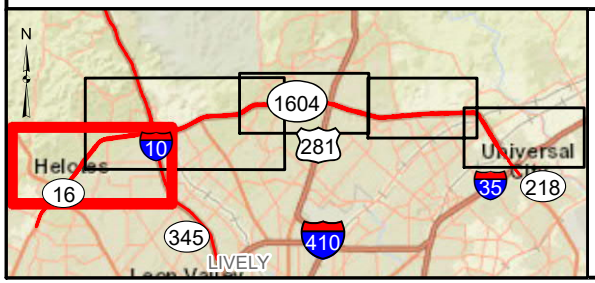


Figure 2b

2045 No Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 No Build Roadway Links

N

0 1,700 3,400
Feet

User Name: LimD Date: 3/3/2020 Document Path: P:_TRANS\TxDOT\60591514-LP1604 Sch_Env\900-CAD_GIS\920_GIS\Exhibits\Environmental\Air\Fig2b_2045NoBuild_AffectedTransNetwork_LP1604.mxd

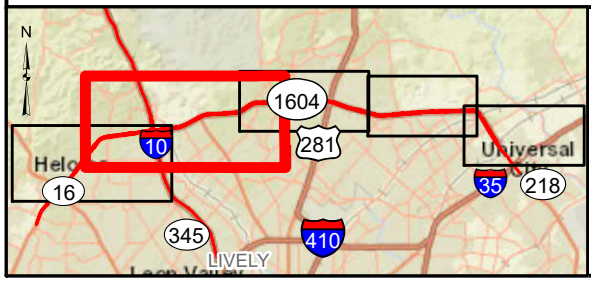


Figure 2b

2045 No Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 No Build Roadway Links

N

0 2,125 4,250
Feet

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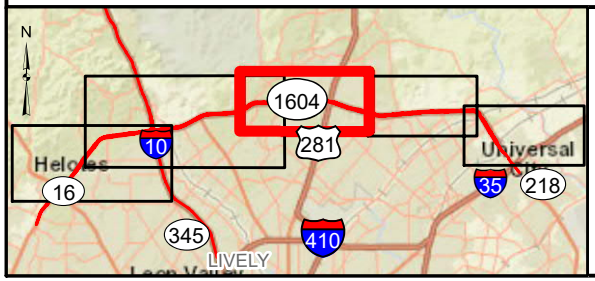


Figure 2b

2045 No Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 No Build Roadway Links

N

0 1,375 2,750
Feet

User Name: LimD Date: 3/3/2020 Document Path: P:_TRANS\TxDOT\60591514-LP1604 Sch_Env\900-CAD_GIS\920_GIS\Exhibits\Environmental\Air\Fig2b_2045NoBuild_AffectedTransNetwork_LP1604.mxd

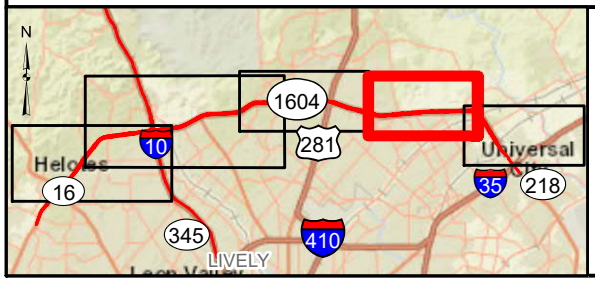


Figure 2b

2045 No Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 No Build Roadway Links

N

0 1,150 2,300
Feet

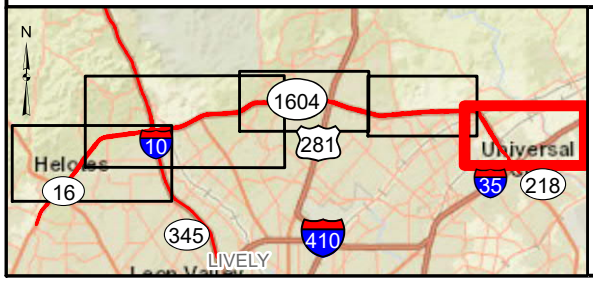


Figure 2b

2045 No Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 No Build Roadway Links

N

0 1,250 2,500
Feet

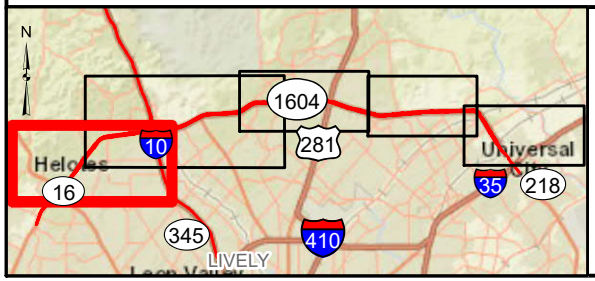


Figure 2c

2045 Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

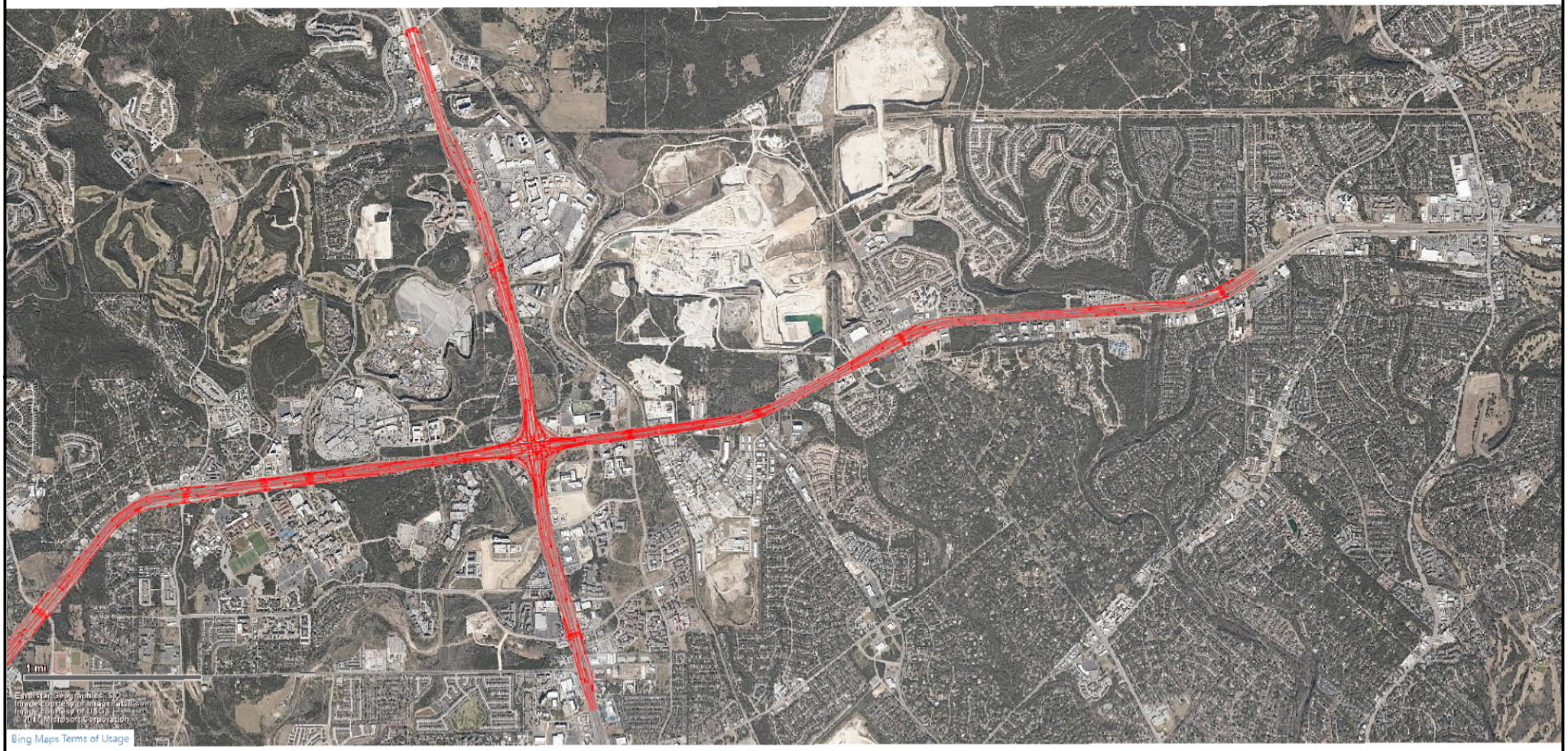
Legend

2045 Build Roadway Links

N

0 1,700 3,400
Feet

User Name: LimD Date: 3/3/2020 Document Path: P:_TRANS\TxDOT\60591514-LP1604 Sch_Env\900-CAD_GIS\920_GIS\Exhibits\Environmental\Air\Fig2c_2045Build_AffectedTransNetwork_LP1604.mxd



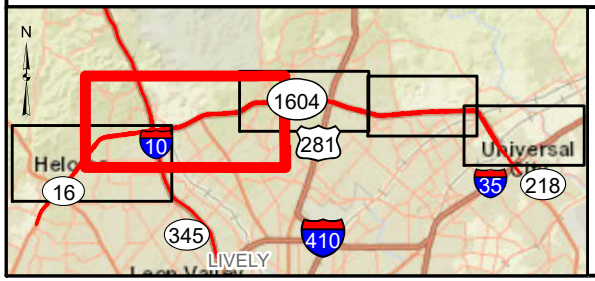


Figure 2c

2045 Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 Build Roadway Links

N

0 2,125 4,250
Feet

User Name: LimD Date: 3/3/2020 Document Path: P:_TRANS\TxDOT\60591514-LP1604 Sch_Env\900-CAD_GIS\920_GIS\Exhibits\Environmental\Air\Fig2c_2045Build_AffectedTransNetwork_LP1604.mxd

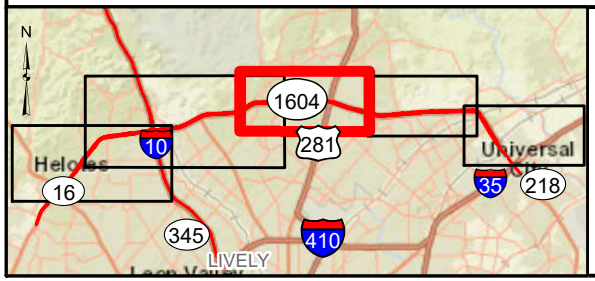


Figure 2c

2045 Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 Build Roadway Links

N

0 1,375 2,750
Feet

User Name: LimD Date: 3/3/2020 Document Path: P:_TRANS\TxDOT\60591514-LP1604 Sch_Env\900-CAD_GIS\920_GIS\Exhibits\Environmental\Air\Fig2c_2045Build_AffectedTransNetwork_LP1604.mxd

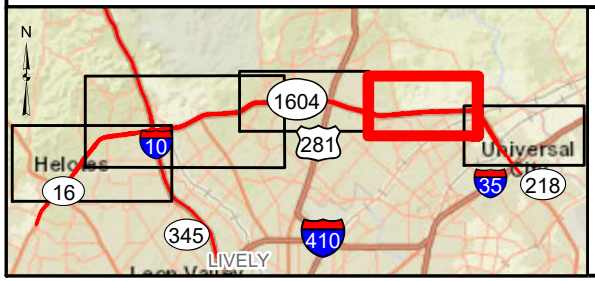


Figure 2c

2045 Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 Build Roadway Links

N

0 1,150 2,300
Feet

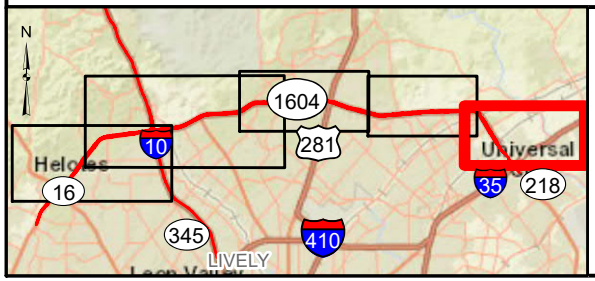


Figure 2c

2045 Build
Affected Transportation Network

Loop 1604 from SH 16 to I-35

Legend

2045 Build Roadway Links

N

0 1,250 2,500
Feet

ATTACHMENT B: MSAT CONSULTATIVE CALL MEETING MINUTES

AECOM

19219 Katy Freeway
Suite 100
Houston, Texas 77094

281 646 2400 tel
281 646 2401 fax

Minutes of Meeting

Date of Meeting	Jan. 23, 2019	Start Time	3:00 pm	AECOM Project Number	60591514
Project Name	Loop 1604 (SH 16 to I-35)				
Location	AECOM Houston and Teleconference				
Attendees	Liang Ding (TxDOT San Antonio District); Tim Wood, Lindsey Kimmitt (TxDOT Environmental Affairs Division); Ashish Loney, Rich Squire, Miranda Maldonado, Bill Tillar (AECOM)				
Distribution	All attendees, John Bryant (TxDOT San Antonio District); via email				
Minutes Prepared By	Miranda Maldonado/Bill Tillar, AECOM				

The following represents the preparer's understanding of the issues discussed and the resolutions agreed upon. Any proposed changes to any item(s) in these minutes must be submitted in writing to the undersigned within seven (7) calendar days of the issue date of these minutes.

Overview – TxDOT San Antonio District and AECOM scheduled a Mobile Source Air Toxics (MSAT) Consultative conference call for the Loop 1604 project. The purpose of the meeting was to determine the parameters for modeling of MSAT and Carbon Monoxide (CO) for the Loop 1604 project.

I. Project Description & History

Rich Squire described the Loop 1604 corridor project and history (Attachment A).

a. The project is an added capacity project and will include the addition of one HOV lane in each direction to be constructed within the median of the existing Loop 1604 roadway. The project will also include a redesign of the Loop 1604 / I-10 interchange.
b. The anticipated environmental approval date is estimated to be January 2020.
c. The Estimated Time of Completion (ETC) year is 2025.

II. Metropolitan Transportation Plan (MTP) Consistency

a. Miranda Maldonado stated that the project is included in the Alamo Area Metropolitan Planning Organization Metropolitan Transportation Plan (MTP); however, the project description is not correct in the MTP (Attachment B). MTP consistency is currently being worked on by TxDOT.

III. MSAT Analysis

a. Analysis Years
   - Because the project will add capacity and have an expected Design Year AADT greater than 140,000 vehicles per day, Tim Wood agreed that the project will require a quantitative MSAT analysis and the years for this project will be: Base Year – 2018 and Design Year – 2045. No Interim Year analysis will be required. Tim Wood asked if there was any known controversy or public concern about air quality due to potential impacts from this project. Miranda Maldonado stated that she does not know about public concerns or controversy regarding project impacts to air quality.

b. Traffic Data

- Rich Squire stated that traffic data for the project is currently being developed by Jacobs/TEDSI under a separate TxDOT contract. Liang Ding stated that TPP Option C Build and No Build Traffic will be provided for the Design Year MSAT analysis. TPP Option C allows the district to review and approve the traffic projections.

c. Emissions Model

- The MOVES2014a based MSAT emission rate lookup table (ERLT) emission factors for San Antonio, available online on the TxDOT Air Quality Toolkit web page, should be used.
- Year 2045 ERLT emission factors do not currently exist. Year 2040 ERLT factors are considered conservative and will be used as a surrogate for 2045.

d. Emissions methodology
- Roadway links for Loop 1604, including I-10 roadway links that are within the project limits, will be used.

IV. CO Analysis

a. Analysis Years
- ETC year: 2025
- Design Year: 2045

b. Traffic Data
- Traffic data currently being developed under a separate TxDOT contract by Jacobs/TEDSI will be used.
- Tim Wood asked Liang Ding if the MPO's model conformity year model was in 2024 and/or 2025. He was concerned if the district wants to let the project earlier that they wouldn't have the project in a conforming model. Liang stated he would check with the MPO to see conformity year availability.

c. Emissions Model
- CALINE3 is being phased out; CAL3QHC will be used.
- TxDOT-approved CO emission rates tables for San Antonio will be used.

d. Receptors

- For the CO TAQA analysis, place receptors at discrete sensitive locations (residences, schools, churches, day care facilities, etc.) located along the right-of-way (ROW) and adjacent to the project.
- Also place CO receptors along the ROW where traffic volumes are the highest.

V. Action Items

a. Liang Ding will check with the MPO to confirm network conformity years in latest MPO plan.

Attachment A

METROPOLITAN TRANSPORTATION PLAN "Mobility 2040"

ALAMO AREA METROPOLITAN PLANNING ORGANIZATION

FY 2019

Updated: December 20, 2018

TxDOT District	County	CSJ	Hwy	Phase	City	Project Sponsor	MPO Proj ID No.	Year of Expenditure Cost
15 - San Antonio	Bexar	2452-01-066	SL 1604	E,R	Other	TxDOT	9110.4	$8,800,000

Limits From: Macdona-Lacoste Rd
Limits To: US 90 W
Description: Expand from 2 lanes to 4 lane divided
Project History: 10/18 - add phases (Engr, ROW)
Last Revision Date: 11/2018

Total Project Cost Information (TxDOT %):

Preliminary Engineering	$4,000,000
ROW Purchase:	$4,800,000
Construction Cost:	$40,000,000
Construction Engineering	$2,552,000
Contingencies:	$516,000
Indirect Costs:	$2,296,000
Other Field	$2,312,000
Total Project Cost:	$56,476,000

Cost of Approved Phases: $40,000,000

Type of Work: Added Capacity: Non Toll Status: Add Cap

Authorized Funding by Category/Share

Funding Categories	Federal	State	Local	Local Contrib	Total
SBPE	$0	$4,000,000	$0	$0	$4,000,000
S102	$3,840,000	$960,000	$0	$0	$4,800,000
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Totals	$3,840,000	$4,960,000	$0	$0	$8,800,000

15 - San Antonio	Bexar	2452-02-083	SL 1604	E,R	San Antonio	TxDOT	3913.2	$81,026,000

Limits From: SH 16
Limits To: US 281
Description: Expand from 4 to 10 lane expressway - including 2 HOV-special purpose lanes, 4 FR lanes & Phase I Direct Connectors at IH 10 W
Project History: 1/19 - rev descr to incl FR lanes; 10/18 - add phases (Engr, ROW)
Last Revision Date: 2/2019

Total Project Cost Information (TxDOT %):

Preliminary Engineering	$36,830,000
ROW Purchase:	$44,196,000
Construction Cost:	$368,300,000
Construction Engineering	$12,692,644
Contingencies:	$17,769,702
Indirect Costs:	$5,077,058
Other Field	$50,770,577
Total Project Cost:	$535,635,981

Cost of Approved Phases: $368,300,000

Type of Work: Added Capacity: Non Toll Status: Add Cap

Authorized Funding by Category/Share

Funding Categories	Federal	State	Local	Local Contrib	Total
SBPE	$29,464,000	$7,366,000	$0	$0	$36,830,000
S102	$35,356,800	$8,839,200	$0	$0	$44,196,000
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Totals	$64,820,800	$16,205,200	$0	$0	$81,026,000

15 - San Antonio	Bexar	2452-03-113	SL 1604	E,R	San Antonio	TxDOT	3786.2	$6,600,000

Limits From: US 281
Limits To: Redland Road
Description: Expand from 4 to 10 lane expressway - including 2 HOV-special purpose lanes & 4 FR lanes
Project History: 1/19 - rev descr to incl FR lanes; 10/18 - add phases (Engr, ROW)
Last Revision Date: 2/2019

Total Project Cost Information (TxDOT %):

Preliminary Engineering	$3,000,000
ROW Purchase:	$3,600,000
Construction Cost:	$30,000,000
Construction Engineering	$1,195,221
Contingencies:	$1,673,310
Indirect Costs:	$478,088
Other Field	$4,780,884
Total Project Cost:	$44,727,503

Cost of Approved Phases: $30,000,000

Type of Work: Added Capacity: Non Toll Status: Add Cap

Authorized Funding by Category/Share

Funding Categories	Federal	State	Local	Local Contrib	Total
SBPE	$2,400,000	$600,000	$0	$0	$3,000,000
S102	$2,880,000	$720,000	$0	$0	$3,600,000
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Totals	$5,280,000	$1,320,000	$0	$0	$6,600,000

Phase: C=Construction, E=Engineering, R=ROW

METROPOLITAN TRANSPORTATION PLAN "Mobility 2040"

ALAMO AREA METROPOLITAN PLANNING ORGANIZATION

FY 2025

Updated: December 20, 2018

TxDOT District	County	CSJ	Hwy	Phase	City	Project Sponsor	MPO Proj ID No.	Year of Expenditure Cost
15 - San Antonio	Bexar	2452-03-087	Loop 1604	E,R,C	Other	TxDOT	3530.0	$230,000,000

Limits From: Redland Road
Limits To: IH 35 North
Last Revision Date: 2/2019
Description: Expand 4 to 10 lane expressway - including 2 HOV -special purpose lanes & 4 FR lanes
Project History: 1/19 - rev descr to incl FR lanes ; 10/18 - move fr FY 27 to FY 25 & rev descr; 4/17 - move fr FY 30 to FY 27 and rev funding; 4/14- move fr FY 18 to FY 30, rev limits and descr; 8/12 - revise description; EIS is underway and project is subject to change

Total Project Cost Information (TxDOT %):

Preliminary Engineering	$5,389,775
ROW Purchase:	$0
Construction Cost:	$230,000,000
Construction Engineering	$4,491,479
Contingencies:	$6,288,071
Indirect Costs:	$1,796,592
Other Field	$17,965,916
Total Project Cost:	

Cost of Approved Phases: $230,000,000

Type of Work: Added Capacity: NonToll Status: Add Cap

Authorized Funding by Category/Share

Funding Categories	Federal	State	Local	Local Contrib	Total
Prop 1/Prop 7	$184,000,000	$46,000,000	$0	$0	$230,000,000
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Totals	$184,000,000	$46,000,000	$0	$0	$230,000,000

15 - San Antonio	Bexar	2452-04-014	SL 1604	C	San Antonio	TxDOT	9108.0	$0

Limits From: IH 10 East
Limits To: FM 1346 - Houston Street
Last Revision Date: 11/2018
Description: Expand from 2 lanes to 4 lane divided
Project History: 10/18 - cancel (reconfigured into 2451-04-016 and 2452-04-017); 3/18 - revise funding distribution; 4/17 - add project; added w/ 12/8/14 adoption of the MTP

Total Project Cost Information (TxDOT %):

Preliminary Engineering	$0
ROW Purchase:	$0
Construction Cost:	$0
Construction Engineering	$0
Contingencies:	$0
Indirect Costs:	$0
Other Field	$0
Total Project Cost:	$0

Cost of Approved Phases: $0

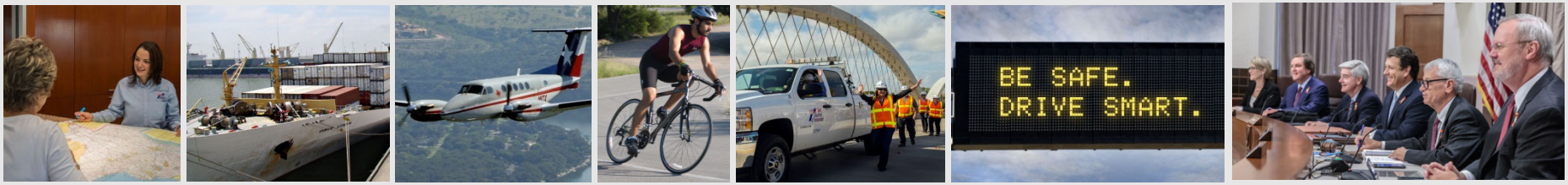
Type of Work: Added Capacity: Non - Toll Status: Add Cap

Authorized Funding by Category/Share

Funding Categories	Federal	State	Local	Local Contrib	Total
2 - Metro Corridor	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Totals	$0	$0	$0	$0	$0

Phase: C=Construction, E=Engineering, R=ROW

Attachment B

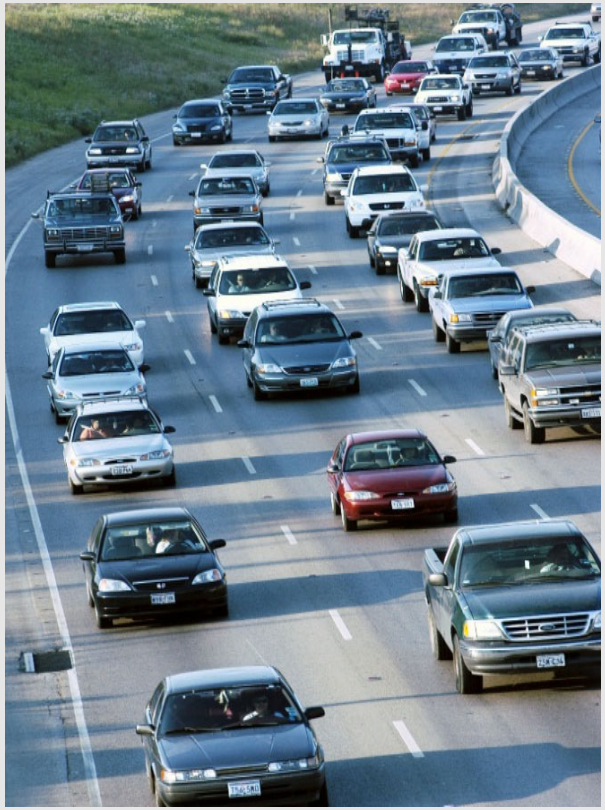


LOOP 1604 SCHEMATIC DESIGN

CSJ: 2452-02-083, 2452-03-113, 2452-03-087

FROM: SH 16

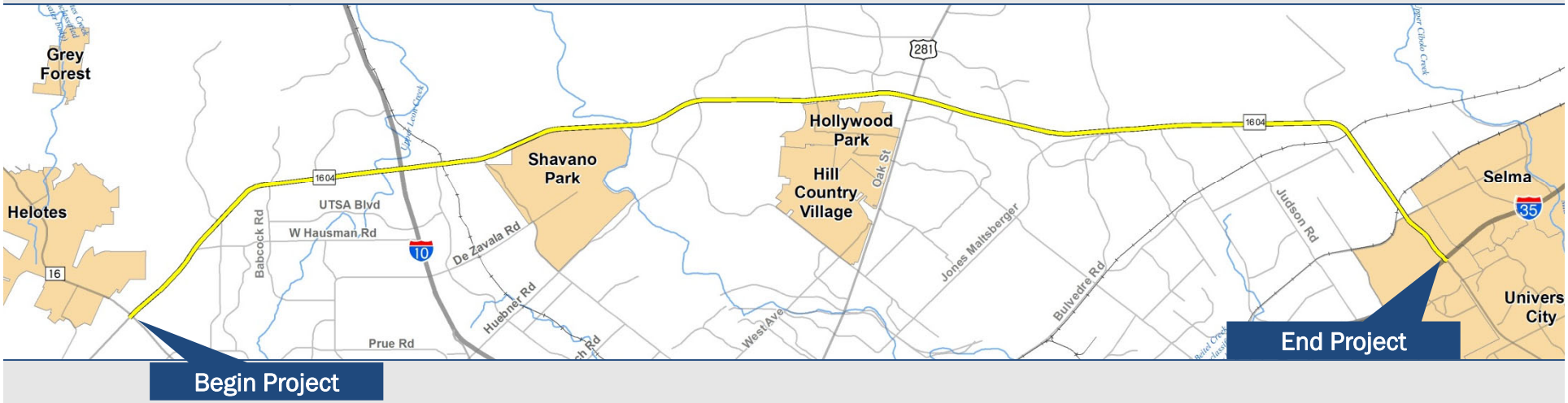
TO: I-35



LP 1604 Air Quality Meeting

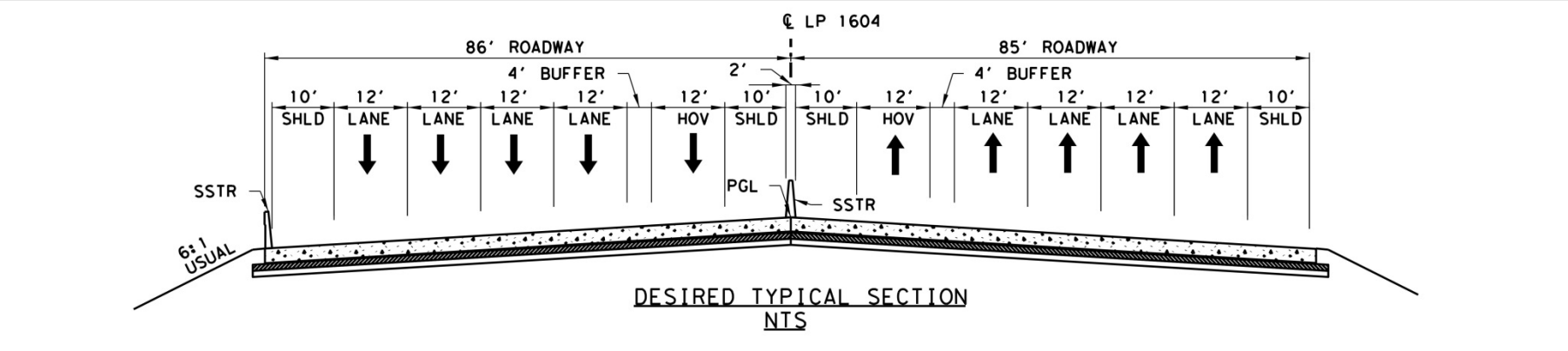
Jan 23, 2019

Project Overview – Existing Conditions



- <u>Project Limits:</u> SH 16 (Bandera Rd) to I-35
- <u>Project Length:</u> Approx. 22 mi.
- <u>Existing Facility:</u>
  - 2 – 3 general purpose lanes in each direction
  - Continuous frontage roads
  - Cloverleaf interchange at I-10

Proposed Typical Section



Desirable Typical Section

In locations where Desirable Section will not fit, the sections will drop a travel lane