METRORapid Inner Katy Project

CATEGORICAL EXCLUSION

Technical Memorandum
December 2022

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Acronyms

A list of common acronyms used throughout this document and their definitions is provided below.

AAI	All-Appropriate Injury
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
APAE	Affected Property Assessment Reports
APE	Area of Potential Effects
AUL	Activity and Use Limitation
AV/CV	Automated Vehicle/Connected Vehicle
BFE	Base Flood Elevation
BMP	Best Management Practices
BOOST	Bus Operations Optimized System Treatments
BRT	Bus Rapid Transit
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CBD	Central Business District
CE	Categorical Exclusion
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CI/ASCE	Construction Institute/American Society of Civil Engineers
CMAQ	Congestion Mitigation and Air Quality Improvement
CNP	CenterPoint Energy
CO	Carbon Monoxide
CO TAQA	Carbon Monoxide Traffic Air Quality Analysis
CPTED	Crime Prevention Through Environmental Design
CWA	Clean Water Act
dB	Decibels
dBA	A-Weighted Decibels
DHHS	Department of Health and Human Services
DPM	Diesel Particulate Matter
EaDo	East Downtown
ERIS	Environmental Risk Information Service
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FTA	Federal Transit Administration
FUDS	Formally Used Defense Site
GHCCS	Greater Houston Coalition for Complete Streets
GHG	Greenhouse Gas
GIS	Geographic Information System

GLO	General Land Office
GWCC	Groundwater Contamination Case
HCS	Highway Capacity Software
H-GAC	Houston-Galveston Area Council
HGB	Houston-Galveston-Brazoria
HIST TANK	Historic Leaking Tank
HOV	High Occupancy Vehicle
IHW CORRACTS	Industrial Hazardous Water Corrective Actions
IOP	Innocent Owner/Operator Program
IPAC	Information for Planning and Consultation
Ldn	Day-Night Sound Level
Leq	Equivalent Sound Level
LOS	Level of Service
LPA	Locally Preferred Alternative
LPST	Leaking Petroleum Storage Tank
LRT	Light Rail Transit
MBTA	Migratory Bird Treaty Act
METRO	Metropolitan Transit Authority of Harris County
METRONext	METRONext Moving Forward Plan
MHRA	Memorial Heights Redevelopment Authority
M-K-T	Missouri-Kansas-Texas
MOT	Maintenance of Traffic
MPH	Miles Per Hour
MRA	Multiple Resource Area
MS4	Multiple Separate Storm Sewer System
MSAT	Mobile Source Air Toxics
MSD	Municipal Setting Designation
$MTCO_2E$	Metric Tons of Carbon Dioxide Equivalent
MVEBs	Motor Vehicle Emissions Budgets
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFRAP	No Further Remedial Action Planned
NHD	National Hydrography Dataset
NHHIP	North Houston Highway Improvement Project
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NPL	National Priorities List
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
NWTC	Northwest Transit Center
O_3	Ozone
OSHA	Occupational Safety and Health Administration

OTHM	Official Texas Historical Markers
PCB	Polychlorinated Biphenyl
PCN	Pre-Construction Notification
PIP	Public Involvement Plan
PM	Particulate Matter
PPM	Parts Per Million
PRP	Potentially Responsible Parties
ROW	Right-of-Way
RTEST	Rare, Threatened, and Endangered Species of Texas
RTHL	Recorded Texas Historic Landmarks
RTP	Regional Transportation Plan
SAL	State Antiquities Landmark
SEMS	Superfund Enterprise Management System
SHWS	State Hazardous Waste Site
SIP	State Implementation Plan
SOC	Sequencing of Construction
SOV	Single Occupancy Vehicle
SPCA	Society for the Prevention of Cruelty to Animals
SSHS	Site-Specific Health and Safety
SUE	Subsurface Utility Engineering
SW3P	Storm Water Pollution Prevention Plan
TAC	Transportation Advisory Committee
TARL	Texas Archeological Research Laboratory
TASA	Transportation Alternatives Set-Aside
TCEQ	Texas Commission on Environmental Quality
TDM	Travel Demand Management
Texas CMP	Texas Coastal Management Program
THC	Texas Historical Commission
THDD	The Houston Design District
TIP	Transportation Improvement Program
TIRZ	Tax Increment Reinvestment Zone
TPC	Transportation Policy Council
TPDES	Texas Pollutant Discharge Elimination System
TPH	Total Petroleum Hydrocarbons
TPWD	Texas Parks and Wildlife Department
TSCA	Toxic Substances Control Act
TSM	Traffic System Management
TSWQS	Texas Surface Water Quality Standards
TxDOT	Texas Department of Transportation
TxMUTCD	Texas Manual on Unified Traffic Control Devices
TxNDD	Texas National Diversity Database
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCP	Voluntary Cleanup Program
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

1. Introduction

The Metropolitan Transit Authority of Harris County (METRO), in coordination with the Federal Transit Administration (FTA) as the lead federal agency, has prepared a documented Categorical Exclusion (CE) in accordance with FTA's regulations on implementing the National Environmental Policy Act (NEPA) (23 CFR §771.118). This CE evaluates construction of a dedicated rapid transit route (I-10 Katy corridor) between I-610 and Downtown Houston with connections to Downtown and Uptown in Houston, Texas.

The METRONext Moving Forward Plan (METRONext) is the approved transit plan designed to enhance regional mobility and ease traffic congestion throughout the Houston region. The plan was developed with the input of the community and addresses the growing demand for the expansion of public transit. METRONext is a $7.5 billion plan that includes investments in METRORapid Bus Rapid Transit (BRT), Light Rail Transit (LRT), Regional Express, Local Bus, Bus Operations Optimized System Treatments (BOOST), Park and Rides, and Transit Centers. In August 2019, the METRO Board of Directors adopted the METRONext Plan. In November 2019, voters overwhelmingly approved the METRONext Plan authorizing bonding capacity of $3.5 billion to be used toward the implementation of the plan.

The METRORapid Inner Katy Project (Inner Katy Project) is one of the five new rapid transit corridors identified in the METRONext Plan. METRO applied for and received project funding for the Inner Katy Project through the Houston-Galveston Area Council's (H-GAC) 2018 Transportation Improvement Program (TIP) Call for Projects. The project has been identified as a top regionally significant project by the H-GAC Transportation Policy Council (TPC) receiving grant funding for development and implementation. Refer to **Appendix A** for a copy of the TIP/Regional Transportation Plan (RTP) for the proposed project.

The Inner Katy Project is designed to close the gap in METRO's Regional Express network on the I-10 Katy Freeway, while also providing a high capacity, rapid transit connection between Downtown and Uptown. With implementation, this project will expand capacity on an existing shared roadway facility on the Inner Katy corridor, addressing the impacts of high traffic volumes, growing congestion, and delays on commuter services. This project will also improve regional connectivity and transit accessibility. In addition, the project is being designed to accommodate future automated vehicle/connected vehicle (AV/CV) buses.

METRO is working on the development, implementation, and management of the Inner Katy Project in partnership with the Texas Department of Transportation (TxDOT). A key element of the Inner Katy Project has been the close coordination with TxDOT along with regional and local agencies and stakeholders. Together, METRO and TxDOT plan to develop new, sustainable, and multimodal solutions along the I-10 Inner Katy corridor to provide improved connectivity between Downtown,

Uptown, and West Houston, serving the needs of local communities and creating a more resilient and accessible corridor.

2. Purpose and Need

The Inner Katy Project is designed to provide a dedicated rapid transit route connecting Downtown and Uptown in the I-10 Inner Katy corridor. The alignment will also enhance Regional Express commuter service originating from the western and northwestern portions of the METRO service area. The project is identified as a top regional priority that responds to the need to relieve the impacts of increased traffic congestion, to improve travel reliability, to close the gap in the Regional Express infrastructure network on I-10, and to enhance transit connectivity and accessibility on both METRO's high-capacity rapid transit and local bus service network.

The transportation needs for the project include:

- Provide expanded capacity on I-10 West to relieve impacts of high traffic levels, congestion, and unreliability on commuter services. The Inner Katy corridor between Downtown and the I-610 West Loop is one of the Houston region's most traveled and congested freeways. This segment of I-10 operates at or near capacity during peak periods. The congestion and the travel time unpredictability impact all users of the Inner Katy corridor, including transit riders. The Inner Katy Project will expand the capacity on the Inner Katy corridor by providing express, reliable service, enticing commuters to use transit. As a result, this proposed transit service will relieve the impacts of high traffic volumes, travel delays, and unreliable commuter travel times.

- Close the gap in Regional Express infrastructure. Presently in the Inner Katy corridor, (between I-610 and the IH 45/IH-10 split), METRO carries thousands of daily Regional Express passenger trips originating from Park & Ride facilities that serve the I-10 West and US 290 corridors. Where available, the METRO Regional Express buses operate in the high occupancy vehicle (HOV) lanes. However, there is a critical piece of the Regional Express network that is missing within the Inner Katy corridor. A 3.3-mile gap forces these Regional Express buses to operate in the general-purpose auto and truck traffic lanes and mixed traffic. By closing the gap, service on the Regional Express buses will be more reliable and will allow METRO to add more Regional Express services in the future.

- Close the major gap in METRO's high capacity, rapid transit network between Downtown and Uptown. Downtown and Uptown, located approximately six miles apart, are two of the largest employment and activity centers in the region. Presently, a gap exists in METRO's high capacity, rapid transit network between the activity centers. By connecting the two, patrons will have the ability to make a rapid transit connection to and from Downtown and Uptown and will also be connected to the multiple rapid transit corridors, including the METRORail Red, Purple, and Green Lines, and the METRORapid Silver Line and the future METRORapid University Line, creating a true rapid transit network.

- Improve connectivity to METRO's local route network to enhance access to housing, jobs, and economic and social opportunities. With the strategic placement of station locations along the corridor, transit riders have greater opportunities to connect to local routes to access the job locations and neighborhoods located along the corridor. This project also will serve as a stimulus and provide an incentive to advance more walkable, accessible mixed-use development in the vicinity of stations.

- Provide a rapid transit connection between Downtown, Uptown and the planned high-speed rail terminal. The Texas High-Speed Rail project is currently in the planning stages and the Inner Katy Project is designed to be extended, providing a critical link that will offer a fast, efficient trip from the terminal to Downtown and Uptown with connections to other regional destinations.

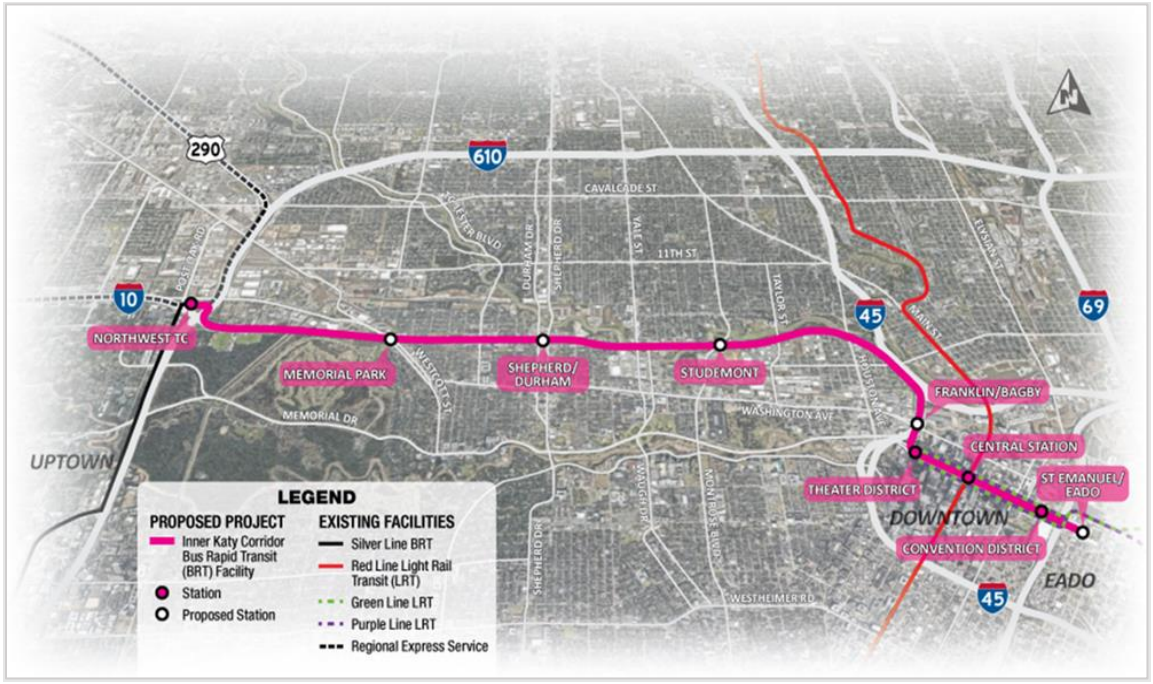
3. Proposed Action

3.1 Overview

The Inner Katy Project would provide a vital east-west BRT connection along the Houston region's busiest travel corridor, the Inner Katy corridor between I-610 and Downtown Houston and close a major gap in the Regional Express network through implementation of an exclusive, bi-directional transit busway. The exclusive busway would accommodate METRORapid BRT service, Regional Express Park & Ride bus service, and express bus service along the Inner Katy corridor.

The project would begin at Northwest Transit Center (NWTC) and continue east along the south of I-10 on an approximately four-mile-long elevated guideway to Downtown Houston. Once in Downtown, the project would continue along the street pairings of Capitol and Rusk Streets to St. Emanuel Street. The project is divided into two segments: the Inner Katy Segment and Downtown Segment. The Inner Katy Segment would be grade-separated on new and existing structures. The Downtown Segment would be street running. The project would include five new stations – three in the Inner Katy Segment and two in the Downtown Segment. In addition to the new stations, the project would also utilize the existing NWTC and three existing METRORail Green and Purple Lines stations along Capitol and Rusk Streets in Downtown at Theatre, Central and the Convention District Stations. **Exhibit 3-1** depicts the project alignment and stations.

Exhibit 3-1: METRORapid Inner Katy Project



3.2 Inner Katy Segment

The Inner Katy Segment extends from NWTC to Downtown at I-45. It would be in existing state-owned right-of-way (ROW), except for several station locations that would require ROW acquisition. The Inner Katy Segment would use the existing HOV ramp from the NWTC, crossing over I-10, and then transition to the four-miles elevated guideway just along the south frontage road of I-10 in the vicinity of Washington Avenue and Westcott Street. The elevated structure would have one lane in each direction plus shoulders and bypass lanes at station areas. **Exhibit 3-2** shows a typical cross section of the elevated busway facing east.

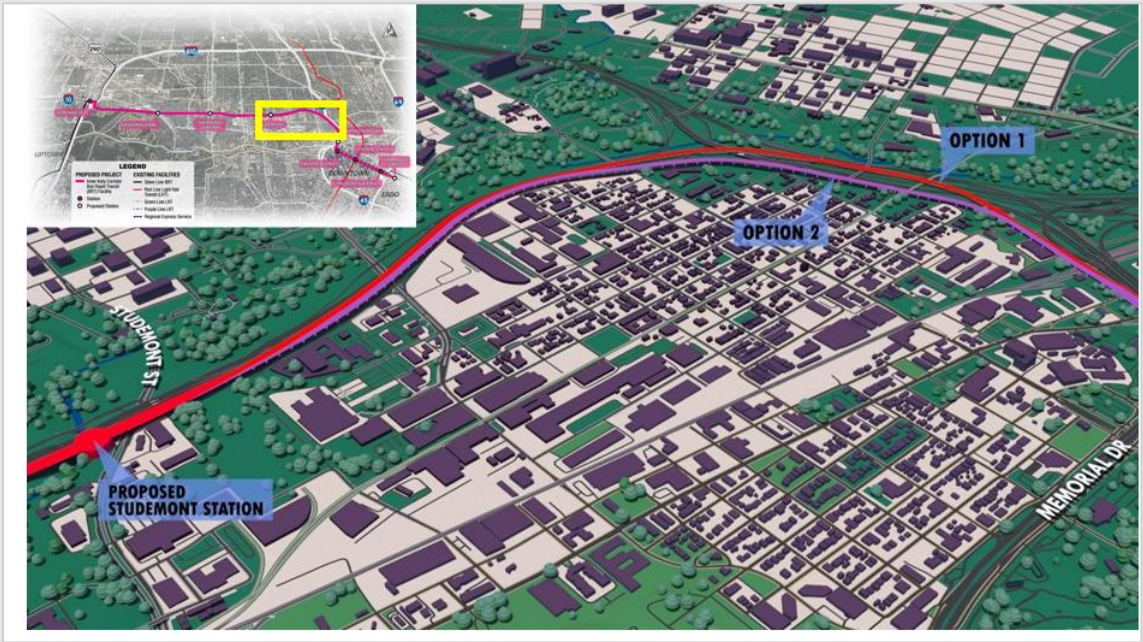
Exhibit 3-2: Typical Cross Section of the Elevated Busway

East of Studemont Street, METRO is advancing two design options. Option 1 is the concept that was developed during the METRONext Long Range Plan and was the basis for the project's 2018 regional funding application. Option 1 consists of an exclusive busway on an elevated structure located along the south side of I-10 that ties back to the existing Central Business District (CBD) ramp into downtown. Option 2 is similar to Option 1 and consists of an exclusive busway along the south side of I-10 but accounts for the TxDOT North Houston Highway Improvement Project (NHHIP), the planned reconstruction of I-45 north between Downtown Houston and the North Sam Houston Tollway. The NHHIP calls for the partial removal of the CBD ramp. Under Option 2, the exclusive busway would not transition to the CBD ramp near Houston Avenue but would instead continue along the south side of I-10 toward Downtown and transition to the remaining segment of the CBD ramp, just north of Franklin Street. Refer to **Figures 3-1 (Option 1)** and **Figure 3-2 (Option 2)** in **Appendix B** for schematic layouts of both options.

The NHHIP is currently on hold and being reviewed by the Federal Highway Administration (FHWA). While TxDOT has restarted design work on portions of the NHHIP, the area closest to the

METRORapid Inner Katy Project remains on hold with timing of construction currently undetermined. **Exhibit 3-3** shows the difference between Options 1 and 2.

Exhibit 3-3: Options 1 and 2 East of Studemont Street



3.3 Inner Katy Segment Stations

Within the Inner Katy Segment, the project would have three new stations from west to east in addition to the existing NWTC: Memorial Park Station at I-10 and Westcott Street, Shepherd/Durham Transit Center Station at I-10 between Durham and Shepherd Drives, and Studemont Station at I-10 and Studemont Street. The station locations would be located adjacent to the guideway to provide local access to the METRORapid service, connect with key destinations, and improve access to METRO's BOOST and local bus transit services. Near station areas, the elevated guideway would also have bypass lanes to allow the Regional Express and express services to continue to and from Downtown without interim stops.

Proposed Memorial Park Station

The proposed Memorial Park Station would be located where Washington Avenue and Westcott Street merge south of I-10. The station would be near the northeast entrance to Memorial Park, a major regional recreation destination. This station would offer access to the area local bus service and to a new BOOST route that will operate along Washington Avenue. **Exhibit 3-4** is a rendering of the proposed Memorial Park Station.

Exhibit 3-4: Proposed Memorial Park Station Rendering Facing Northwest

Proposed Shepherd/Durham Station

The proposed Shepherd/Durham Station would be located alongside the eastbound frontage road between Shepherd Drive and Durham Drive. As envisioned in METRONext, this station would also serve as a major transit center to accommodate transfers between the Inner Katy BRT and existing north-south METRO bus routes. The transit center would be located just across the street from the I-10 frontage road and would connect to the station area via an aerial pedestrian bridge. The transit center would also connect with the network of bicycle lanes being developed by the City of Houston along the Shepherd Drive/Durham Drive corridor providing a multimodal connection at a key transit hub. **Exhibit 3-5** is a rendering of the proposed Shepherd/Durham Station and Transit Center.

Exhibit 3-5: Proposed Shepherd/Durham Station and Transit Center Facing Southeast

Proposed Studemont Station

The proposed Studemont Station is the easternmost station along the Inner Katy Segment and is adjacent to Studemont Street. The station would be accessible from both the street and the White Oak Bayou Trail. The surrounding area has been rapidly redeveloping with new and renovated retail and residential space. METRO's newest BOOST Route 56 Airline/Montrose operating along Studemont Street would provide additional transit connections. **Exhibit 3-6** is a rendering of the proposed Studemont Station.

Exhibit 3-6: Proposed Studemont Station Facing North

3.4 Downtown Segment

The Downtown Segment begins at the end of the CBD ramp at Franklin Street. From there the BRT buses would travel down Bagby Street where they would connect to the one-way street pairings of Capitol and Rusk Streets and continue east to St. Emanuel Street in the East Downtown (EaDo) neighborhood using the METRORail Green and Purple Lines ROW and existing three station locations:

- Theater District Station at Smith Street
- Central Station between Fannin Street and San Jacinto Street
- Convention Center Station at Avenida de las Americas

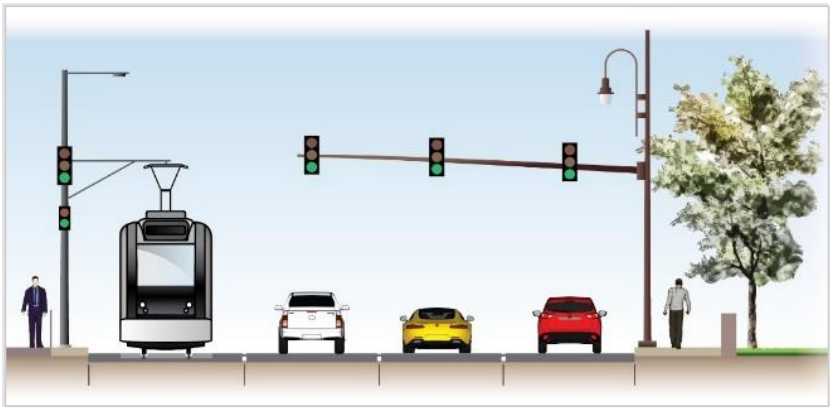
The project would feature a new exclusive transit lane for the BRT and light rail transit (LRT) with improvements to signal timings to safely accommodate buses and trains in the exclusive lane. The LRT is currently operating along the south side of Capitol Street (left lane) and Rusk Street (right lane) with mixed general vehicular traffic. By interlining the BRT operations in the curb lanes along

Capitol and Rusk Streets, METRO is maximizing use of existing infrastructure and creating an east-west transit corridor.
This alignment only applies to the METRORapid operations. There will be no change to the existing Regional Express and express service and alignments in Downtown.

In addition to retrofitting upgrades to the existing three light rail stations along Capitol and Rusk Streets, two new at-grade station platforms would be constructed: Franklin/Bagby Station and St. Emanuel/EaDo Station. **Exhibit 3-7** is a map of the Downtown Segment and associated station locations. **Exhibit 3-8** depicts typical cross sections of the Downtown Segment.

Exhibit 3-7: Downtown Segment and Associated Station Locations

Exhibit 3-8: Downtown Segment Typical Cross Sections



3.5 Downtown Segment Stations

Proposed Franklin/Bagby Station

The Franklin/Bagby Station would be located on a City of Houston owned property bordered by I-45 and Franklin, Bagby, and Preston Streets in the northwest corner of Downtown. This station is included in the analysis due in part to stakeholder comments that supported the location, suggesting the location is near the new POST Houston development and the Amtrak Station. The station location also supports economic development in the area and responds to the need for greater connectivity in the northern portion of Downtown. **Exhibit 3-9** shows the conceptual rendering of the Franklin/Bagby Station.

Exhibit 3-9: Proposed Franklin/Bagby Station Rendering Facing South

Proposed St. Emanuel/EaDo Station

The St. Emanuel/EaDo Station would be located on St. Emanuel Street between Capitol and Rusk Streets just outside Downtown, serving the EaDo neighborhood. This location provides the opportunity for a turnaround and station at the end of the BRT line. The station would serve PNC Stadium and the proposed EaDo Cap Park that is planned to be built over the depressed freeway in conjunction with NHHIP. Exhibit 3-10 shows the conceptual rendering of the St. Emanuel/EaDo Station.

Exhibit 3-10: Proposed St. Emanuel/EaDo Station Rendering Facing North

3.6 Operations

Transit service that would be operated on the proposed Inner Katy transit guideway includes METRORapid Inner Katy BRT service, Regional Express service connecting US 290 and I-10 West to Downtown Houston, and express buses. The headway for the Inner Katy BRT service would be six minutes for all day service. METRO plans to use 60-foot articulated buses. Fifteen buses would be acquired to operate with six-minute headways and to maintain a spare ratio of 20 percent. The Regional Express headway would be 5 to 15 minutes during the peak periods with the AM peak being between 5 AM and 9 AM and the PM peak being between 3 PM and 7 PM. The off-peak service, between 9 AM and 2 PM, will operate with 30-minute headways.

3.7 Ridership

Preliminary estimates suggest that the projected 2045 daily passenger trips carried on the Inner Katy guideway would be 42,000, including 12,000 from Inner Katy BRT service and 30,000 from Regional Express and Express bus services.

Initial analysis reflects a BRT travel time from the NWTC to the proposed St. Emanuel/EaDo Station end of line station with seven stops to run about 22 minutes. The Regional Express routes would experience a 25 percent travel time savings on the Inner Katy corridor as a result of the ability to operate in an exclusive transit guideway from the NWTC to Downtown.

3.8 Schedule

Upon completion of the National Environmental Policy Act (NEPA) process, the preliminary engineering may commence in early 2023. Construction is scheduled to potentially begin in late 2023 and service is scheduled to begin in 2027.

3.9 Estimated Cost

The estimated costs for Options 1 and 2 would be $469 million and $565 million in 2021 dollars, respectively. The project is included in the H-GAC TIP and will be funded to a large extent by Congestion Mitigation and Air Quality Improvement (CMAQ) Program funding authorized by the H-GAC TPC. The local share of the costs will be provided by METRO, taking advantage of the available bonding capacity approved by voters in 2019. METRO will also explore other funding opportunities that may become available as a result of the newly enacted U.S. Federal Infrastructure Bill.

3.10 Current and Related Projects

Throughout the Inner Katy Project planning and conceptual engineering process, METRO has been in constant conversations with its regional partners, including TxDOT, City of Houston, Memorial Park Conservancy, Memorial Heights Redevelopment Authority/Tax Increment Reinvestment Zone (TIRZ) 5, FTA, and others to ensure impacts are limited and the project supports and complements other planned improvements in the area and along the corridor. As the Inner Katy Project would be in TxDOT ROW, communication, and coordination with TxDOT are critical and ongoing.

There are projects at various stages of development that are in or adjacent to the Inner Katy corridor and could potentially impact the Inner Katy Project. The following six projects are presently moving forward and are of interest relevant to the Inner Katy Project:

- **I-10/I-610 West Loop Pedestrian Bridge** – In conjunction with the construction of the dedicated bus lanes from the NWTC to Post Oak Boulevard constructed as part of the METRORapid Silver Line project, TxDOT is also planning to construct a pedestrian/shared use bridge over I-10. The design for the bridge has been completed. TxDOT is finalizing the approval process and plans to solicit bids for construction in 2022. This bridge will provide pedestrians and cyclists on the south side of I-10 a safe connection to the NWTC and the Inner Katy Project.
- **Memorial Park Trail Connector/I-10 Pedestrian Bridge** – TxDOT is planning to build a new trail connector to Memorial Park and pedestrian bridge over I-10 from the Cottage Grove neighborhood. The project complements the TIRZ 5 and City of Houston plans to extend the Missouri-Kansas-Texas (M-K-T) Trail under TC Jester Boulevard. The 14-foot-wide bridge would improve access to Memorial Park for pedestrians and cyclists coming from north of I-10. It will parallel the existing pedestrian/utility bridge. In addition, a new trail to Memorial Park running approximately 0.4-mile parallel to the south side of I-10 to Washington Avenue will be constructed under the railroad and is proposed to be cut into the sloped concrete embankment. Close coordination with TxDOT is ongoing to ensure integration of the intersection improvements at Washington Avenue and I-10 frontage road to accommodate the Inner Katy Project guideway structure, transit station, and the new park trail.
- **NHHIP** – TxDOT is planning a multi-billion-dollar project to reconstruct and improve I-45 from US 59/I-69 at Spur 527 to Beltway 8 North. The project is divided into three segments. The southern segment from US 59/I-69 to I-10 includes the reconstruction of the I-10/I-45 interchange and the rerouting of a portion of I-10. These proposed improvements will impact the Inner Katy Project's access to Downtown. The Inner Katy Segment Option 2 was developed to address Downtown access in response to the planned TxDOT improvement. In addition, the NHHIP project could delay the construction of the St. Emanuel station. In that event, the project would temporarily end at the Convention District station and METRO would provide a temporary layover area for buses in Downtown. Construction of the St. Emanuel/EaDo station could be delayed several years until the completion of the Rusk and Capitol bridges over I-45.
- **I-10 White Oak Bayou Reconstruction Project** – TxDOT is proposing to reconstruct a section of the general-purpose lanes on I-10 in the vicinity of White Oak Bayou north of Downtown to raise the highway above and out of the White Oak Bayou Floodway. The improvement on I-10 is approximately 1.25 miles and the project will tie in with the NHHIP improvements.
- **I-10 Inner Katy Managed Lanes Project** – TxDOT is examining alternatives to provide Express/Managed lanes within the Inner Katy corridor. The Express/Managed lanes would be separated from the exclusive transit guideway and will provide non-transit, high capacity, express vehicles with dedicated lanes for faster, safer, and more reliable travel along the

Inner Katy corridor. The express/managed lane options being analyzed include depressed, at-grade, and elevated alignments. The analysis is underway, and alternatives are being refined. The eastern extension of the express/managed lanes are expected to tie into the NHHIP Managed Lanes in the future.

- **Memorial Heights Redevelopment Authority (MHRA)/TIRZ 5 Shepherd and Durham Major Investment Project and City of Houston Shepherd/Durham Improvements** – The Shepherd/Durham Improvement Project includes roadway and intersection improvements and lane reduction from four lanes to three in each direction, and the addition of bicycle lanes and reconstruction of widened sidewalks along both Shepherd and Durham Drives. The improvement project extends along Shepherd Drive and Durham Drive from I-610 to Washington Avenue. The project is divided into multiple phases. The first phase of the project extends from I-610 to 15th Street and includes bicycle and pedestrian amenities in the Heights area, north of the proposed METRORapid transit center. Construction on this phase is underway. Phase 2 of the project, which extends south from 15th Street to just north of I-10, is funded and currently in final design. Construction is anticipated to begin in later 2022. The City of Houston is responsible for the Shepherd/Durham Improvement Project that will extend south of I-10 to Washington Avenue. This section of the project currently is not funded, but the City is exploring various funding scenarios. These improvements will connect with the transit center and provide an enhanced neighborhood connection to the regional transit center and METRORapid service.
- **Inner Katy Drainage Improvements** - The I-10 main lanes between I-610 West and Patterson Road experienced flooding during recent major storm events which impacted mobility and access for local and regional destinations. TxDOT proposes to make drainage improvements in this area consisting of new detention pond(s), improved outfalls, and upgrades to pump stations and storm sewer pipes. The project includes the proposed purchase of new right-of-way (ROW) to construct a detention pond near the Union Pacific Railroad crossing between Washington Avenue and I-610 West. The TxDOT Drainage Improvements Project is currently not funded for construction.

4. Existing Conditions and Environmental Consequences

4.1 Acquisitions and Relocations Required

Existing Conditions

The proposed Inner Katy Segment is primarily made up of existing roadway. Adjacent to the existing roadway, the project area is almost entirely developed, excluding specific areas designated as park space. Development along the corridor is primarily commercial, with some pockets of residential and industrial development. Commercial development contains a variety of different businesses, from standard highway-oriented retail establishments including restaurants, gas stations, and convenience stores, along with other commercial development including retail establishments, storage facilities, auto repair shops, gyms, offices, and hotels. These businesses are not unique to the area. Residential development is scattered throughout along the corridor but is primarily made up of single-family residences in a part of Washington Avenue Coalition/Memorial Park Super Neighborhood. Industrial development increases towards the eastern end of the Inner Katy Segment where the alignment curves to the south into Downtown Houston, where additional ROW is proposed. Within this area along the curve, there are several industrial facilities, single-family residences, and vacant/undeveloped areas located adjacent to the Inner Katy corridor. Refer to **Appendix C** for the *Socioeconomics, Community Impacts, and Environmental Justice Memorandum* (Stantec, 2022a) for more details.

Northwest Transit Center (NWTC)

The NWTC is primarily made up of existing roadway and is situated between major interstate systems (Katy Freeway, I-610, and US 290). It consists of a north and south platform with a large parking lot to the east. The NWTC is unique to the area; the Northline Transit Center and the Bellaire Transit Center are the nearest transit centers, both located approximately 10 miles away.

Proposed Memorial Park Station

The proposed Memorial Park Station location is primarily made up of existing roadway (I-10 and Westcott Street). Adjacent to the existing roadway, the project area is completely developed, excluding specific areas designated as park space (Memorial Park). Development along the existing proposed station area is primarily commercial, with some pockets of residential and industrial development. Commercial development contains a variety of different businesses, including restaurants, gas stations, convenience stores, and hotels. These businesses are not unique to the area.

Proposed Shepherd/Durham Station

The proposed Shepherd/Durham Station location is primarily made up of existing roadways (Katy Freeway, Shepherd Drive, and Durham Drive). The project area is completely developed and is primarily commercial. Commercial development contains a variety of different businesses, including restaurants, a kitchen cabinet wholesale store, and a bail bond service. These businesses are not unique to the area.

Environmental Consequences

Option 1

Approximately 2.66 acres of proposed ROW is required for Option 1. The proposed station locations are the same for both Option 1 and Option 2. Aside from the ROW anticipated to accommodate the proposed stations, minimal ROW would be required for the Option 1 alignment. The proposed Shepherd/Durham Station would involve acquisition of the block from the Katy Freeway Service Road south along Shepherd Drive, west along Nolda Street to Durham Drive, and north to the Katy Freeway Service Road. Four commercial properties are anticipated to be displaced by the proposed Shepherd/Durham Station. These four properties contain six businesses.

Option 2

Option 2 would require approximately 3.41 acres of proposed ROW. In addition to the ROW required for stations, new ROW would be required along the Option 2 alignment, specifically along the curve of I-10, to accommodate an elevated guideway. However, ROW acquisition would be limited to vacant land where possible, however, the proposed Shepherd/Durham Station would involve acquisition of the block from the Katy Freeway Service Road south along Shepherd Drive, west along Nolda Street to Durham Drive, and north to the Katy Freeway Service Road. Four commercial properties are anticipated to be displaced by the proposed Shepherd/Durham Station. These four properties contain six businesses.

Inner Katy Proposed Stations

No ROW is required from the NWTC or the proposed Memorial Park Station, and no structures would be impacted; therefore, no proposed acquisitions or relocations are required at those locations.

The proposed project is expected to result in six potential displacements around the Shepherd/Durham Station (**Figure 4-10** in **Appendix B**). Approximately 1.32 acres of ROW would be required for the proposed Shepherd/Durham Station, which would involve acquisition of the block from the Katy Freeway Service Road south along Shepherd Drive, west along Nolda Street to Durham Drive, and north to the Katy Freeway Service Road. Four commercial properties are anticipated to be displaced by the proposed Shepherd/Durham Station. Where ROW impacts would occur, displaced entities would receive assistance through compliance with the Uniform Relocation Assistance and Real Property Acquisition Act.

Because commercial displacements would occur, some employees could be impacted by the proposed project. The number of potentially impacted employees resulting from the anticipated commercial displacements is estimated to be between 59 and 116 employees. According to 2020 American Community Survey estimates, 30,117 people over 16 years of age were employed in the 77007 zip code. Although displacements are always impactful, the number displaced by the proposed project represents less than one percent of local employment.

Based on a March 2022 Loopnet.com search, there are several properties for sale or lease that may accommodate the businesses displaced by the proposed project within the 77007 zip code. Six out of the 19 available properties do not disclose the listing price. Comparable properties for sale include four vacant commercial/office units and three vacant commercial lots. Properties for lease include 38 retail and office spaces.

Nearby zip codes would likely contain additional commercial properties in this densely developed part of western Houston. There are also vacant commercial lots for sale that could potentially accommodate relocation of the businesses. It is assumed that standard commercial properties would be able to accommodate the displaced businesses. If the business can maintain operations or relocate within the vicinity and remain viable, any potential employment effects would be temporary. More substantial impacts could occur if the businesses cannot relocate or must do so outside of the general vicinity of their current location.

Minimal ROW (0.13-acre) would be required for the proposed Studemont Station, but no structures would be impacted; therefore, no acquisitions or relocations would be required.

Downtown Segment and Stations

No additional ROW is required from the Downtown segment alignment; therefore, no proposed acquisitions or relocations are required. Minimal ROW would be required for the proposed Franklin/Bagby station (0.60-acre) and St. Emanuel/EaDo station (0.10-acre). No structures would be impacted, and no displacements would be required. No new ROW would be required for the existing METRORail stations improvements. No structures would be impacted, and no displacements would be required.

In 2027 and 2045, the I-10 corridor is still expected to experience oversaturation under the No -Build condition. With the project in place, the I-10 corridor would experience minimal impacts to traffic operations, and, in some cases, would generate slightly higher speeds, lower density and faster travel times. This is due to transit vehicle volumes shifting from the general-purpose lanes to the exclusive guideway in the Build condition, resulting in relatively lower volumes in the general-purpose lanes compared to the No Build condition. However, overall, the percentage differences between the No-Build and Build scenario for speed, density, and travel time, are less than 2 percent for the Opening Year (2027) and Design Year (2045) conditions. This indicates that the project would bring very minimal impacts to traffic operations along the I-10 corridor.

Downtown Alignment

Along the Downtown alignment, BRT buses would operate within existing transportation ROW via Bagby Street, Rusk Street, and Capitol Street. BRT would travel within mixed-traffic lanes along Bagby Street and via transit-exclusive lanes along Rusk Street (rightmost lane) and Capitol Street (leftmost lane). BRT in Downtown would also include potential transit priority treatments and six-minute headways except for overnight hours. By interlining with the existing METRORail Green and Purple LRT lines on Capitol and Rusk Streets, METRO is maximizing use of existing

infrastructure including the current Green/Purple alignment and stations on Capitol and Rusk Streets. This alignment only applies to the METRORapid operations. There will be no change to the existing Regional and Express services and alignments in Downtown. The Downtown alignment would intersect the existing METRORail Red Line at Main Street (Central Station).

Currently, the Green/Purple Lines operate within curbside lanes in mixed traffic. METRO proposes that the Green/Purple Lines will operate on exclusive transit lanes by the Inner Katy Project's Opening Year (2027). The proposed exclusive LRT lane project features improvements to signal timings, exclusive lane delineation, and signage, which are necessary to accommodate BRT in the exclusive lane.

Traffic will continue to operate on three travel lanes along Capitol and Rusk Streets. The BRT buses would operate with LRT on the right-most lane along Rusk Street and the left-most lane along Capitol Street, as preferably marked by distinguishing pavement color, delineation, and signage. Right turns along Rusk Street would be made from the lane adjacent to the exclusive transit lane (second lane from the right) to access driveways, garages, and cross-streets. Similarly, left turns along Capitol Street would be made from the second lane from the left. Along Bagby Street, BRT buses would operate with mixed traffic.

The proposed project would not impact current parking regulations. On-street parking will be maintained along Capitol and Rusk Streets, along the non-transit curbside lane, during off-peak hours (as currently signed). Parking is currently not allowed at any time of the day along Bagby Street; this condition will be maintained.

All accesses to parking garages and loading docks will be maintained. Drivers would be able to access sites located along the transit curb lane via the next lane adjacent to the transit lane. Along Rusk Street, this is the second lane from the right. Along Capitol Street, this is the second lane from the left. Installation of proper signage and flashing lights are recommended to alert drivers of operations and increase safety.

Downtown Traffic

A traffic analysis for the Downtown route was conducted for the AM and PM peak hours using VISSIM microsimulation software to assess impacts to traffic associated with implementation of the METRORapid Inner Katy Project. Microsimulation was used in the Downtown area due to the area's large, complex network of signalized and stop-controlled intersections on top of mixed traffic modes and transit signal priority. The findings from the analysis show traffic impacts under the Build Condition are minimal and maintain similar operations as the No-Build Condition.

Traffic operations in Downtown were evaluated using a rating system called Level of Service (LOS). LOS ratings are measured in terms of average delay per motorist, where delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. LOS A is the freest-flowing operating condition, and LOS F has the longest delays. LOS D or better is considered acceptable in most urban

settings. The LOS results along the Downtown route are presented in **Figure 4-1** through **Figure 4-8** in **Appendix B**.

Under Existing (2021) and No-Build (2027 and 2045) conditions, the Downtown area performs at acceptable LOS (LOS D or better). During Opening Year 2027, all study intersections under the Build condition maintain acceptable LOS Cor better during the AM and PM peak hours. During Design Year 2045, all study intersections under the Build Condition maintain acceptable LOS D or better during both peak hours. Some intersection average delays are lower in the Build Conditions when compared to the No-Build Conditions. This is due to the metering of intersection traffic that occurs due to the presence of BRT changing signal timings along Capitol and Rusk Streets. Intersection traffic metering will increase delays at certain intersections. In turn, reducing delays at other intersections due to either lack of volume for high-delay movements or an increase of volume for low-delay movements.

Travel time analysis shows that the added BRT component will have minimal impacts to the mobility of the Red, Purple and Green LRT Lines. With the BRT, vehicles may experience up to 2.5 minutes of travel time increase by 2045 particularly during the AM peak hour however, this increase is reasonable and acceptable considering the anticipated increase in travel demand by the project's Design Year. LRT travel times may experience up to one minute increase of travel time during both AM and PM peak hours. Travel time analysis also shows that the BRT would have very similar travel times as the LRT (within 1.5 minutes). These minimal impacts to the No-Build condition conclude that the BRT can be effectively interlined and operated within the transit exclusive lane.

Parking

Currently, there is no transit-related parking along I-10 or at the three proposed stations along I-10 (Memorial Park, Shepherd-Durham, and Studemont Stations). Approximately 75 commercial business-related parking spaces are located on the south side of the I-10 frontage road between Shepherd Drive and Durham Drive. The commercial business-related parking spaces will be displaced to accommodate the proposed transit center associated with the Shepherd-Durham Station. The Shepherd-Durham Station is proposed to include 13 new kiss-and-ride parking spaces and three new handicap parking spaces for temporary use to drop off or pick up transit passengers. No new transit-related parking is proposed along I-10, at the Memorial Park Station, or at the Studemont Station.

Traffic and Parking

The findings from the traffic analysis indicate that the BRT project and its associated improvements would not result in any significant impacts on traffic operations or parking on the existing roadways. Increased traffic congestion from operation of the project is not anticipated. The proposed project would provide dedicated transit lanes for BRT and Regional Express for most of its length, rather than operating in mixed traffic, therefore improving transit operations in the study area. Other than temporary losses in parking and travel lanes during periods of construction, there would be no permanent loss of on-street or off-street public parking and no permanent loss in the number of

general-purpose travel lanes. The existing parking spaces at the proposed Shepherd/Durham Station will be displaced along with the businesses. The project would not change existing parking at the NWTC.

The project would also improve safety for all transportation modes by reducing congestion, reducing train on vehicle conflicts, modifying several signal phasing splits, transit queue jump treatments and offsets in Downtown, and recommending proper traffic control signage to increase roadway user awareness and improve decision-making.

The proposed improvements may temporarily increase traffic congestion in the study area during construction. This would particularly impact the eastbound I-10 frontage road where utilities are relocated and bridge structures are constructed, and the Downtown area around the new stations at Franklin/Bagby Streets and St. Emanuel Street. However, the temporary lane closures and detours are considered minor and would cease when the project would be completed. Once construction is complete, the findings from the traffic study indicate that the project will enhance connectivity, safety, and accessibility to road users. Considering this, in addition to the minimal traffic impacts and improved transit modes, the METRORapid Inner Katy Project offers potential benefits to Houston and all affected roadway users.

4.2 Land Use

This section describes current land use patterns and development trends in the proposed project area and the potential effect of the proposed project on existing land uses and proposed developments. Refer to **Appendix D** for the *Land Use and Parks Technical Memorandum* (Stantec, 2022b) for more details.

Existing Conditions

The predominant land use within the project footprint is transportation uses, which would not be converted from other land uses. There are small areas along the corridor where ROW acquisition would be required. Land use categories are shown in **Table 4-1** below and in **Figure 4-9** in **Appendix B**.

Table 4-1: Land Use Categories in the Inner Katy and Downtown Segments (Maximum Proposed ROW)

Land Use Category	Total (Acres)	Percentage (%)
Industrial	1.31	34
Transportation & Utility	0.63	19
Commercial	0.70	17
Undeveloped	0.62	16
Office	0.32	8
Public & Institutional	0.07	2
Multi-Family Residential	0.06	2
Unknown	0.06	2
Single-Family Residential	0.00	0.1

Source: City of Houston, 2021

Two Super Neighborhoods are located directly adjacent to the Inner Katy Segment: Washington Avenue Coalition/Memorial Park and the Greater Heights Super Neighborhoods. The Downtown Segment is located entirely within the Downtown Super Neighborhood.

Northwest Transit Center

Existing land use surrounding the existing NWTC includes parks/open space, office, and transportation/utility. The NWTC makes up most of the existing land use. The NWTC is situated north of the I-10/I-610/US 290 interchange and is a central hub for the METRO transit system. This station consists of a north and south platform. As described by METRO, NWTC is a waiting area where several bus routes converge which serve as efficient "hubs" allowing travelers access to various locations to assemble at a central point to take advantage of express trips or other route-to-route transfers.

Proposed Memorial Park Station

Existing land use surrounding the proposed Memorial Park Station includes parks/open space, commercial, and single-family residential. Most of the land use surrounding the proposed station location consists of Memorial Park itself, which stretches from I-610 to Washington Avenue, over 0.5-mile along the south side of I-10. Several recreational facilities owned by the park, including a soccer complex and several softball/baseball fields, exist within the proposed station study area. Residential land use is also present south of Memorial Park within the proposed station study area. Commercial land use is present east of the proposed station, located on the east side of Washington Avenue and along the I-10 corridor. **Exhibit 4-1** is a view of the proposed Memorial Park Station location along the south side of I-10.

Exhibit 4-1: View of Proposed Memorial Park Station Location Facing North

Proposed Shepherd/Durham Station

Existing land use surrounding the proposed Shepherd/Durham Station is primarily commercial, with some single-family residential, industrial, office, and undeveloped land use. Commercial land use is dominant, making up most of the land use located along both sides of the Inner Katy frontage roads. A cluster of single-family residential land use exists within the proposed Shepherd/Durham Station area along Nolda Street, between Roy Street and Sandman Street. Small areas of office and industrial land use exist within the project area but are mainly located within larger commercial developments. **Exhibit 4-2** is a view of the proposed Shepherd/Durham Station location facing east.

Exhibit 4-2: View of Proposed Shepherd/Durham Station Location Facing East

Proposed Studemont Station

Existing land use surrounding the proposed Studemont Station project area is primarily industrial, with some multi-family residential, commercial, office, and undeveloped land use. The White Oak Bayou Trail crosses the proposed I-10 and the proposed Studemont Station project area, making land use west of Studemont Street undevelopable. Most of the existing land use surrounding the proposed station is a mix of industrial, commercial, and office development adjacent to Studemont Street. **Exhibit 4-3** is a view of the proposed Studemont Station location facing northwest.

Exhibit 4-3: View of Proposed Studemont Station Facing Northwest

Proposed Franklin/Bagby Station

Existing land use surrounding the proposed Franklin/Bagby Station includes parks and open space, with minimal office, multi-family residential, and undeveloped land use. The proposed station location is a vacant paved lot, with an existing bus stop location (Stop ID: 9205). **Exhibit 4-4** is a view of the proposed Franklin/Bagby Station location facing north.

Exhibit 4-4: View of Proposed Franklin/Bagby Station Location Facing North

Proposed St. Emanuel/EaDo Station

Existing land use surrounding the proposed St. Emanuel/EaDo Station includes multi-family residential, industrial, commercial, and undeveloped land use. **Exhibit 4-5** is a view of the proposed St. Emanuel/EaDo Station location facing south.

Exhibit 4-5: View of Proposed St. Emanuel/EaDo Station Location Facing South

METRORail Station Improvements

The existing light rail (LRT) station consists of three existing stations located in Downtown Houston. These Green and Purple Light Rail lines include Theater District, Central Station, and Convention District stations located on Rusk Street and Capitol Street in Downtown. Existing land use surrounding the METRORail Stations includes public and institutional, commercial, multi-family residential, undeveloped, and office land use.

Environmental Consequences

Option 1

The proposed Option 1 project area is primarily composed of residential and commercial land uses. Commercial development is concentrated along the frontage roads of I-10, and residential areas are located along both sides of the I-10 corridor. Industrial and public/institutional land uses are located along the frontage roads and throughout the entire Option 1 project area. Approximately 2.66 acres of new ROW would be required, which includes the proposed station locations. Land use within the proposed Option 1 impacted areas include an industrial property (Budweiser facility) and commercial lot (vacant).

Option 2

The Option 2 project area is primarily composed of residential, commercial, and public and institutional land uses. Commercial development is concentrated along the frontage roads of I-10, and residential areas are located along both sides of the I-10 corridor between Washington Avenue and Studemont Street. Residential areas front the freeway on the north and south sides. Industrial and public/institutional land uses are located along the frontage roads and throughout the entire Option 2 project area. In total, Option 2 would require approximately 3.41 acres of proposed ROW, which includes the proposed station locations. Outside of the stations, new ROW is proposed along the Option 2 alignment along the curve of I-10 where an evaluated guideway which would clip several existing properties. Land use within the impacted areas include one industrial property, one commercial property, one community facility, and one area identified as vacant commercial. All existing land use within proposed ROW would be permanently converted to transportation use and is described below.

Proposed ROW would be required from two parcels located on the south side of I-10 between White Street and Sabine Street. This area of proposed ROW contains vacant land behind an industrial facility, Tejas Building Materials (0.41-acre), and a commercial business, Sagis Ventures LLC. (0.47-acre).

Proposed ROW (0.10-acre) would be required from a parcel that contains a community facility, Impact Church of Christ. A small amount of ROW would be required from this property and exclusive to a parking lot that currently stations buses as observed from the February 2022 site visit.

Continuing along the eastbound Option 2 alignment, approximately 0.18-acre of ROW would be required from an existing vacant commercial property (Toomey Guseman Family LTD) located north of Spring Street. The existing commercial vacant use would be permanently converted to transportation use.

Proposed Inner Katy Segment Stations

No additional ROW would be required from the existing NWTC or for the proposed Memorial Park Station. All commercial land use in the proposed stations would be permanently converted to transportation use.

Downtown Segment and Stations

No ROW would be required for the Downtown Segment. No additional ROW is required from the METRORail Stations located at Theater District, Central Station, and Convention District stations on Rusk Street and Capitol Street in Downtown.

The proposed Franklin/Bagby Station location is a vacant paved lot with an existing bus stop location (METRO Stop ID: 9205). The proposed project would acquire approximately 0.06-acre of new ROW. The proposed St. Emanuel/EaDo Station location is a vacant paved lot. The proposed

station would acquire approximately 0.10-acre of new ROW. All land uses that would be directly impacted by the proposed project would be permanently converted to transportation use.

4.3 Traffic

The following summarizes the potential traffic and parking impacts identified in the technical Traffic Impact Analysis Report. Close coordination on the traffic analysis methodologies, assumptions, and findings has been maintained with METRO, the City of Houston, and other local agencies throughout the study area. The technical report concludes that the proposed BRT project and its associated improvements would not result in any significant impacts on traffic operations or parking on the existing roadways and would improve transit service reliability and travel time by introducing an exclusive transit guideway and shifting some automobile users to public transit.

Existing Conditions

The Inner Katy Freeway (I-10) is an east-west corridor that connects Downtown and Uptown, two of Houston's largest employment and activity centers. Utilized by personal vehicles and transit vehicles (Regional Express and local buses), the corridor currently experiences oversaturation with high congestion along the entire corridor in both directions. As a major east-west route providing access to employment centers in Downtown Houston, traffic from rapidly growing regions west and northwest of Houston, (Katy and Cypress, i.e.) is expected to increase. Although local bus service is provided on city streets, there is currently no rapid transit connection between Downtown and Uptown that provides high-capacity, fast, and frequent transit service. The project would close a gap in rapid transit service and alleviate the growing congestion by providing a dedicated transit guideway along the corridor.

The project would enhance connectivity in Houston by providing a direct connection:

- Between the NWTC and Downtown (including the Convention Center, stadiums, and EaDo)
- With the existing METRORapid Silver Line from the NWTC, connecting Downtown to Uptown
- With several METRO local and Regional Express routes, increasing connectivity to Texas Medical Center, Greenway Plaza, Memorial Park and Westchase

Environmental Consequences

I-10 Alignment

Along I-10, the BRT would operate on a new exclusive transit guideway which would be constructed as a separate, elevated structure along the corridor. Because of this, there will be no loss in the number of general-purpose travel lanes. Only BRT and regional express buses will be able to access the new transit guideway; personal vehicles and HOVs would continue to use the general-purpose lanes. By operating transit on a separate structure, more capacity will be provided to general-purpose traffic. A new express bus lane (beginning west of the NWTC) will merge into the exclusive guideway at the NWTC, however, vehicles traveling to/from the NWTC, including US 290 HOV traffic, will continue to have access to the I-10 general purpose lanes.

Exhibits 4-6 and **4-7** present the lane geometry along I-10 under the Existing and Build conditions. The diagrams show no changes in the number of general-purpose lanes along its entire length. There will be no impact to parking as there are currently no existing parking facilities along the corridor.

Exhibit 4-6: Conceptual Lane Diagram – Existing Condition

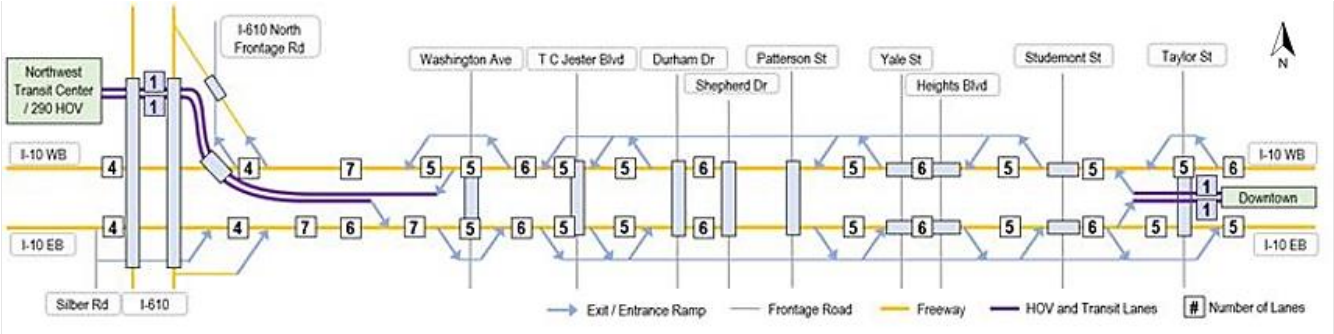
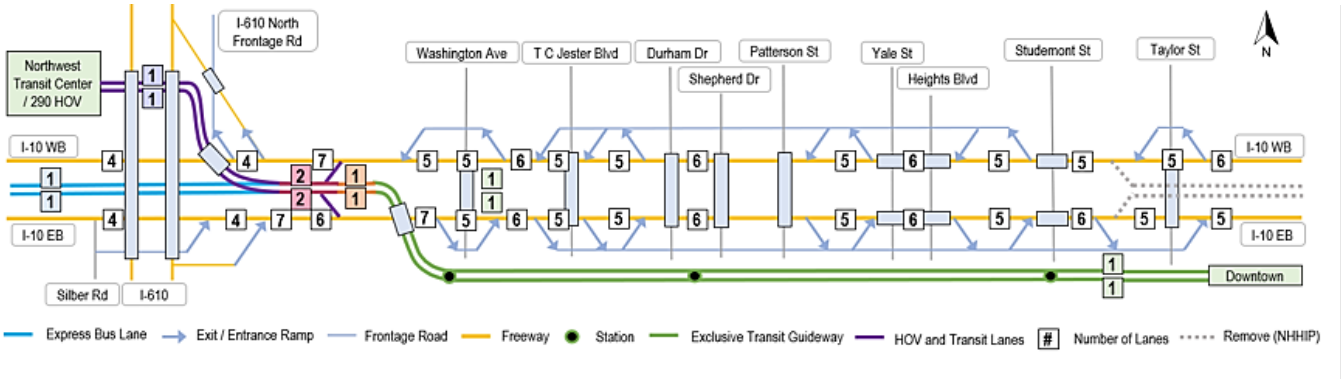


Exhibit 4-7: Conceptual Lane Diagram – Build Condition



I-10 Corridor Traffic

Traffic analysis for the I-10 corridor was conducted for the AM and PM peak hours using Highway Capacity Software (HCS) to assess impacts to general-purpose traffic associated with implementation of the METRORapid Inner Katy Project. The analysis results for the eastbound and westbound study corridor are presented in **Table 4-2** and **Table 4-3**, respectively.

Table 4-2: Eastbound I-10 Measures of Effectiveness

Facility Performance	2021 Existing	2027 No-Build	2027 Build	2027 % Difference (No-Build to Build)	2045 No-Build	2045 Build	2045 % Difference (No-Build to Build)
AM Peak							
Speed (miles/hour)	44.6	15.7	15.8	1%	15.2	15.3	1%
Density (passenger cars/miles/lane)	42.2	120.6	119.6	-1%	122.3	122.3	0%
Travel time (minutes)	7.2	20.3	20.2	0%	21.0	20.9	0%
PM Peak							
Speed (miles/hour)	42.9	43.1	42.9	0%	42.3	42.2	0%
Density (passenger cars/miles/lane)	44.1	43.7	43.7	0%	43.6	43.6	0%
Travel time (minutes)	7.5	7.4	7.4	0%	7.6	7.6	0%

Table 4-3: Westbound I-10 Measures of Effectiveness

Facility Performance	2021 Existing	2027 No-Build	2027 Build	2027 % Difference (No-Build to Build)	2045 No-Build	2045 Build	2045 % Difference (No-Build to Build)
AM Peak							
Speed (miles/hour)	43.4	40.5	41.2	2%	37.1	37.1	0%
Density (passenger cars/miles/lane)	45.1	48.5	47.7	-2%	52.1	52.1	0%
Travel time (minutes)	7.1	7.5	7.4	-1%	8.2	8.2	0%
PM Peak							
Speed (miles/hour)	45.6	48.6	48.6	0%	48.3	48.3	0%
Density (passenger cars/miles/lane)	42.8	40.1	40.1	0%	39.9	39.9	0%
Travel time (minutes)	6.7	6.3	6.3	0%	6.3	6.3	0%

In 2027 and 2045, the I-10 corridor is still expected to experience oversaturation under the No-Build condition. With the project in place, the I-10 corridor would experience minimal impacts to traffic operations, and, in some cases, would generate slightly higher speeds, lower density and faster travel times. This is due to transit vehicle volumes shifting from the general-purpose lanes to the exclusive guideway in the Build condition, resulting in relatively lower volumes in the general-purpose lanes compared to the No Build condition. However, overall, the percentage differences between the No-Build and Build scenario for speed, density, and travel time, are less than two percent for the Opening Year (2027) and Design Year (2045) conditions. This indicates that the project would bring very minimal impacts to traffic operations along the I-10 corridor.

Downtown Alignment

Along the Downtown alignment, BRT would operate within existing transportation right-of-way via Bagby Street, Rusk Street, and Capitol Street, along transit-exclusive lanes with potential priority treatments and six-minute headways except for overnight hours. The METRONext concept calls for the BRT line to be interlined with the existing METRORail Green and Purple LRT lines using the current Green/Purple alignment and stations on Capitol and Rusk Streets. The Downtown alignment would intersect the existing LRT Red Line at Main Street (Central Station). The BRT project also features a new exclusive transit lane for BRT and LRT with improvements to signal timings, which are warranted to safely accommodate buses and trains in the exclusive lane. The LRT is currently operating along the south side of Capitol Street (left lane) and Rusk Street (right lane) with mixed general vehicular traffic. The exclusive transit lane has been proposed to improve LRT traffic safety by removing turning-vehicle conflicts with trains through the usage of transit queue jumps; increase transit vehicle capacity; and improve transit reliability for both buses and trains.

Traffic will operate on three travel lanes along Capitol and Rusk Streets. The BRT would operate with LRT on the right-most lane along Rusk Street and the left-most lane along Capitol Street, as preferably marked by distinguishing pavement color, delineation, and signage. Right turns along Rusk Street would be made from the lane adjacent to the exclusive transit lane (second lane from the right) to access driveways, garages, and cross-streets. Similarly, left turns along Capitol Street would be made from the second lane from the left. Along Bagby Street, BRT would operate with mixed traffic.

The proposed exclusive transit lane requires a loss of one vehicular travel lane along Capitol Street and Rusk Street; however, the operational analysis shows adequate capacity and acceptable operations for vehicular traffic is maintained with this conversion.

The project would not impact current parking regulations. On-street parking will be maintained along Capitol and Rusk Streets, along the non-transit curbside lane, during off-peak hours (as currently signed). Parking is currently not allowed at any time of the day along Bagby Street; this condition will be maintained.

All access to parking garages and loading docks will be maintained. Drivers would be able to access sites located along the transit curb lane via the next lane adjacent to the transit lane. Along Rusk Street, this is the second lane from the right. Along Capitol Street, this is the second lane from the left. Installation of proper signage and flashing lights are recommended to alert drivers of operations and increase safety.

Downtown Traffic

A traffic analysis for the Downtown route was conducted for the AM and PM peak hours using VISSIM microsimulation software to assess impacts to traffic associated with implementation of the METRORapid Inner Katy Project. Microsimulation was used in the Downtown area due to the area's large, complex network of signalized and stop-controlled intersections on top of mixed traffic

modes and transit signal priority. The findings from the analysis show traffic impacts under the Build Condition are minimal and maintain similar operations as the No-Build Condition.

Traffic operations in Downtown were evaluated using a rating system called Level of Service (LOS). The *Highway Capacity Manual, 6th Edition* (HCM6) defines LOS as a way to categorize various levels of vehicular control delay at signalized intersections, as shown in **Table 4-4.** The HCM splits LOS into six categories, ranging from LOS A (lowest control delay) to LOS F (highest control delay). Control delay is defined as the delay a vehicle experiences due to the presence of a traffic control device, such as a traffic signal or stop-sign. As recommended by COH, LOS D is considered the threshold for acceptable traffic operations. The LOS results along the Downtown route are presented in **Table 4-4**, **Exhibit 4-8** through **Exhibit 4-15** and in **Figure 4-1** through **Figure 4-8** in **Appendix B**.

Table 4-4: HCM6 LOS Criteria for Signalized Intersections

LOS	Average Control Delay (seconds per vehicle)	Description
A	≤10	Free Flow
B	> 10 and ≤ 20	Stable flow (slight delay)
C	> 20 and ≤ 35	Stable flow (acceptable delays)
D	> 35 and ≤ 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	> 55 and ≤ 80	Unstable flow (intolerable delay)
F	> 80	Forced Flow (jammed)

Source: Highway Capacity Manual, 6th Ed.

Exhibit 4-8: No Build 2027 – AM Peak Hour

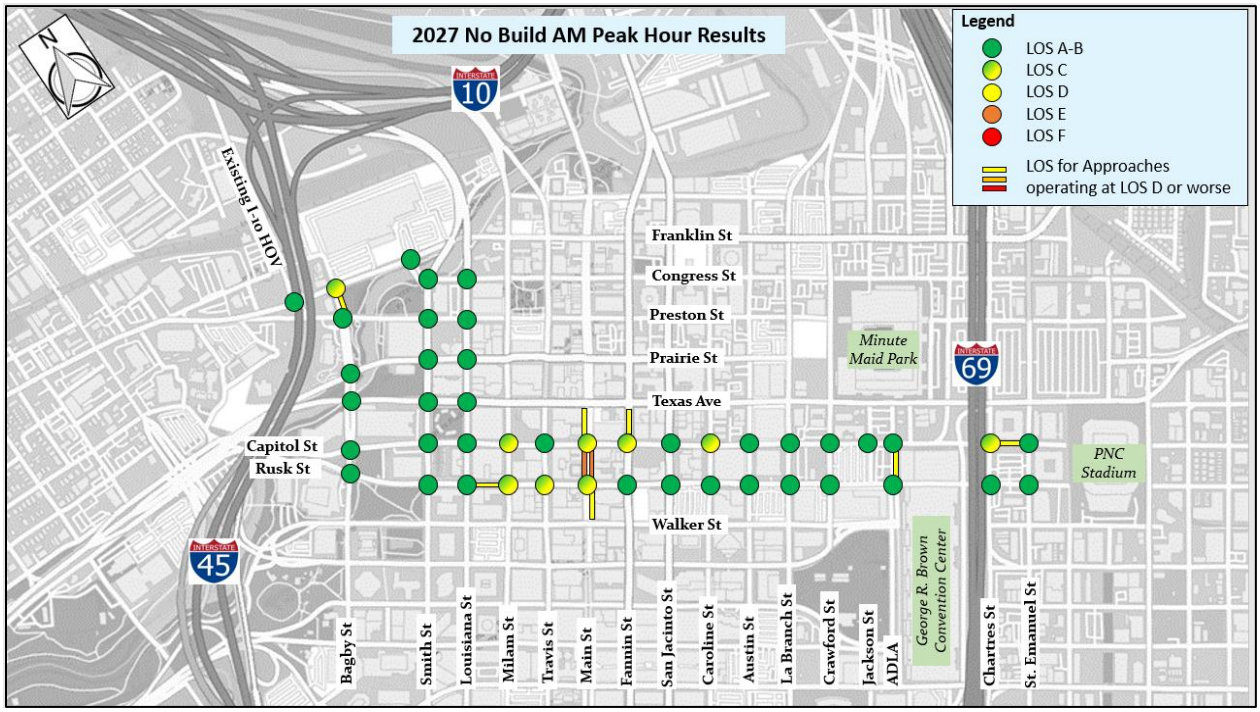


Exhibit 4-9: No Build 2027 – PM Peak Hour

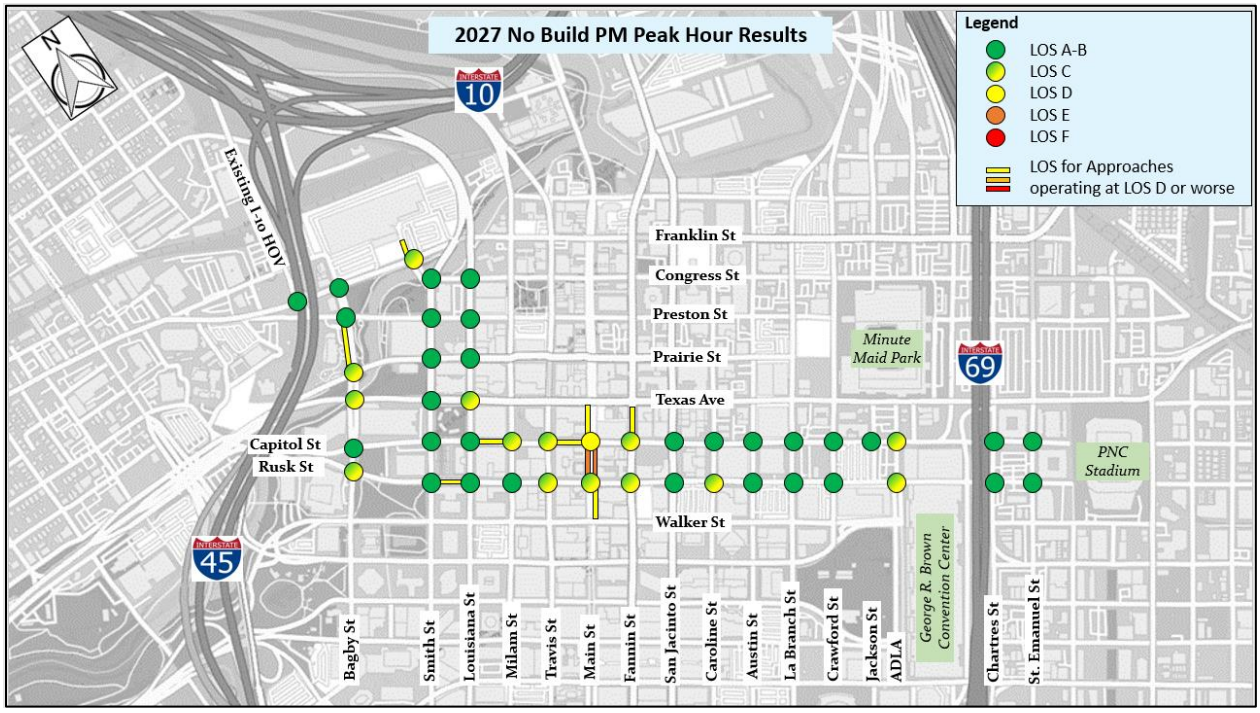


Exhibit 4-10: No Build 2045 – AM Peak Hour

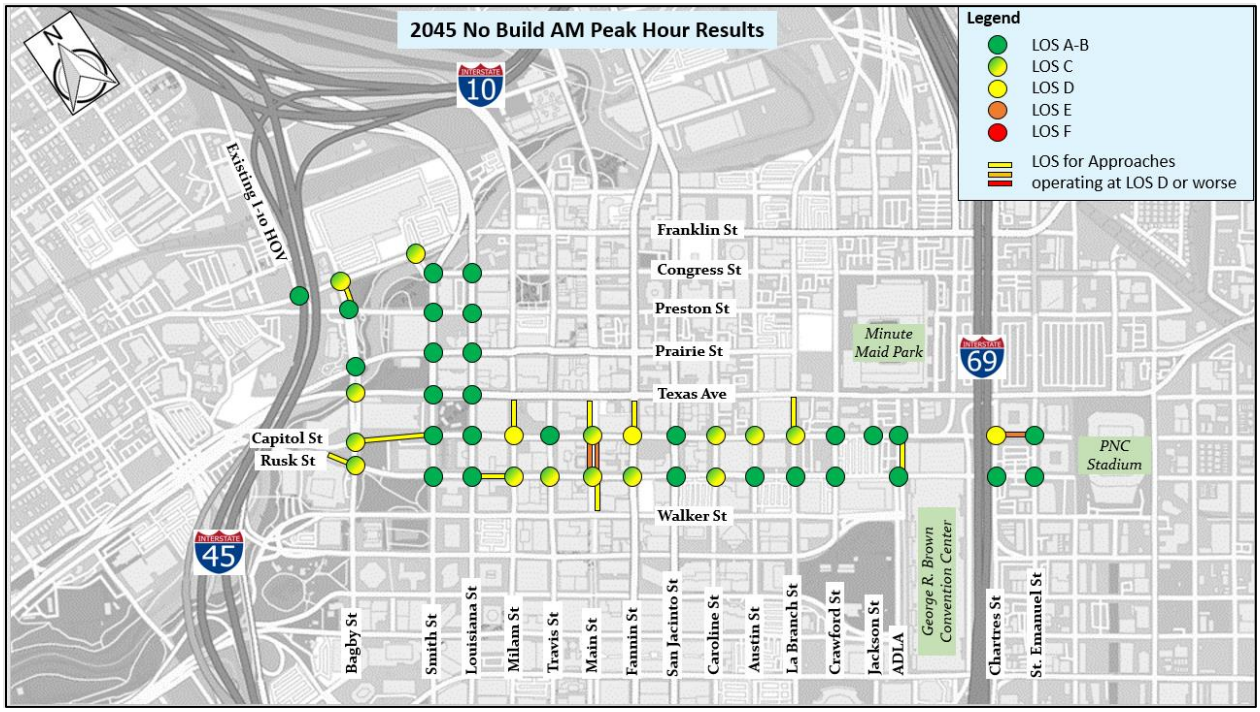


Exhibit 4-11: No Build 2045 – PM Peak Hour

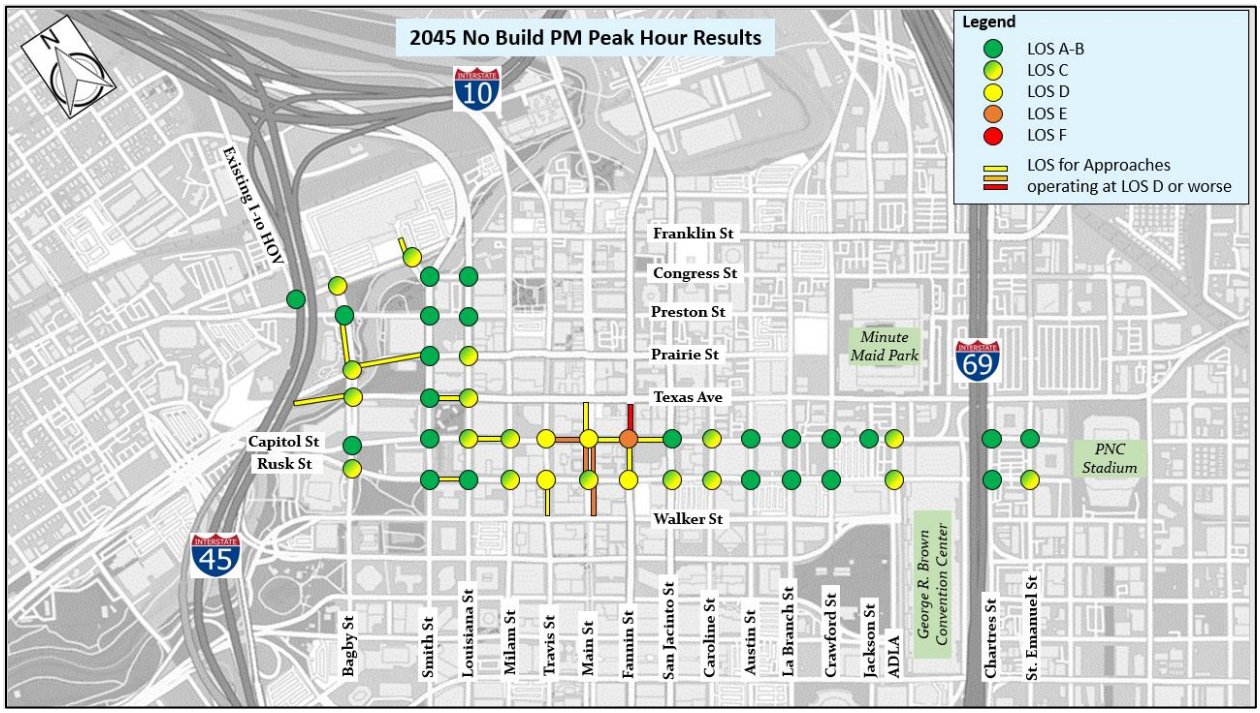


Exhibit 4-12: Build 2027 – AM Peak Hour

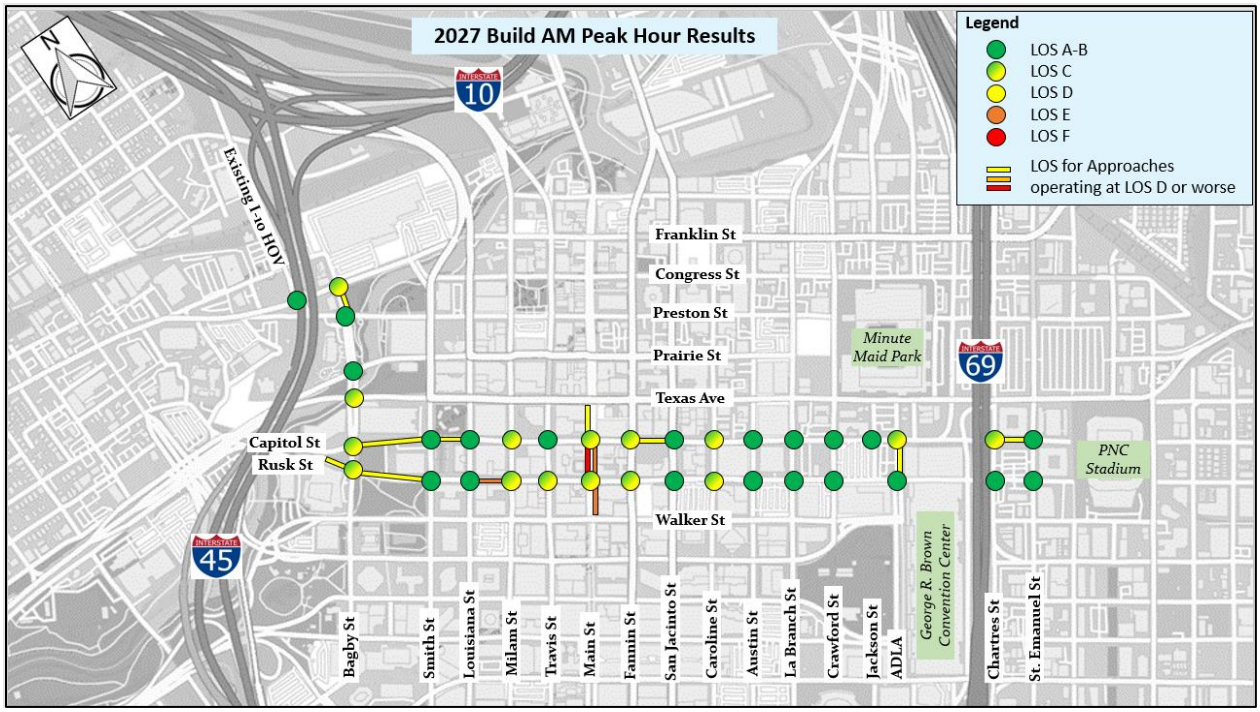


Exhibit 4-13: Build 2027 – PM Peak Hour

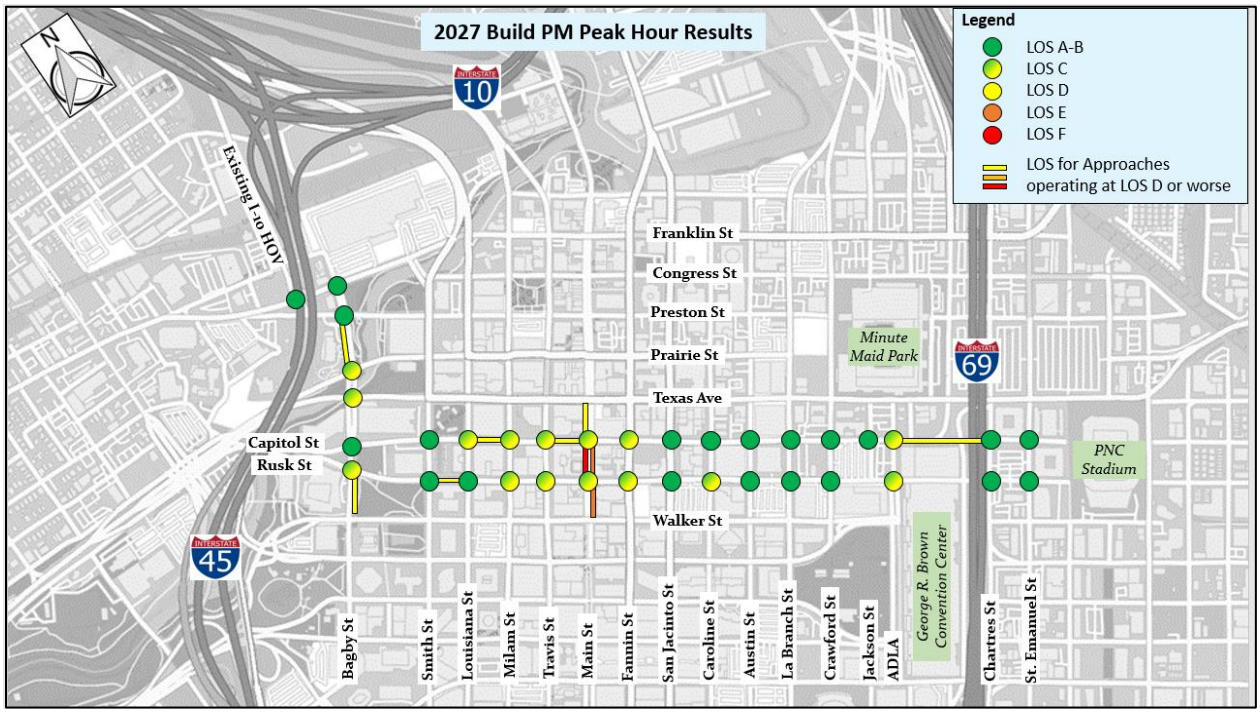


Exhibit 4-14: Build 2045 – AM Peak Hour

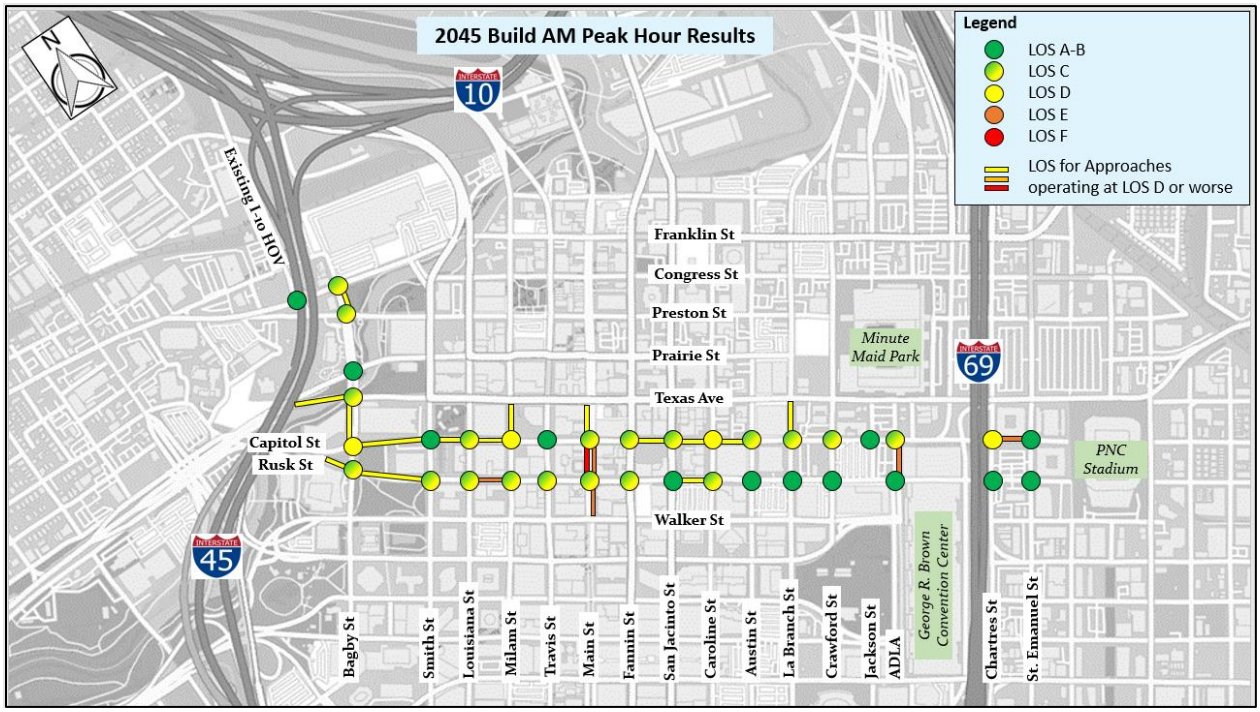
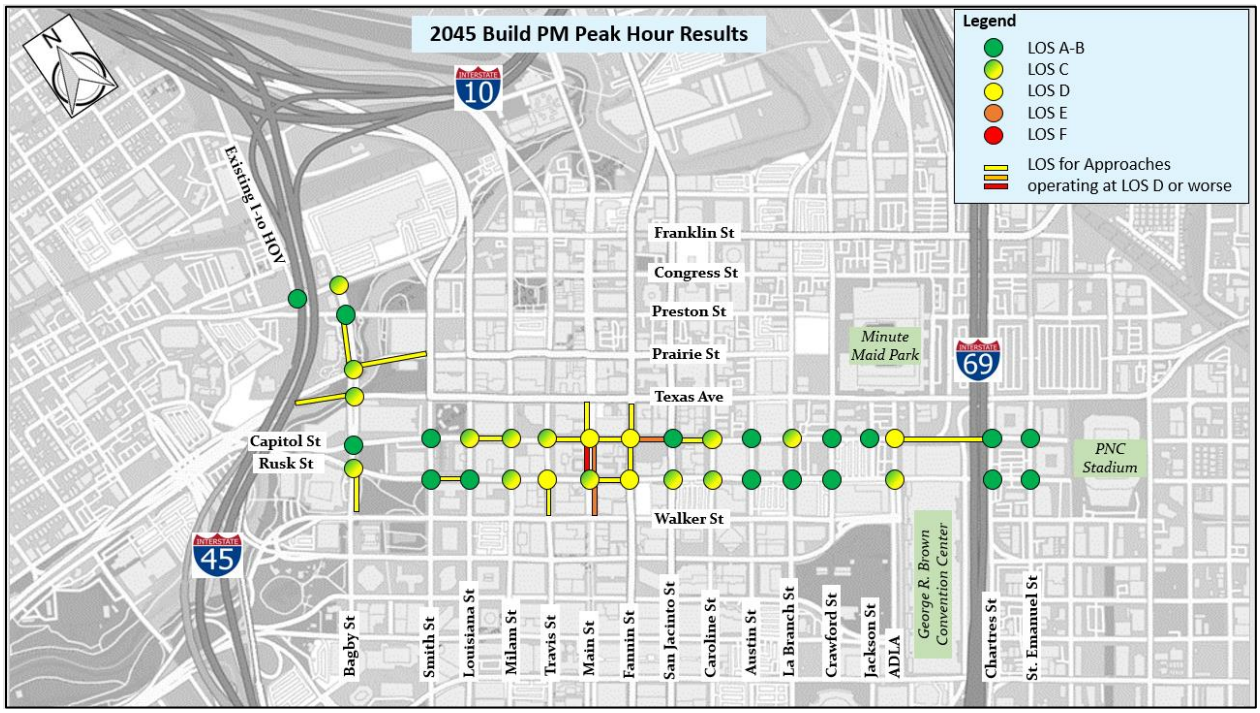


Exhibit 4-15: Build 2045 – PM Peak Hour



Under Existing (2021) and No-Build (2027 and 2045) conditions, the Downtown area performs at acceptable LOS (LOS D or better). During Opening Year 2027, all study intersections under the Build condition maintain acceptable LOS Cor better during the AM and PM peak hours. During Design Year 2045, all study intersections under the Build Condition maintain acceptable LOS D or better during both peak hours. Some intersection average delays are lower in the Build Conditions when compared to the No-Build Conditions. This is due to the metering of intersection traffic that occurs due to the presence of BRT changing signal timings along Capitol and Rusk Streets. Intersection traffic metering will increase delays at certain intersections, in turn, reducing delays at other intersections due to either lack of volume for high-delay movements or an increase of volume for low-delay movements.

Travel times for traffic and transit were also evaluated during Existing, No-Build, and Build conditions, as summarized in **Table 4-5**. The results show that the added BRT plus other Build improvements will have minimal impacts to the mobility of the Red, Purple and Green LRT Lines, supporting the decision that BRT and LRT can be effectively interlined and operated within the same transit lane. General traffic may experience up to 3.5 minutes of travel time increase compared to 2045 No Build Scenario, along Capitol Street during the AM peak hour with the implementation of this project, however all intersections along study corridors will continue to operate at acceptable traffic conditions with LOS D or better. This increase is attributed to the addition of transit queue jumps and other signal timing adjustments along Capitol Street necessary to accommodate the exclusive lane for LRT and BRT.

Table 4-5: Downtown Traffic and Transit Travel Time Summary (mins)

Travel Mode	Street	Existing 2021		No Build 2027		No Build 2045		Build 2027		Build 2045	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Vehicles	Rusk Street	5.4	5.3	5.2	5.3	5.8	5.4	5.9	5.9	6.2	6.4
	Capitol Street	5.5	4.3	5.9	4.3	6.4	4.6	8.1	5.9	9.9	6.4
Green/Purple Line LRT	Rusk Street	8.7	8.0	8.4	8.0	8.8	8.5	9.0	7.9	9.0	8.0
	Capitol Street	8.2	7.2	8.2	7.5	8.6	7.5	8.6	7.8	8.6	7.9
BRT	Rusk Street	-	-	-	-	-	-	9.6	8.7	9.3	8.6
	Capitol Street	-	-	-	-	-	-	8.3	7.3	8.3	7.3
Red Line LRT	Southbound Main Street	1.38	1.39	1.43	1.43	1.43	1.43	1.47	1.47	1.48	1.49
	Northbound Main Street	1.41	1.41	1.49	1.48	1.48	1.48	1.54	1.53	1.57	1.55

Traffic and Parking Conclusions

Increased traffic congestion from operation of the project is not anticipated. The proposed project would provide dedicated transit lanes for BRT for most of its length, rather than operating in mixed traffic, therefore improving transit operations in the study area. The project would not have any impacts on on-street or off-street parking because the improvements would be in either existing

transportation right-of-way (Downtown) or in areas not accessible to the public for automobile use (I-10 corridor). It would not change existing parking at the NWTC or roadway lanes. There would be no permanent loss of on-street or off-street public parking and no permanent loss in the number of general-purpose travel lanes along I-10. The conversion to exclusive transit lanes along the Downtown corridor requires the loss of one general purpose travel lane along Capitol Street and Rusk Street, however, the operational analysis shows adequate capacity and acceptable operations for vehicular traffic is maintained with this improvement.

The project would also improve safety for all transportation modes by reducing congestion, reducing train on vehicle conflicts, modifying several signal phasing splits and offsets in Downtown, and recommending proper traffic control signage to increase roadway user awareness and improve decision-making.

The proposed improvements may temporarily increase traffic congestion in the study area during construction. This would particularly impact the eastbound I-10 frontage road where utilities are relocated and bridge structures are constructed, and the Downtown area around the new stations at Franklin/Bagby Streets and St. Emanuel Street. However, the temporary lane closures and detours are considered minor and would cease when the project would be completed Once construction is complete, the findings from the traffic study indicate that the project will enhance connectivity, safety, and accessibility to road users. Considering this, in addition to the minimal traffic impacts and improved transit modes, the METRORapid Inner Katy Project offers potential benefits to Houston and all affected roadway users.

4.4 Air Quality

An air quality study was conducted to identify existing conditions and model a future condition from which to determine impacts of the METRORapid Inner Katy Project. The primary effect of the proposed project on air quality would be reduction in vehicle miles traveled (VMT) on the regional roadway network eliminating emissions of air pollutants that would have otherwise been produced by passenger vehicle trips. Results of the study are summarized below.

Existing Conditions

The United States Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ) maintain a network of monitoring stations that measure and record concentrations of air pollutants in ambient air. Data collected at air monitoring stations in the vicinity of the proposed project (i.e., within approximately seven miles) over the five-year period 2017–2021 did not record any National Ambient Air Quality Standards (NAAQS) violations for carbon monoxide (CO), nitrogen dioxide (NO_2), or particulate matter (PM). Ozone (O_3) concentrations are of particular concern in the region. **Table 4-6** summarizes maximum O_3 concentrations recorded at nearby monitoring stations during the most recent five-year period. As shown, O_3 concentrations near the proposed project alignment during the last five years exceeded the applicable NAAQS in every year, with maximum concentrations reaching approximately 143 percent of the 8-hour

standard. The elevated O_3 concentrations are demonstrative of the Nonattainment status for Harris County.

Table 4-6: Summary of Maximum O_3 Concentrations in the Project Area

Station	Averaging Time	Maximum Concentrations in Each Monitoring Year in Parts Per Million (ppm)				
		2017	2018	2019	2020	2021
Houston Harvard Street	**8-Hour**	-	-	-	-	0.086
Lang	**8-Hour**	0.077	0.100	0.088	0.073	0.089
Houston North Wayside	**8-Hour**	0.076	0.090	0.074	0.062	0.075
UH Moody Tower & Launch Trailer	**8-Hour**	0.081	0.100	0.093	0.080	0.080
NAAQS (2015) **NAAQS (2008)**	**8-Hour**	**0.070 ppm** **0.075 ppm**				
Maximum % of 2015 NAAQS	**8-Hour**	**116%**	**143%**	**133%**	**114%**	**127%**

Source: TCEQ, 2022; USEPA, 2022.

Transportation Conformity

The USEPA Green Book identifies Harris County as being in attainment of all the NAAQS except O_3. Harris County is designated as Marginal Nonattainment of the 2015 O_3 NAAQS and is designated as Serious Nonattainment of the 2008 O_3 NAAQS. Therefore, transportation conformity rules apply. Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, and PM. Project-level conformity is achieved by demonstrating that the project comes from a conforming regional transportation plan.

The proposed project is consistent with the H-GAC financially constrained 2045 RTP and the 2019–2022 TIP. The proposed project is accurately described as, "Construct multimodal dedicated BRT busway, including grade-separation and connection to HOV lanes and transit center." Regarding project-level conformity, the proposed project is located in Harris County, which is designated as attainment of the NAAQS for CO and PM. Therefore, project-level conformity does not apply.

Important to regional conformity, the proposed project would not worsen O_3 concentrations shown in **Table 4-6**. Traffic forecast data demonstrated that implementation of the Build Alternative would reduce automobile VMT on the regional roadway network by approximately 39,000 daily VMT in the opening year of 2027 and by 80,600 VMT in the design year of 2045. The displaced auto trips would eliminate the associated O_3 precursor emissions.

Emissions Analyses

Carbon Monoxide Traffic Air Quality Analysis (CO TAQA)

Project assessments are conducted to determine the appropriate scope of analyses required to satisfy all applicable federal and State regulations. An analysis of CO concentrations along the I-10 Inner Katy corridor was conducted to address state and federal requirements. Results of the emissions modeling analysis determined that—under worst-case meteorological conditions and traffic congestion—concentrations of CO would not approach or exceed the NAAQS.

Mobile Source Air Toxics (MSAT)

Regarding the potential for environmental effects related to emissions of MSAT, the proposed project qualifies as a CE under NEPA; therefore, no further assessment of potential MSAT effects is required. The purpose of the proposed project is to alleviate congestion along the I-10 Inner Katy corridor and to close the gap in the high-capacity transit network between the NWTC and Downtown Houston and METRO's Regional Express infrastructure gap by providing an elevated, transit-dedicated corridor that would not add single occupancy vehicle (SOV) capacity.

The Build Alternative has been determined to generate minimal air quality impacts for Clean Air Act (CAA) criteria pollutants and has not been linked with any special MSAT concerns. As such, the proposed project will not result in changes in traffic volumes, vehicle mix, basic facilities location, or any other factor that would cause a meaningful increase in MSAT impacts of the proposed project from that of the No Build Alternative. Furthermore, traffic forecast data demonstrated that implementation of the Build Alternative would reduce automobile VMT on the regional roadway network by approximately 39,000 daily VMT in the opening year of 2027 and by 80,600 VMT in the design year of 2045. The displaced auto trips would eliminate the associated MSAT emissions.

Construction Emissions

During the construction phase of the proposed project, temporary increases in PM and MSAT emissions may occur from construction activities. The primary construction-related emissions of PM are fugitive dust from site preparation, and the primary construction-related emissions of MSAT are diesel particulate matter (DPM) from diesel-powered construction equipment and vehicles.

The potential impacts of PM emissions will be minimized by using fugitive dust control measures contained in standard specifications, as appropriate. The Texas Emissions Reduction Plan provides financial incentives to reduce emissions from vehicles and equipment. TxDOT encourages construction contractors to use this and other local and federal incentive programs to the fullest extent possible to minimize diesel emissions. It is not anticipated that emissions from construction of this project will have any significant impact on air quality in the area.

Greenhouse Gas Emissions

Implementation of the proposed project would bridge the gap in the METRORapid network to provide enhanced transit services between the NWTC and Downtown Houston. The TxDOT 2018

Greenhouse Gas (GHG) inventory report identified three principal categories of strategies to reduce GHG emissions from the transportation sector:

- Federal engine and fuel controls under the CAA implemented jointly by the USEPA and USDOT, which include Corporate Average Fuel Economy (CAFE) standards as well as other reasonably foreseeable technological advances (e.g., electric or hydrogen vehicles);
- Traffic system management (TSM), which improves the operational characteristics of the transportation network (e.g., traffic light timing, pre-staged wrecker service to clear accidents faster, or traveler information systems); and,
- Travel demand management (TDM), which provides reductions in VMT (e.g., transit, rideshare, and bicycle and pedestrian facilities).

The proposed project represents a prime example of TDM strategies being implemented to reduce VMT and associated GHG emissions, and it is identified as a regionally significant project towards achieving emission reduction objectives. As stated above, implementation of the proposed project would reduce on-road VMT by approximately 39,000 vehicle miles in the estimated year of 2027 and by approximately 80,600 vehicle miles in the design year of 2045. The annual GHG emissions savings attributed to these VMT reductions would be approximately 6,526 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2027 and 11,938 $MTCO_2e$ in 2045.

Environmental Consequences

Implementation of the proposed project would bridge the gap in the rapid transit network to provide enhanced transit services between the NWTC and Downtown Houston. The forecasted transit ridership is projected to displace approximately 39,000 daily auto VMT by 2027 and 80,600 daily auto VMT by the design year of 2045. The reduction in on-road auto VMT would spur environmental benefits related to air quality, specifically by reducing emissions of O_3 atmospheric precursors, criteria pollutants, and MSAT compounds that would have otherwise been produced by passenger vehicle travel on the regional roadway network. The proposed project would facilitate enhanced connectivity to multimodal transportation hubs and job centers and is identified as a crucial component of METRONext. Replacing passenger vehicle trips with efficient public transit is a core tenet of air quality and transportation planning initiatives to reduce pollution and the dependency on fossil fuels.

The proposed project is fully programmed in the H-GAC RTP, which means that the approved Motor Vehicle Emissions Budgets (MVEBs) for the 2045 RTP and 2019 TIP Conformity Analysis that were certified by FHWA and FTA accounted for effects of the proposed project on regional transportation and air quality. Thus, the proposed project would not delay timely attainment of the O_3 NAAQS and in fact would be an essential piece of the region transportation system improvements that would aid in achieving the committed emissions reductions within the State Implementation Plan (SIP) for the Houston-Galveston-Brazoria (HGB) area. Additionally, as outlined in its Climate Action Plan, METRO is committed to procuring only zero-emission technology vehicles in expanding its fleet by 2030, which would further contribute to regional transportation planning objectives and reduce the

greater METRO systemwide air pollutant emissions. The proposed project would provide community mobility and environmental quality benefits and is fully consistent with the applicable transportation and air quality planning initiatives undertaken at the federal, state, and local levels.

Refer to **Appendix F** for the *Air Quality Technical Report* (Taha, 2022b).

4.5 Historic Resources

For this project, historic-age resources primarily refer to structures, buildings, objects, and potential historic districts that are 45 years of age or older from the time of letting (1979 or earlier). For transportation projects such as the proposed Inner Katy Project, the project must comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, NEPA, and the Antiquities Code of Texas, and be in accordance with the Advisory Council on Historic Preservation (ACHP) regulations pertaining to the protection of historic properties (36 CFR 800). Historic properties, as defined by the NHPA, are those properties that are included in, or eligible for inclusion in the National Register of Historic Places (NRHP). In addition, the proposed project falls under the purview of the Antiquities Code of Texas because METRO is a political subdivision of the State of Texas. Refer to **Figure 4-14** in **Appendix B** for Historic Resources.

Existing Conditions

Historic Markers

As one of the most visible programs of the Texas Historical Commission (THC), Official Texas Historical Markers (OTHM) commemorate diverse topics in Texas history, including: the history and architecture of houses, commercial and public buildings, religious congregations, and military sites; events that changed the course of local and state history; and individuals who have made lasting contributions to our state, community organizations, and businesses. Historical markers can be found in all 254 Texas counties. Age, significance, and architectural requirements govern the eligibility of topics and sites when applying for either a subject marker, Historic Texas Cemetery marker, or a Recorded Texas Historic Landmark marker.

The number of Historic Markers located within 500 feet of the proposed alignment and potential station locations was assessed. The Inner Katy Segment has two Historical Markers within 500 feet of the proposed alignment. The First Baptist Church of Houston (#12380, 7401 Katy Freeway) is a ca. 1977 church with a history dating back to 1841. The parish relocated to the present site from Downtown after experiencing astronomical growth during the postwar period. Olivewood Cemetery (#14239, 1300 Court Street) also features a Historical Marker (see Cemeteries for additional information).

Twenty-two Historic Markers are in the Downtown Segment project area. Refer to **Table 4-7** for a complete list of Historical Markers within the Downtown Segment.

Table 4-7: Historic Markers within the Downtown Segment

Title	Marker Number
Arthur B. Cohn House	10633
Site of Academy of the Incarnate Word	10588
Daughters of the Republic of Texas	10646
Site of Old Houston Academy	10690
Annunciation Church	10596
Thomas William House, Jr.	11952
Gulf Building	14042
The Houston Club	13445
Julia Ideson Building	13888
Houston Public Library	13093
Sam Houston Park	15758
Houston City, Republic of Texas	10692
San Felipe Cottage	10766
Pillot House	10745
Edward Mandell House	10723
Thomas William House	10689
Democratic National Convention, 1928	10648
W. L. Foley Building	10665
Houston Cotton Exchange and Board of Trade	10693
Houston Infirmary	16495
1840 Houston City Cemetery	16008
Jefferson Davis Hospital	15523

Source: THC, 2022

Cemeteries

A cemetery, burial ground, gravesite, or graveyard is a place where the remains of dead people are buried or otherwise interred. The number of cemeteries located within 500 feet of the proposed alignment and potential station locations was assessed. Three cemeteries are located within the Inner Katy Segment. These include Beth Yeshurun-Post Oak Cemetery, Woodlawn Cemetery, and Olivewood Cemetery. Beth Yeshurun-Post Oak Cemetery (HR-C096, 1037 Post Oak Road) is a 10.1-acre Jewish cemetery established in 1925 by Beth El Congregation. Adath Yeshurun congregation joined Beth El in 1947 in managing the site. An NRHP-listed site, the Woodlawn Garden of Memories Cemetery (HR-C097, 1101 Antoine Drive) was established in the 1920s. Woodlawn features ca. 1930s sculpture by renowned Mexican artist, Dionicio Rodriguez, who popularized faux boi design (Light, 2004). Olivewood Cemetery (HR-C401, 200 Court Steet), also

referred to as Hollywood Cemetery, is a historic African American cemetery dating to the late nineteenth century. At an estimated eight acres, Olivewood is the city's first incorporated Black cemetery and is currently being restored by the community.

One cemetery was identified in the project area of the Downtown Segment: the 1840 Houston City Cemetery (HR-C057, 1101 Elder Street). Located north of the Houston Terminal Subdivision Railroad, the 1840 Houston City Cemetery is Houston's first municipal burial ground. The cemetery was divided into four sections: a potter's field, a section for Black residents, commoners, and family plots. In 1893, plans were proposed to relocate the cemetery remains to build a new schoolhouse but were vehemently opposed by residents. The NRHP- and RTHL-designated Jefferson Davis Hospital was built on top of the cemetery in 1924, and a city fire station was added in 1968.

Note that impacts to a cemetery constitute a major constraint regarding regulatory compliance requirements (including required efforts to contact living descendants). Therefore, avoiding adverse impacts to any cemetery (including any associated with historic/archeological sites) is strongly encouraged.

Historic Bridges

No NRHP-listed bridges were found within 500 feet of the project area for the Downtown Segment. The Yale Street Bridge over White Oak Bayou, an NRHP-listed bridge, was demolished in 2015 and replaced with a new bridge mimicking the historical neoclassical appearance.

Historic Highway Routes

The earliest routes used by Texas inhabitants followed natural features, such as rivers and ridge lines, and connected travelers to natural resources and trade opportunities. The number of historic highway routes located within 500 feet of the proposed alignment and potential station locations was assessed. Four historic highway routes related to the Meridian Highway (in both the Inner Katy and Downtown Segments) are in the project area. In the Inner Katy Segment, Meridian Highway followed the path of Washington Avenue and Westcott Street. This section of Meridian Highway was previously recommended ineligible for the NRHP because of the numerous alterations to the historic-age road.

Although the segments of the Meridian Highway that intersect the project area have been recommended not eligible for the NRHP, some associated resources have been recommended eligible and are near the corridor and/or station locations, including a ca. 1970 Mid-Century Modern restaurant at 7300 Washington Avenue.

Historic Districts

Two NRHP historic districts fall within the 500-foot buffer of the Inner Katy Segment: Woodlawn Garden of Memories Cemetery NRHP Historic District (corresponding to Woodlawn Garden of Memories Cemetery north of the Katy Freeway) and the Heights Boulevard Esplanade NRHP Historic District. The project corridor crosses the Heights Boulevard Esplanade Historic District at Heights

Boulevard and Katy Freeway. The district extends across the Katy Freeway and has designed landscape features within the ROW of Heights Boulevard. The Houston Heights Multiple Resource Area (MRA), an NRHP inventory area consisting of 134 resources, is also present within the Inner Katy Segment. The only contributing resource within the MRA in the project area is the Heights Boulevard Esplanade.

Eight NRHP districts are in the Downtown Segment project area. Refer to **Table 4-8** for Historic Districts within the Downtown Segment.

Table 4-8: Historic Districts within the Downtown Segment

Title	Location
Main Street/Market Square Historic District	Roughly bounded by Buffalo Bayou, Fannin, Texas, and Milam Streets
Southwestern Bell Capitol Main Office	1121 Capitol Street/1114 Texas Avenue
Jefferson Davis Hospital*	1101 Elder Street
Houston City Hall	901 Bagby Street
Texas Company Building	1111 Rusk Avenue
Downtown Houston Post Office, Processing and Distribution Center	401 Franklin Street
Petroleum Building	1314 Texas Street
Battelstein's	812 Main Street

Source: THC, 2022

*Also listed as a Recorded Texas Historic Landmarks (RTHL)

Other Historic Resources

Additional historic resources were assessed within the 500-foot buffer of Inner Katy Segment. One NRHP-listed building and three buildings have already been recommended eligible for the NRHP based on previous studies. The House at 112 West 4th Street is listed in the NRHP under Criterion C for Architecture. The ca. 1903 Victorian house was listed in the NRHP in 1980 as a well-preserved dwelling near industrial activity. Two dwellings in Houston Heights are listed as eligible for the NRHP: a one-and-a-half story Queen Anne house at 321 Heights Boulevard and a two-story Mission Craftsman house at 349 Heights Boulevard. The Denny's Restaurant at 7300 Washington Avenue was recommended eligible for the NRHP from the aforementioned Meridian Highway Road survey. The ca. 1970 restaurant has a complex roof design with low pitch characteristics.

Twelve NRHP properties are in the Downtown Segment project area. Three RTHL and one state antiquities landmark (SAL) are located within the Downtown Segment. The ca. 1860 W.L. Foley Building, the ca. 1884 Houston Cotton Exchange and Board of Trade, and the 1837 San Felipe Cottage all have RTHL designations. The 1868 Pillot House is an SAL within Sam Houston Park

adjacent to San Felipe Cottage. Refer to **Table 4-9** for NRHP Properties within the Downtown Segment.

Table 4-9: NRHP Properties within the Downtown Segment

Title	Location
U.S. Custom House	San Jacinto/Rusk Streets
Houston-Post Dispatch Building	609 Fannin Street
Annunciation Church*	1618 Texas Avenue
City National Bank Building	1001 McKinney Street
Gulf Building*	710-724 Main Street
Kress Building*	705 Main Street
Julia Idelson Building*	720 Fannin Street
Arthur B. Cohn House (Relocated)	612 Chenevert Street
Texas State Hotel	720 Fannin Street
Houston Bar Center Building	723 Main Street
Stowers Building	820 Fannin Street
The Melrose Building	1121 Walker Street
1879 Houston Waterworks**	27 Artesian Place

Source: THC, 2022 *Also listed as a RTHL **Also listed as a SAL

Environmental Consequences

A historic resources survey was conducted by professional architectural historians in May and June 2022. An Area of Potential Effects (APE) of 150 feet from new ROW areas and new elevated construction was established. One hundred and four (104) historic-age resources constructed in or before 1979 were recorded. Three of the recorded resources were recommended eligible for the NRHP:

- The Heights Boulevard Esplanade Historic District and Houston Heights MRA, previously listed in the National Register of historic Places; no changes were recommended to either designated district.
- Old Fashion Church of God in Christ church sanctuary and parsonage (two buildings, built ca. 1925) at 4520 Nolda Street; recommended eligible for the NRHP under Criterion A for Ethnic History/Black at the local level.
- Phyllis Palmer and William T. Price House (1947-1951) at 1611 Basse Street; a Houston City Landmark recommended eligible for the NRHP under Criterion A for Ethnic History/Black and Criterion C for Architecture, both at the local level.

Consulting party letters were distributed in June 2022. METRO has not received comments as of November 4, 2022.

A letter report was submitted with these findings to the THC in August 2022. On September 29, 2022, the THC concurred that the Old Fashion Church of God in Christ and the Phyllis Palmer and William T. Price House are eligible for the NRHP, as recommended.

In accordance with 36 CFR 60 and 36 CFR 800.11, the criteria of effect were applied to the properties that are listed and recommended eligible for NRHP listing. This includes the Heights Boulevard Esplanade NRHP Historic District, the Houston Heights MRA, and the aforementioned resources recommended eligible for the NRHP. The proposed project would have no direct effect on any of these resources. For the Heights Boulevard Esplanade, all proposed construction would take place within the existing interstate ROW, between the main lanes and access road, and consist of an elevated busway.

Indirect impacts were also evaluated for each resource. Since the setting and feeling of all resources have already been heavily altered from the adjacent construction of I-10 in 1966 as well as subsequent development over the years, the proposed project would not have an adverse indirect effect to historic properties. Noise impacts were also evaluated for each historic property. Traffic noise modeling determined that there would be no impact or less noise impact than current levels based on the proposed project. No vibration impacts are expected in either segment of the project based on FTA General Vibration Assessment methodology. THC concurred with the report findings as of September 29, 2022. Refer to **Appendix G** for *Historic Resource Coordination*.

4.6 Archeological Resources

An archeological site is a place (or group of physical sites) in which evidence of past activity is preserved (either prehistoric or historic or contemporary), and which has been, or may be, investigated using the discipline of archaeology and represents a part of the archeological record. Sites may range from those with few or no remains visible above ground, to buildings and other structures still in use.

Existing Conditions

To evaluate the level of constraint of archeological resources for the corridor, a 500-foot buffer of the existing centerline was utilized for a search of the THC Archeological Sites Atlas and Texas Archeological Research Laboratory Resources (TARL) datasets:

- Archeological Sites
- NRHP-listed Archeological Districts
- Historical Markers
- Historic Highway Routes
- Cemeteries
- TxDOT Historic Bridges
- TxDOT Historic Properties

It should be noted that this approach is meant to provide a general impression of site/resource density along each segment of the corridor, and that a greater density of sites/resources is generally correlated with a greater likelihood of resources that may present constraints. The full picture of each segment's sensitivity only truly emerges at the scale of specific resources, their contexts, and their individual relationships to the segment. A single highly significant or sensitive archeological site, NRHP-listed archeological district, resource, or cemetery, near a proposed segment can present a more serious constraint than dozens of minor archeological sites.

Due to laws protecting the recorded locations of archeological sites, no such resources can be shown in a publicly disseminated figure. However, geographic locations of publicly disclosable archeological sites can be found in **Figure 4-15** in **Appendix B** for Known Archeological Sites for use by WSP and METRO. It should be noted that the constraints presented in this evaluation are limited to previously identified archeological resources; the absence of previously identified archeological resources does not mean that none exist in those areas of each corridor.

Environmental Consequences

Archeological resources are very common in Downtown Houston, and this is reflected in those corridor segments that enter the downtown or central Houston areas. Seven previously recorded sites are in the Downtown Segment near the terminus of the project area. Three of those sites are within the proposed project footprint and are discussed below.

Northwest Transit Center

No resources are expected to be impacted at the NWTC.

Proposed Memorial Park Station

One recorded archeological resource is mapped within the 500-foot buffer project area. 41HR614, or Camp Logan, was originally recorded in 1989 and has subsequently been subjected to multiple investigations. Between 2017 and 2019 Gray & Pape conducted the first systematic surveys to cover all portions of Memorial Park, including mapping of all encountered features. As a result of these surveys, Gray & Pape recommends that the site boundary for 41HR614 be adjusted to include all the historic footprints of Camp Logan within the boundaries of Memorial Park. This adjustment is based on the locations of newly mapped Camp Logan features (which are located outside the current 41HR614 boundary) as well as a geo-referenced map of the camp completed as part of the U.S. Army's construction completion report of the camp. The research potential at 41HR614 is high and the remains of Camp Logan are one of the few preserved examples of a World War I am training camp in the United States. There is also potential research value in the process of transition from military camp to city park and early 20th century recreation. Additionally, 41HR614 is a SAL (Atlas No. 8200003264).

Proposed Shepherd/Durham Station

No known archeological resources were found within 500 feet of the proposed Shepherd/Durham Station.

Proposed Studemont Station

Approximately 800 feet southwest of the proposed Studemont Station is the Historic Olivewood Cemetery (41HR1071). Site 41HR1071 is an historic African American cemetery. The site includes burials, markers, a cistern, and site of the caretaker's cottage. This site is privately operated by a non-profit, 501(3) corporation registered in Texas. 41HR1071 is also listed as included in the Texas Historical Landmark. The cemetery dates to 1875 and spans approximately eight acres south of White Oak Bayou. Besides the cemetery, no known archeological resources were found within 500 feet of the proposed station footprint.

Proposed Franklin/Bagby Station

No known archeological resources were found within 500 feet of the proposed Franklin/Bagby Station footprint.

Proposed St. Emanuel/EaDo Station

No known archeological resources were found within 500 feet of the proposed St. Emanuel/EaDo Station footprint.

METRORail Station Improvements

Three archeological resources have been previously recorded in the vicinity of the proposed METRORail Stations improvements along Capitol and Rusk Streets in Downtown. Site 41HR978 consists of buried remnants of cisterns, trash pits, privy pits, house foundation elements, and similar archeological resources originating from mid-nineteenth-to early-twentieth-century residential and light commercial occupations. It is considered ineligible for inclusion to the NRHP. Site 41HR861 is an historic site consisting of two cisterns exposed via mechanical scraping. It is considered ineligible for inclusion to the NRHP. Site 41HR795 was recorded as comprising of over 1,700 fragments of historic period ceramics, glass, and architectural material dating from latter third of the [1]9th century into the [2]0th century. It is considered ineligible for inclusion to the NRHP.

Archeological Survey

In May 2022, Cox|McLain Environmental Consulting, Inc. (now Stantec) conducted an intensive archeological survey within the APE. The fieldwork was carried out over the course of a single field session under Texas Antiquities Permit #30651 by archeologists Bennett Kimbell and Pedro Torres of Stantec under the supervision of Principal Investigator Ryan Hale.

Results of the survey indicate that the APE has been substantially and significantly disturbed by construction and maintenance of existing highways, streets, and intersections; rail construction and maintenance; channelization of waterways; construction and demolition of industrial facilities; commercial and residential development; and above- and below- ground utility installation. Two shovel test units were placed judgmentally in areas that seemed relatively intact, but both showed significant disturbance by construction or landscaping activity. No artifacts or features were found during this survey. Considering these factors, no archeological historic properties would be adversely affected by the project.

No further archeological work is recommended prior to construction. Per Texas Historical Commission requirements, if any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease in that area and METRO personnel should be notified immediately. During evaluation of any unanticipated finds and coordination between METRO and THC, clearing, preparation, and/or construction could continue in any other areas along the corridor where no such deposits or materials are observed. THC concurred with the report findings as of November 7, 2022.Refer to **Appendix H** for *Archeological Resource Coordination*.

4.7 Section 4(f) - Public Parks, Wildlife Refuges, and Historic Buildings

Existing Conditions

Four parks and two trails were identified within a 500-foot buffer of the Inner Katy Segment. Six parks were identified within a 500-foot buffer of the Downtown Segment. **Table 4-10** below includes parks identified through additional records searches, review of past reports, and reviews of aerial mapping. Refer to **Figure 4-16** in **Appendix B** for Identified Parks.

Table 4-10: Identified Parks

Name	Managing Entity	Total Park/Trails Area (Acres)	Distance from project area (ft)	Description
Memorial Park	Houston Parks and Recreation Department/ Memorial Park Conservancy	1,500 acres	Adjacent	City Park
Cottage Grove Park	Houston Parks and Recreation Department	1.97 acres	300ft N	City Park
White Oak Bayou Greenway	Houston Parks and Recreation Department	11,392 acres (17.8 miles)	Intersects (BRT crosses over)	Trail
MKT Trail	Houston Parks and Recreation Department	2,944 acres (4.6 miles)	Intersects (BRT crosses over)	Trail
Bayou Greenways Park	Houston Parks and Recreation Department	2.0 acres	375ft N	City Park
American Statesmanship Park	Harris County	1.0 acre	Adjacent	Statue
Sesquicentennial Park	Buffalo Bayou Partnership/ Houston Parks and Recreation Department	22.5 acres	Adjacent	City Park
Little Tranquility Park	Houston Parks and Recreation Department	1.01 acres	Adjacent	City Park
Tranquility Park	Houston Parks and Recreation Department	19.7 acres	Adjacent	City Park
Jones Plaza	Houston Parks and Recreation Department	1.39 acres	Adjacent	City Park
Hermann Square	Houston Parks and Recreation Department	1.44 acres	400ft E	City Park
Discovery Green	Discovery Green Conservancy/ Houston Parks and Recreation Department	12.0 acres	380ft W	City Park

Source: City of Houston, 2020; Google Earth, 2022, City of Houston Parks inventory, 2022.

Memorial Park and American Statesmanship Park are located immediately adjacent to the Inner Katy Segment. Trails within the White Oak Bayou Greenway include White Oak Bayou and MKT Trail, both cross under the Inner Katy Corridor near Studemont Street. All identified parks and trails

are active; no passive parks exist in the study area. No wildlife refuges are located within the study area.

Environmental Consequences

The Inner Katy Segment and proposed station locations would enhance access to existing parks along the alignment, especially parks and trails that are near the proposed stations, including Memorial Park, Cottage Grove Park, Bayou Greenway Park, American Statesmanship Park, the White Oak Bayou Greenway trail, and MKT trail. The proposed project does not require ROW acquisition from any parks or trails. The Inner Katy Project would have a positive impact on the recreational parks and trails located along the corridor through enhanced access and use. METRO would require that design and letting documents indicate that all construction equipment should remain outside of park and trail boundaries so that no temporary construction impacts would occur.

Stations to be constructed at Memorial Park and Studemont Street would provide additional connectivity to the recreational resources and trails that currently exist in the project area. The new Inner Katy BRT access to both these stations would alleviate parking congestion at White Oak Bayou and at Memorial Park in particular, which is a major urban park. No adverse impacts would occur to parks, trails, or wildlife refuges as a result of the proposed project for either Option 1 or Option 2. Refer to **Appendix D** for the *Land Use and Parks Technical Memorandum* (Stantec, 2022b) for more details.

4.8 Socioeconomics, Community Impacts, and Environmental Justice

Existing Conditions

For the Inner Katy Segment, the total minority populations range from approximately 12.7 percent to 92.1 percent of the total population in each of the 27 block groups in the project area. The total minority percentage for Harris County was 70.4 percent and for the City of Houston was 75.6 percent based on the American Community Survey data. None of the block groups within the project area reported a median household income below the Department of Health and Human Services (DHHS) poverty level for a family of four ($27,750). However, three block groups had median household income lower than the City of Houston's and Harris County's median household income ($52,338 and $61,705 respectively).

For the Downtown segment, minority populations ranged from 31.3 percent to 59.7 percent. None of the block groups met or exceeded the total minority population percentages for the City of Houston (75.6 percent) or Harris County (70.4 percent). None of the block groups had a median household income below the DHHS poverty level. Refer to **Figures 4-11** and **4-12** in **Appendix B** for Minority Populations and Low-Income Households. Refer to **Appendix C** for the *Socioeconomics, Community Impacts, and Environmental Justice Memorandum* (Stantec, 2022a) for more details.

Regarding the existing transportation system from the perspective of assessing changes in travel patterns and access, in addition to the interstate and local street network, there are several existing transportation facilities, including railroads and intermodal facilities managed by Houston METRO.

These transportation facilities include bus routes, bus stops, and transit centers and were identified within the 500-foot buffer of the proposed alignment. Using data obtained from the City of Houston, approximately 73 METRO bus stops and 45 METRO bus routes are located within the Inner Katy segment. Using data obtained from the City of Houston, approximately 132 METRO bus stops and 50 METRO bus routes are in the downtown segment. In addition, the project area contains existing METRORail stations. The Green, Purple, and Red Rail Lines intersect the 500-foot buffer of the proposed alignment.

Given the urban nature of the project area, there are numerous community facilities present. Eight places of worship, six schools, nine local/state government facilities, two community centers, two police stations, one fire station, one medical facility, one social services organization, one funeral home, one assisted living center, one veteran's center, one cemetery, five performing arts theaters/music venues, two non-profits, two post offices, two stadiums, one employment agency, one foreign consulate, one federal prison, and one military base were identified within the project area. Field reconnaissance conducted in February 2022 identified several facilities associated with one of the places of worship: Impact Houston Church of Christ, which is located adjacent to the corridor where the alignment curves to the south into Downtown. These facilities include a worship center and offices, a teen house, ministry building, children's center, resource center, and a warehouse. All these facilities associated with the Impact Houston Church of Christ had signage in Spanish. Refer to **Figure 4-13** in **Appendix B** for Community Facilities.

Northwest Transit Center

The NWTC study area intersects four block groups, which contain minority populations that range from approximately 26.8 to 50.6 percent of the total population; however, no low-income block groups exist within the NWTC study area.

The Spring Branch East Super Neighborhood includes the NWTC project study area. One community facility, Concentra Urgent Care, is located within the project area of the existing transit center. No METRO bus stops are located within the NWTC project study area; however, nine METRO bus routes traverse the project area.

Proposed Memorial Park Station

The proposed Memorial Park Station intersects three block groups which contain minority populations that range from approximately 15.6 to 38.9 percent of the total population; no low-income block groups exist within the station study area.

The Memorial Park Neighborhood and the Washington Avenue Coalition/Memorial Park Super Neighborhood boundaries meet near the proposed station. No community facilities are located within the project area of the potential station. However, Memorial Park which includes several athletic facilities is located adjacent to the proposed Memorial Park Station. No METRO bus stops are located within the potential station project area, but 13 METRO bus routes traverse the Memorial Park Station study area.

Proposed Shepherd/Durham Station

The proposed Shepherd/Durham Station intersects four block groups, all of which contain minority populations that range from approximately 26.4 to 49.5 percent of the total population; no -low-income block groups exist within the proposed station area.

The Washington Avenue Coalition/Memorial Park Super Neighborhood includes this station. No community facilities are located within the project area of the potential station. Three METRO bus stops and 26 METRO bus routes are within the Shepherd/Durham Station project study area.

Proposed Studemont Station

The proposed Studemont Station intersects three census tracts which contain minority populations that range from approximately 21.8 to 53.5 percent; no low-income census block groups exist within the station study area.

The Washington Avenue Coalition/Memorial Park Super Neighborhood and Greater Heights Super Neighborhood meet near this station. No community facilities are located within the project area of the potential station. No METRO bus stops are located within the potential station project area, but 34 METRO bus routes traverse it.

Proposed Franklin/Bagby Station

The proposed Franklin/Bagby Station intersects two block groups, both of which contain minority populations that are approximately 31.3 and 42.2 percent of the total population; however, no low-income census block groups exist within the station project area.

No community facilities are located within the project area of the potential station; however, Sesquicentennial Park is located adjacent to the proposed Franklin/Bagby station. The station project area is within the Downtown Super Neighborhood. Eight METRO bus stops and 25 METRO bus routes traverse the proposed Franklin/Bagby Station project area.

Proposed St. Emanuel/EaDo Station

The proposed St. Emanuel/EaDo Station intersects two block groups, both of which contain minority populations that are approximately 56.3 to 59.7 percent of the total population; no low-income census block groups exist within the station project area.

Three community facilities within the project area of the proposed St. Emanuel/EaDo Station include the George R. Brown Convention Center, which houses the Houston Police Station-Downtown, and the PNC Financial Services (PNC) Stadium. The station project area is within the Downtown Super Neighborhood. Eleven METRO bus stops and the Green and Purple Lines intersect at the 500-foot buffer of the proposed St. Emanuel/EaDo Station project area.

Existing METRORail Stations

The existing METRORail stations in the project area include the Theater District, Central Station, and Convention District stations. This project area intersects two block groups, both of which

contain minority populations from approximately 31.3 to 42.2 percent of the total population; no low-income census block groups exist within the station project area.

Several community facilities are located within the project area for the three METRORail stations. Eight community facilities were identified around the existing Theater District, including three local civic institutions (Houston City Hall, Houston Public Works, and City of Houston Human Resources), two performing arts theatres (Jones Hall for the Performing Arts and Alley Theatre), two federal institutions (United States District Courthouse and United States Postal Service), and one park (Tranquility Park).

Six community facilities were identified around the Central Station, including two federal institutions (Federal Detention Center Houston and United States Postal Service), one place of worship (Christ Church Cathedral), a foreign consulate (Consulate General of Japan in Houston), a military base (Houston Military Entrance Processing Station), and a non-profit (High School for the Performing and Visual Arts Friends).

Four community facilities were identified around the Convention District station, including the George R. Brown Convention Center, which houses the Houston Police Station-Downtown, an employment agency (Workforce Solutions), and one school (Incarnate Word Academy).

Environmental Consequences

Regarding displacements and environmental justice considerations, none of the six commercial displacements for the proposed project would occur within a census block group containing mostly minority or low-income populations. However, the Executive Order 12898 term "disproportionately high and adverse effect" considers the totality of significant individual or cumulative human health or environmental impacts. Analysts reviewed the noise and visual quality technical reports for potential environmental justice considerations. A review of the noise technical report identified a densely developed portion of the project area where moderate noise impacts would occur. Although displacements would not be required in this area, analysts collected census block level data from 2020 that just became available in 2022. That data shows that Census Tract 5106, Block Group 2 contains blocks 2004 and 2009. The total minority population in those blocks was 63 percent (block 2004) and 76 percent (block 2009). In addition, there is an existing noise wall that runs between Thompson and Bass Streets which are located between the larger boundaries of Patterson and Yale Streets. During the visual quality technical report, this area was identified as a location where visual screening should potentially be considered if the design option is elevated and visible in this location, and/or if noise mitigation options are considered that could incorporate aesthetic treatments. From an air quality perspective, enhancing transit options and reducing single-occupancy vehicle trips would help improve air quality.

Because Option 1 joins the existing CBD ramp heading into downtown, the alignment would be farther from adjacent land uses compared to Option 2. As discussed in the *Visual Quality Technical Report* (**Appendix M**), the elevated portions of Option 2 that run closer to existing land uses could

obstruct existing views more than Option 1. Due to the existing elevated transportation infrastructure, existing below-grade main lanes, and visual screening from trees, it is possible that adverse visual impacts could be mitigated with replacement screening.

Regarding impacts to changes in travel patterns and access, permanent adverse impacts would be limited. ROW impacts are minimal. The Inner Katy guideway would be constructed within existing ROW, between main lanes and frontage roads along an existing CBD ramp or new structure that would not substantially change the ways drivers would use the corridor. For bicyclists and pedestrians, there would be no permanent adverse impacts to designated routes. The proposed transit route and stations would connect with bicycle and pedestrian facilities allowing a "one seat ride" from Uptown Galleria, through NWTC, across the proposed stations, and to Downtown. Other benefits associated with the proposed project would include enhanced safety, improved mobility, and added capacity.

Regarding the community facilities discussed for the Inner Katy and Downtown Segments, additional access to this transit facility would be available especially for those within walking or bicycling distance from the existing and proposed stations.

Where ROW impacts would occur, displaced entities would receive assistance through compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Act) (FHWA 2015a). For all displacements incurred as a result of the proposed project, METRO would comply with the Uniform Act of 1970 by providing protections and relocation assistance for the displaced entities. Due to the limited number of displacements, the potential for visual screening or aesthetic treatments, the improved access to the transit amenity, and the additional mobility and access to community facilities provided around station areas, the adverse impacts to communities would be minimal. Based on current information, there does not appear to be disproportionately high and adverse direct impact on minority and low-income populations associated with Option 1 or Option 2.

Northwest Transit Center

The proposed guideway facility would not be noticeable since it would be collocated with the existing elevated facilities serving NWTC.

Proposed Memorial Park Station

Memorial Park Station would be dominant in the landscape but as shown in **Exhibit 3-4**, the station would be aesthetically pleasing, would provide access to transit and Memorial Park, and for these reasons could be considered a beneficial rather than adverse impact.

Proposed Shepherd/Durham Station

The Shepherd/Durham Station would be dominant in the landscape because it would be elevated with an aerial pedestrian walkway connecting to a bus platform. As shown in **Exhibit 3-5**, the station

would be aesthetically pleasing, would provide access to a bus platform, and would bring this transit amenity to a densely developed residential area.

Proposed Studemont Station

Studemont Station would be constructed on the elevated guideway and would include an aerial pedestrian walkway over White Oak Bayou floodplain and over Montrose Street. It would be considered co-dominant in the landscape with existing highway infrastructure. The existing condition and the visual rendering for Studemont Station are shown in **Exhibit 3-6**.

Proposed Franklin/Bagby Station

The Franklin/Bagby Station would be constructed on an existing parking lot located in the shadow of I-45 next to Buffalo Bayou, Downtown Aquarium, and the Downtown POST Houston development (former Post Office building). The visual quality is considered moderate given the park setting at Buffalo Bayou and the potential for travelers to view several notable buildings when riding the current METRO routes. The visual sensitivity in this location is considered low. Construction of an at-grade station in this location would be compatible with the urban environment.

4.9 Hazardous Materials

Existing Conditions

An All-Appropriate Inquiry (AAI) Phase I Environmental Site Assessment (ESA) was performed for proposed METRORapid Inner Katy Project. The Phase I ESA consisted of a site visit on March 9, 2022, and review of readily available documents.

Methodology

The Phase I ESA was divided into several tasks: the physical setting data evaluation, the historical information review, any information provided by the client (in this case METRO), regulatory records review, and development of findings, conclusions, and the opinion of the environmental professional. Physical setting data are typically consulted when conditions have been identified in which potentially hazardous materials or petroleum related products are likely to migrate to the project site, from the project site, or within the project site into groundwater or soil. The historical information review portion was performed to develop a history of the site and adjoining properties to identify past uses suggesting the presence of environmental conditions that pose a risk of encountering hazardous materials during the development of the project site. Federal and state databases compiled by an environmental database company, Environmental Risk Information Services (ERIS), were reviewed to identify registered or documented facilities which may present an environmental project site. Reasonably ascertainable standard regulatory sources were reviewed for the project site and vicinity within minimum search distances, as detailed in the AAI Standard. Current site uses (as determined from aerial photograph and other records) were documented, paying particular attention to uses involving the treatment, storage, disposal, or generation of hazardous substances or petroleum products, apparent evidence of past or present underground petroleum storage tanks, or aboveground storage tanks.

Records Review Results and Site Visit

A review of environmental regulatory records was performed in March 2022 to evaluate whether the subject properties or nearby properties have faced or are currently facing any regulatory actions, fines, or notices of violation for conditions that may have an environmental impact on the study area (ERIS 2022).

Environmental Records Sources

Available federal and state information sources were reviewed to identify sites of potential environmental concern within the applicable AAI search radii for each database. The database search from the project site, which is the property that was used to create a search point to generate the reports from ERIS, were based on property boundaries as shown on the ERIS Radius Map. As a note at the time the ERIS search was completed, existing parcel boundaries were used to complete the search to ensure full coverage and all potential environmental sites were addressed. The project site in this report lies wholly within the defined ERIS search parameters. A listing of databases searched in support of this Phase I ESA is presented in the ERIS Database Report (2022). Due to the size of the report, it is available in the METRO project files.

ERIS Listed Sites

A total of 1,291 database records at 562 mapped sites were documented within the standard radius of the proposed project corridor in the ERIS database report for the proposed project corridor. Among the environmental conditions noted in the database report located within the standard radii of the proposed project and that may have the potential to affect the proposed project are six Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) records/ six CERCLIS No Further Remedial Action Planned (NFRAP) sites, one Superfund Enterprise Management System (SEMS), five SEMS archive sites [archived Superfund sites], six federal brownfields, one state Superfund site, one state hazardous waste site (SHWS), 168 Leaking Petroleum Storage Tank (LPST) records, 28 historic leaking tanks (HIST TANK), 17 Activity and Use Limitation (AUL), 12 Innocent Owner/Operator Program (IOP), 24 Texas Municipal Setting Designations (MSD), 20 Toxic Substances Control Act (TSCA) manufacturers, 12 potentially responsible parties (PRP), one polychlorinated biphenyl (PCB) activity record, one Formerly Used Defense Site (FUDS), six potential concerns for dry cleaner sites, 19 groundwater contamination cases (GWCC) and nine historic GWCC, and 89 Industrial Hazardous Water Corrective Actions (IHW CORRACTS).

Out of the database records listed above, within the corridor and immediately adjacent to the proposed easements and right-of-way along I-10, hazardous materials sites and locations are listed in **Table 4-11** below, and shown on **Figure 4-18** in **Appendix B**.

Table 4-11: Hazardous Materials Sites in the Vicinity of the I-10 BRT Corridor

Map Key #	Database	Company/ Site Name	Address	Direction*	Distance (miles/ feet)	Elevation Difference (feet)
556	IHW CORRECTIVE ACTION	HELFMAN DODGE	1031 SILBER RD HOUSTON TX 77055	WNW	0.77/ 4,048.06	11
558	IHW CORRECTIVE ACTION	TWO SOILS EXCAVATIONS SOUTHERN PART OF FACILITY	1100 SILBER RD HOUSTON TX 77055	WNW	0.79/ 4,166.07	11
562	IHW CORRECTIVE ACTION	SILBER 3 PROPERTY HOUSTON	1150 SILBER RD HOUSTON TX 77055	WNW	0.93/ 4,912.71	12
16	IHW CORRECTIVE ACTION	BERGER IRON WORKS	1414 BONNER ST HOUSTON TX 77007	NNE	0.15/ 809.76	1
19	LPST	HOUSTON COMPRESSED STEEL	101 YALE ST HOUSTON TX 77007	NE	0.25/ 1,344.67	0
39	DRYCLEANERS	SUPERMATIC CLEANERS	1801 DURHAM DR STE 6 HOUSTON TX 77007	NW	0.05/ 281.39	0
42	MSD	357 YALE	357 YALE ST HOUSTON, TX 77007	NNE	0.05/ 283.48	-11
201	IOP	1402 CROCKETT	1402 CROCKETT ST HOUSTON, TX 77007	E	0.19/ 1,1018.40	-12
475	LPST	NORTHWEST TRANSIT CENTER	IH 10 LOOP 610 HOUSTON, TX	WNW	0.08/ 437.91	-6

*N= north, S= south, W= West, E= east

Source: ERIS, 2022

Within the proposed downtown stations and corridor, hazardous materials sites and locations are listed in **Table 4-12** below, and shown on **Figure 4-18** in **Appendix B**.

Table 4-12: Hazardous Materials Sites in the Vicinity of the I-10 BRT Corridor – Downtown Segment

Map Key #	Database	Company/ Site Name	Address	Direction*	Distance (miles/ feet)	Elevation Difference (feet)
247	PST, HIST TANK, FINDS/FRS	FIRESTATION 1 HEADQUARTERS	410 BAGBY STREET HOUSTON TX 77002	E	0/0	-17
268	HIST TANK (2)	FIRE STATION 1	510 PRESTON STREET HOUSTON TX 77002	E	0.06/ 306.39/0	-21
290	LPST	STREET MAINTENANCE	803 RUSK ST HOUSTON, TX 77002	ESE	0/0	-7
307	PRP (8); PROPOSED NPL	SOUTHERN PACIFIC TRANSPORATION COMPANY	808 TRAVIS, STE 620 HOUSTON TX 77002	ESE	0.01/ 47.46	-8
362	GWCC, GWCC HIST (2)	BLOCK 94	801 FANNIN ST HOUSTON TX 77007	ESE	0.02/ 83.18	-8
363	IOP	BLOCK 69	NO ADDRESS, FANNIN HOUSTON TX 77007	ESE	0.01/ 27.91	-8
382	FINDS/FRS, GWCC HIST, GWCC	SAN JACINTPO STREET, BLOCK 95	801 SAN JACINTO HOUSTON TX 77007	ESE	0.01/ 74.49	-10
394	PRP, NPL	D.J.M.A. Corporation	806 CAROLINE STREET, HOSTON TX 77002	ESE	0.01/34.32	-9
457	APAR	HOUSON ENDOWMWNT BLOCK 99 and 121 PROPERTIES	NORTHWEST CORNER OF RUSK AND AVENIDA DE LAS AMERICAS	ESE	0/0	-11
459	LPST, PST, FINDS/FRS, HIST TANK	FORNER TEXACO STATION	1702 CAPITAL ST HOUSTON, TX 77007	ESE	0/16.48	-11
492	VCP	BLOCKS 183, 196, 197 DOWNTOWN	CAPITAL AVENUE AT ST. EMANUEL HOUSTON, TX	ESE	0.01/ 28.29	-11
496	MSD	SIX BLOCK AREA	220 TEXAS ST HOUSTON, TX7702	ESE	0.07/ 365.55	-9

Map Key #	Database	Company/ Site Name	Address	Direction*	Distance (miles/ feet)	Elevation Difference (feet)
502	LPST, UST, IHW CORRECTS, GWCC (2), APAR, GWCC HIST	ABANDONED PYRAMID ROOFING, BBVA COMPASS STADIUM	220 TEXAS ST HOUSTON, TX 77002	ESE	0.01/ 510.98	-11
515	FED BROWNFIELDS	DYNAMO STADIUM	810 DOWNING STREET HOUSTON TX 77002	ESE	0.19/ 981.02	-10

*N= north, S= south, W= west, E= east

Source: ERIS, 2022

Observed Sites During Site Visit

Capped monitoring wells were observed on two sides of the Franklin/Bagby Station. New construction and redevelopment were noted within the corridor, particularly in the Heights area near the proposed Studemont Station.

Environmental Consequences

The current and historic use of most of the project site as a transportation corridor is consistent with the proposed use as a BRT corridor. Based on the site visit conducted on March 9, 2022, and the data reviewed in the ERIS reports, historic environmental conditions and current land uses that may pose a moderate risk of encountering hazardous materials were identified within the proposed easements and parcels of the project site, or on adjacent properties with the potential of environmentally impacting the project site. A total of 1,291 database records at 562 mapped sites were documented within the standard radii of the proposed project corridor. Fourteen of these sites are located within and an additional 668 sites are located immediately adjacent (within 0.125-mile) to the proposed ROW and easements. Many of these records are historically contaminated sites with some level of remediation work. These historic sites have the potential to retain groundwater and soil contamination that could affect the project site. No oil and gas wells or pipelines are located on the project site.

A transient encampment was observed within the proposed corridor adjacent to White Street, which may pose a health and safety risk to construction crews.

Due to the historic and current use of the properties adjacent to the project site, there is a moderate risk of encountering conditions that are indicative of releases or threatened releases of hazardous substances and potentially contaminated soils and/or groundwater. A Phase II ESA is recommended for all areas where right-of-way is acquired, deep impacts (such as the placement of bridge bents/piers) are planned, and if soil removal or groundwater disturbance is anticipated in the Downtown Houston area.

Mitigation

Mitigation measures, if needed, would be determined after the recommended Phase II analyses are performed. A Phase II ESA would be conducted once final design is complete. Refer to **Appendix I** for the *Phase I ESA* for more details.

4.10 Noise and Vibration

FTA Transit Noise Impact Criteria

The FTA transit noise impact criteria are based on well-documented research on community response to noise and are based on both the existing level of noise and the change in noise exposure due to a project. The FTA noise criteria compare the project noise with the existing noise (not the no-build noise). This is because comparison of a noise projection with an existing noise condition is more accurate than comparison of a projection with another noise projection. Because background noise may increase by the time the project is operational, this approach of using existing noise conditions is conservative.

The FTA noise criteria are based on the land use category of the sensitive receiver. The descriptors and criteria for assessing noise impact vary according to land use categories adjacent to the project alignment. For Category 2 land uses where people live and sleep (e.g., residential neighborhoods, hospitals, and hotels), the day-night sound level (Ldn) is the assessment parameter. For other land use types (Category 1 or 3) where there are noise-sensitive uses (e.g., outdoor concert areas, schools, and libraries), the equivalent sound level (Leq) for an hour of noise sensitivity that coincides with project activity is the assessment parameter. **Table 4-13** summarizes the three land use categories.

Table 4-13: Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Land Use Type	Noise Metric A-weighted Decibels (dBA)	Description of Land Use Category
1	High Sensitivity	Outdoor Leq(1hr) *	Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and national historic landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category.
2	Residential	Outdoor Ldn	This category is applicable to all residential land use and buildings where people normally sleep, such as hotels and hospitals.
3	Institutional	Outdoor Leq(1hr) *	This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category.

Source: FTA, 2018

* Leq(1hr) for the loudest hour of project-related activity during hours of noise sensitivity.

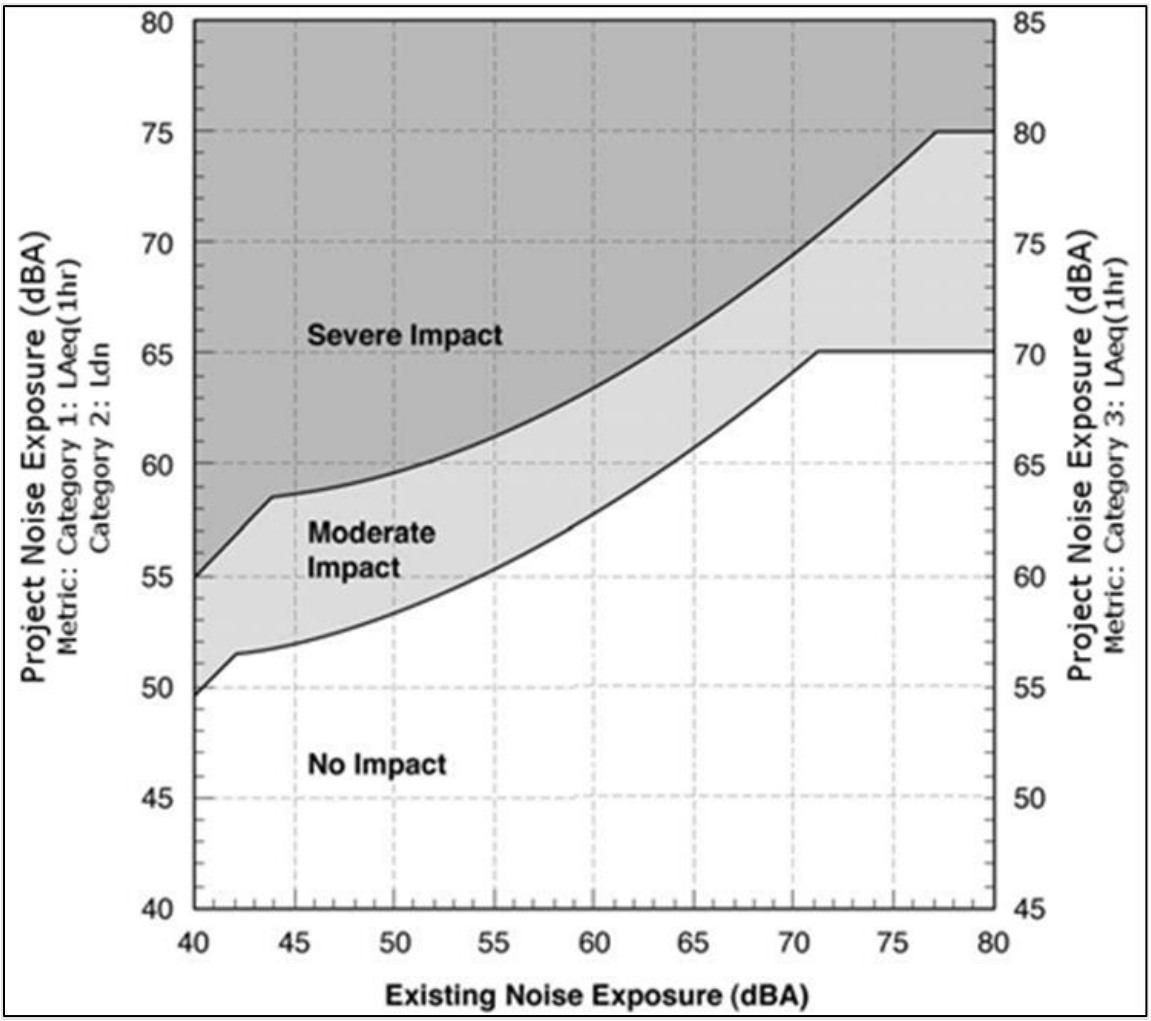
Exhibit 4-16 shows the two curves that are defined in the FTA noise impact criteria. These curves allow increasing project noise as existing noise levels increase, up to a point at which impact is determined based on project noise alone. The FTA noise impact criteria include three levels of impact. The three levels of impact include:

No Impact: Project-generated noise is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required.

Moderate Impact: Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties.

Severe Impact: Project-generated noise in this range is likely to cause a high level of community annoyance. The project sponsor should first evaluate alternative locations/alignments to determine whether it is feasible to avoid severe impacts altogether. If it is not practical to avoid severe impacts by changing the location of the project, mitigation measures must be considered.

Exhibit 4-16: FTA Noise Impact Criteria



Source: FTA, 2018

The FTA noise impact criteria described above are based on levels of exterior noise and are designed to provide protection for both outdoor and indoor land uses. However, for locations where noise impact will be evaluated but there is no sensitive outdoor land use, such as apartment buildings, hotels or upper levels of multi-story buildings, indoor criteria can be used. In these cases, the criterion for indoor noise levels from project sources is a Ldn of 45 dBA. This criterion is consistent with Federal Aviation Administration (FAA) policy.

Methodology

The methodology for assessing noise impact from the BRT project included the following steps:

- Identify noise-sensitive land uses in the corridor using aerial photography, GIS data and field surveys, typically within a distance of up to 500 feet from the alignments (based on the FTA noise impact screening distance for busways where the sound path is unobstructed).

- Measure or estimate existing noise levels in the corridor near sensitive receivers.

- Predict future project noise levels from transit operations, using preliminary engineering plans and information on speeds, headways, and vehicle type. The project noise impact assessment includes noise from BRT, regional express and express bus operations, as well as idling noise from BRT buses at stations. Details regarding the information used to predict future project noise levels can be found below.

- Assess the impact of the project by comparing the predicted future project noise levels with the existing noise levels using the FTA noise impact criteria presented above.

- Recommend mitigation at locations where predicted future noise levels exceed the FTA impact criteria.

Project noise levels from transit operations are based on source reference levels in the FTA guidance manual and the current design of the proposed project. This information was used to predict noise levels at sensitive locations from the proposed alignments. Specific inputs used in the noise impact assessment include the following:

- Locations of the noise sensitive receivers in relation to the guideway, including the distances between the guideway and sensitive receivers and relative elevations

- A source reference noise level for diesel buses of 82 dBA SEL[1] at 50 feet and 50 miles per hour (mph)

- Bus speeds of 50 mph along the elevated freeway portion of the busway, 30 mph on the connecting ramps to/from the NWTC and Downtown, and 30 mph along the Downtown route

- The weekday schedule for the buses operating on the Inner Katy Segment is as follows:

[1] The SEL is the cumulative noise exposure from a single noise event (e.g., a bus passage), normalized to an interval of one second. SEL contains the same overall sound energy as the actual varying sound energy during the event and is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both Leq and Ldn. The SEL metric is A-weighted and is expressed in the unit dBA.

- The BRT buses will operate with a headway of six minutes in each direction between 4:30 AM and 12:00 Midnight
- There will be a combined total of 411 inbound and 448 outbound regional express and express bus operations during the daytime hours (7:00 AM to 10:00 PM)
- There will be a combined total of 113 inbound and 84 outbound regional express and express bus operations during the nighttime hours (10:00 PM to 7:00 AM)

- Along the Downtown Segment, BRT buses will operate with a headway of six minutes between 4:30 AM and 12:00 Midnight on weekdays

- A source reference noise level for idling diesel buses of 88 dBA SEL at 50 feet (corresponding to a noise level emission of 75 dBA at 50 feet for a period of 20 seconds)

Existing Conditions

The areas adjacent to the proposed alignments for Inner Katy Options 1 and 2 include a mix of residential, institutional, commercial, and industrial land use. Noise-sensitive receivers located along the alignments primarily consist of single-family and multi-family residences, but also include a hotel, two churches, and parks as well as the Houston SPCA. Traffic on I-10 and adjacent service roads is the most significant source of existing noise along the project alignments.

The areas adjacent to the proposed alignment for the Downtown Segment include a mix of residential, institutional, and commercial land use. Although the land use is primarily commercial, noise-sensitive receivers located along the proposed BRT route include residential apartment buildings, hotels, schools, and parks, as well as the Downtown Aquarium, Hobby Center for the Performing Arts, Federal Courthouse and Jones Hall for the Performing Arts. The primary sources of existing noise at these locations include motor vehicle traffic on local streets and nearby freeways, as well as light rail train operations along portions of the proposed BRT route.

The existing noise conditions along the Inner Katy Segment were characterized based on noise measurements at representative noise-sensitive locations along the project alignments during July of 2021. The noise measurement program consisted of both long-term (18 to 24-hour) and short-term (one-hour) monitoring of the A-weighted sound level in decibels (dBA) at sites that represent a range of existing noise conditions along the project alignments. Long-term noise measurements were made at nine sites and short-term noise measurements were made at eight sites.

The existing noise conditions along the Downtown Segment were characterized based on noise measurements at representative noise-sensitive locations along the project alignments during January 2022. The noise measurement program consisted of both long-term (three-hour) and short-term (one-hour) monitoring of the A-weighted sound level in decibels (dBA) at sites that were selected to represent a range of existing noise conditions at noise-sensitive areas along the

proposed BRT route. The long-term measurements were made at three residential sites for one-hour periods during three typical hours of the day (during peak-hour roadway traffic, during the midday between the morning and afternoon roadway-traffic peak hours, and during the late night between midnight and 5:00 AM). Short-term noise measurements were made at each of eight institutional sites for periods of 40-60 minutes.

The noise data sampled at each measurement location were analyzed to determine the cumulative noise exposure levels in terms of the metrics prescribed by FTA. These metrics condense the varying noise over time into a single number that relates to how people respond to noise. For the short-term measurements, the metric is the "equivalent" sound level (Leq) which represents the changing sound level over a period of time (typically one hour). For the long-term measurements, the metric is the Day-Night Sound Level (Ldn) which represents the Leq over a 24-hour period with a 10-decibel penalty applied to noises that occur during the more sensitive nighttime period (10 PM to 7 AM).

The noise measurement results along the Inner Katy Segment indicate Ldn values in the range of 64 dBA to 81 dBA and hourly Leq values in the range of 63 dBA to 80 dBA, depending on location, which are representative of the noise environment along a major highway corridor. These results serve as the basis for determining the existing noise conditions at all noise-sensitive receivers along the Inner Katy Segment.

The noise measurement results along the Downtown Segment indicate Ldn values in the range of 68 dBA to 70 dBA and Leq values in the range of 61 dBA to 71 dBA, depending on location, which are representative of an urban noise environment. For the long-term measurement sites, the Ldn values were computed from three partial one-hour Leq measurements using FTA methodology. The results define the existing noise conditions at all noise-sensitive receivers along the Downtown Segment.

Environmental Consequences

Noise Impact Assessment

The project noise predictions represent exterior noise levels at all noise-sensitive receivers except for the Sawyer Heights Lofts Luxury Apartments, a four-story, multi-family building located between Studemont Street and Taylor Street with no sensitive outdoor land use, where interior noise was predicted. The façade of this building consists of brick or stucco walls with double-glazed, single-hung windows and is centrally air-conditioned such that the windows are typically kept closed. FHWA guidance[2] suggests that, in the absence of detailed acoustical analyses or field measurements, the outdoor-to-indoor noise reduction for masonry buildings may be taken to be 35 dB with double-glazed windows. Thus, the interior project noise level at the apartments was

[2] U.S. Department of Transportation Federal Highway Administration, "Highway Traffic Noise Analysis and Abatement Policy and Guidance" (June 1995).

predicted by reducing the predicted exterior noise level by 35 dB, and the result was then compared with the FTA interior Ldn noise criterion of 45 dBA to assess noise impact.

Comparisons of the existing and future noise levels at locations along the Inner Katy Segment are presented in **Table 4-14** and **Table 4-15** for Option 1 and in **Table 4-16** and **Table 4-17** for Option 2. **Table 4-14** and **Table 4-16** include ranges of results for FTA Category 2 (residential) receivers with both daytime and nighttime sensitivity to noise, whereas **Table 4-15** and **Table 4-17** include ranges of results for FTA Category 3 (institutional) receivers with primarily daytime and evening use. In addition to the distances to the near bus lane and anticipated bus speeds, the tables include the existing noise levels and the projected noise levels from bus operations for each section or noise-sensitive receiver along the Inner Katy Segment. Based on a comparison of the predicted project noise levels with the impact criteria, the tables also include an inventory of the number of moderate and severe noise impacts without mitigation for each section or noise-sensitive receiver. At locations where impacts are predicted, the data provided in the table represent a range for the impacted receivers. In sections where no impacts are predicted, the data are for the receiver with the highest predicted project noise level.

For Option 1, the results in **Table 4-14** identify moderate noise impacts without mitigation at a total of 60 residences, all on the eastbound (south) side of the busway. Most (46) of these predicted impacts are in the neighborhood between Patterson Street and Yale Street where many of the closest residences are shielded from existing traffic noise by a sound wall that results in lower existing noise levels. No severe impacts are predicted at any residences. Furthermore, no moderate or severe impacts are predicted at any noise-sensitive institutional land use as indicated by the results in **Table 4-15**.

For Option 2, the noise impacts are predicted to be the same as for Option 1, with one additional impact predicted between Spring Street and Crockett Street. As indicated in **Table 4-16**, moderate noise impacts without mitigation are identified at a total of 61 residences, all on the eastbound (south) side of the busway. No severe impacts are predicted at any residences. Furthermore, no moderate or severe impacts are predicted at any noise-sensitive institutional land use as indicated by the results in **Table 4-17**.

Based on the results of the noise impact assessment for the Inner Katy Segment, similar impacts are predicted for Option 1 and Option 2 and therefore it is concluded that both options are essentially the same from a noise perspective. The locations of the predicted residential noise impacts without mitigation for Option 1 and Option 2 are shown on **Exhibit 4-17** through **Exhibit 4-20**. No noise impacts are predicted for the Downtown Segment.

Table 4-14: Summary of FTA Category 2 (Residential) Noise Impacts Without Mitigation (Option 1)

Corridor Segment Description	Side of Busway1	Distance from Near Lane (feet)	Bus Speed (mph)	Existing Noise Level (dBA)2	Project Noise Level (dBA)2			Number of Residential Impacts	
					Predicted3	Impact Criteria4		Moderate	Severe
						Moderate	Severe		
NWTC to Washington – South	EB	321	15	67	57	62	67	0	0
Washington to TC Jester – North	WB	359	50	73	60	65	72	0	0
Washington to TC Jester – South	EB	57 to 104	50	73	65 to 68	65	72	9	0
TC Jester to Patterson – North	WB	316	50	72	60	65	71	0	0
TC Jester to Patterson – South	EB	69 to 99	50	77 to 80	65 to 67	65	74 to 75	5	0
Patterson to Yale – North	WB	324	50	67	60	62	67	0	0
Patterson to Yale – South	EB	59 to 270	50	61 to 77	59 to 68	58 to 65	64 to 75	46	0
Yale to Studemont – North	WB	318	50	78	61	65	75	0	0
Yale to Studemont – South	EB	270	50	78	61	65	75	0	0
Studemont to Sabine – South	EB	188	50	72	63	65	71	0	0
Sabine to Houston – South	EB	145	30	77	58	65	75	0	0
Houston to Crockett – West	EB	299	30	73	55	65	72	0	0
Crockett to Dart – West	EB	235	30	75	56	65	73	0	0
TOTAL NUMBER OF NOISE IMPACTS:								60	0

Source: Cross-Spectrum Acoustics, 2022

[1] Eastbound (EB) or Westbound (WB)

[2] Noise levels are based on Ldn and measured in dBA (rounded to the nearest decibel).

[3] Predicted levels include bus idling noise, where applicable (rounded to the nearest decibel) and are compared with the impact criteria to assess noise impact.

[4] The noise impact thresholds vary, depending on the land use category and the existing noise levels.

Table 4-15: Summary of FTA Category 3 (Institutional) Noise Impacts Without Mitigation (Option 1)

Noise-Sensitive Receiver Description	Side of Busway[1]	Distance from Near Lane (feet)	Bus Speed (mph)	Existing Noise Level (dBA)[2]	Project Noise Level (dBA)[2]			Number of Institutional Impacts	
					Predicted[3]	Impact Criteria[4]		Moderate	Severe
						Moderate	Severe		
Houston SPCA	WB	553	50	76	58	70	79	0	0
Santana Funeral Directors	WB	329	50	74	60	70	77	0	0
Medical Offices at 5225 Katy Fwy	EB	105	50	67	65	67	72	0	0
Medical Offices at 5151 Katy Fwy	EB	115	50	67	64	67	72	0	0
Michael A. Wong, DDS General Dentistry	EB	97	50	67	65	67	72	0	0
Zora Diaa DDS	WB	343	50	74	60	70	77	0	0
Open Door Deliverance Apostolic Church	EB	176	50	67	63	67	72	0	0
Pearl Dentistry	EB	413	50	74	59	70	77	0	0
Impact Houston Church of Christ	EB	137	30	77	60	70	80	0	0
American Statesmanship Park	EB	218	30	78	59	70	80	0	0
Ecclesia —Houston - Downtown Campus	EB	78	30	78	63	70	80	0	0
TOTAL NUMBER OF NOISE IMPACTS:								0	0

Source: Cross-Spectrum Acoustics, 2022

[1] Eastbound (EB) or Westbound (WB)

[2] Noise levels are based on 1-hour Leq and measured in dBA (rounded to the nearest decibel).

[3] Predicted levels include bus idling noise, where applicable (rounded to the nearest decibel) and are compared with the impact criteria to assess noise impact.

[4] The noise impact thresholds vary, depending on the land use category and the existing noise levels.

Table 4-16: Summary of FTA Category 2 (Residential) Noise Impacts Without Mitigation (Option 2)

Corridor Segment Description	Side of Busway[1]	Distance from Near Lane (feet)	Bus Speed (mph)	Existing Noise Level (dBA)[2]	Project Noise Level (dBA)[2]			Number of Residential Impacts	
					Predicted[3]	Impact Criteria[4]		Moderate	Severe
						Moderate	Severe		
NWTC to Washington - South	EB	321	15	67	57	62	67	0	0
Washington to TC—Jester - North	WB	359	50	73	60	65	72	0	0
Washington to TC Jester – South	EB	57 to 104	50	73	65 to 68	65	72	9	0
TC Jester to Patterson - North	WB	316	50	72	60	65	71	0	0
TC Jester to Patterson – South	EB	69 to 99	50	77 to 80	65 to 67	65	74 to 75	5	0
Patterson —to Yale - North	WB	324	50	67	60	62	67	0	0
Patterson to Yale – South	EB	59 to 270	50	61 to 77	59 to 68	58 to 65	64 to 75	46	0
Yale to Studemont - North	WB	318	50	78	61	65	75	0	0
Yale to Studemont - South	EB	270	50	78	61	65	75	0	0
Studemont to Sabine – South	EB	69	50	72	32[5]	45[5]	45[5]	0	0
Sabine to Houston - South	EB	39	30	77	64	65	75	0	0
Houston to Crockett - West	EB	22	30	73	66	65	72	1	0
Crockett to Dart - West	EB	49	30	75	63	65	73	0	0
TOTAL NUMBER OF NOISE IMPACTS:								61	0

Source: Cross-Spectrum Acoustics, 2022

[1] Eastbound (EB) or Westbound (WB)

[2] Noise levels are based on Ldn and measured in dBA (rounded to the nearest decibel).

[3] Predicted levels include bus idling noise, where applicable (rounded to the nearest decibel) and are compared with the impact criteria to assess noise impact.

[4] The noise impact thresholds vary, depending on the land use category and the existing noise levels.

[5] Noise levels represent interior noise at the Sawyer Heights Lofts Luxury Apartments where there is no sensitive outdoor land use.

Table 4-17: Summary of FTA Category 3 (Institutional) Noise Impacts Without Mitigation (Option 2)

Noise-Sensitive Receiver Description	Side of Busway[1]	Distance from Near Lane (feet)	Bus Speed (mph)	Existing Noise Level (dBA)[2]	Project Noise Level (dBA)[2]			Number of Institutional Impacts	
					Predicted[3]	Impact Criteria[4]		Moderate	Severe
						Moderate	Severe		
Houston SPCA	WB	553	50	76	58	70	79	0	0
Santana Funeral Directors	WB	329	50	74	60	70	77	0	0
Medical Offices at 5225 Katy Fwy	EB	105	50	67	65	67	72	0	0
Medical Offices at 5151 Katy Fwy	EB	115	50	67	64	67	72	0	0
Michael A. Wong, DDS General Dentistry	EB	97	50	67	65	67	72	0	0
Zora Diaa DDS	WB	343	50	74	60	70	77	0	0
Open Door Deliverance Apostolic Church	EB	176	50	67	63	67	72	0	0
Pearl Dentistry	EB	292	50	74	61	70	77	0	0
Impact Houston Church of Christ	EB	30	30	77	67	70	80	0	0
American Statesmanship Park	EB	37	30	78	66	70	80	0	0
Ecclesia — - Downtown Campus	EB	79	30	78	63	70	80	0	0
TOTAL NUMBER OF NOISE IMPACTS:								0	0

Source: Cross-Spectrum Acoustics, 2022

[1] Eastbound (EB) or Westbound (WB)

[2] Noise levels are based on 1-hour Leq and measured in dBA (rounded to the nearest decibel).

[3] Predicted levels include bus idling noise, where applicable (rounded to the nearest decibel) and are compared with the impact criteria to assess noise impact.

[4] The noise impact thresholds vary, depending on the land use category and the existing noise levels.

Exhibit 4-17. Noise Impact Locations for Option 1 and Option 2 (Washington Avenue to TC Jester Boulevard)

Source: Cross-Spectrum Acoustics, 2022

Exhibit 4-18: Noise Impact Locations for Option 1 and Option 2 (TC Jester Boulevard to Patterson Street)

Source: Cross-Spectrum Acoustics, 2022

Exhibit 4-19: Noise Impact Locations for Option 1 and Option 2 (Patterson Street to Yale Street)

Source: Cross-Spectrum Acoustics, 2022

Exhibit 4-20: Noise Impact Locations for Option 2 (Spring Street to Crockett Street)

Source: Cross-Spectrum Acoustics, 2022

Vibration Impact Assessment

Ground-borne vibrations from rubber-tired vehicles are not generally perceptible, even at locations close to major roads, unless roadways have significant bumps, potholes, or other uneven surfaces. Most vibration-sensitive receivers along the project alignments are located beyond the FTA vibration impact screening distances for bus projects. For the few sensitive receivers within the screening distances, no vibration impacts are predicted based on FTA General Vibration Assessment procedures. Furthermore, the proposed BRT vehicles would generate ground-borne vibrations that are comparable to vibrations generated by existing buses and lower than vibrations generated by light rail vehicles already in service along the proposed Downtown BRT route. Thus, no vibration impacts are expected due to the project.

Mitigation Measures

The following three pavement options, in combination with a solid bridge parapet, have been determined to be feasible and to warrant consideration for mitigating noise impacts from bus operations along the Inner Katy Segment:

- Longitudinal Saw Grooving
- Portland Cement Concrete (PCC) with Diamond Ground Surface
- Next Generation Concrete Surface (NGCS)

These pavement options are undergoing additional analysis for their effectiveness and feasibility and METRO may implement one of these approaches, but a final decision is not available at this time.

No vibration impacts are predicted from project operations along the Inner Katy Segment or Downtown Segment and therefore no vibration mitigation measures are required.

Construction Phase Noise and Vibration Considerations

All construction activities will be carried out in compliance with Houston METRO specifications and the applicable noise limits of the City of Houston Code of Ordinances. In addition, the following mitigation measures will be applied to the extent practical as needed to minimize temporary construction noise and vibration impacts:

- Avoid nighttime construction near residential neighborhoods
- Locate stationary equipment on the construction site as far away from noise sensitive sites as possible
- Attach noise-deadening material to the inside of hoppers, conveyor transfer points or chutes

- Limit the number and duration of equipment idling on the site, the use of annunciators of public address systems and the use of air or gasoline-driven hand tools

- Minimize noise from the use of back-up alarms using measures that meet OSHA regulations (e.g., by using self-adjusting ambient-sensitive back-up alarms, using manually adjustable alarms on low setting, using observers, and configuring construction sites or scheduling activities to minimize alarm use)

- Use alternative construction methods to minimize the use of impact equipment (e.g., the use of drilled piles in place of impact pile driving)

- Avoid the use of vibratory rollers and packers near sensitive areas

Refer to **Appendix J** for the *Noise and Vibration Analysis Technical Report* (Cross Spectrum Acoustics, 2022).

4.11 Floodplains

Existing Conditions

Portions of the proposed project would traverse areas that are designated by Federal Emergency Management Agency (FEMA) as special flood hazard areas (i.e., regulatory floodways, 100-year floodplains, and 500-year floodplains). Areas of the Inner Katy Segment cross one major designated floodway and the 100-year floodplain associated with White Oak Bayou and Buffalo Bayou. Based on the FEMA dataset, 100-year and 500-year floodplains associated with the White Oak Bayou and Buffalo Bayou are within the Inner Katy Downtown Segment. There are no floodplains intersected by proposed improvements at the Northwest Transit Center, proposed St. Emanuel/EaDo Station, or the METRORail Stations.

Proposed Memorial Park Station

The proposed Memorial Park Station is located within FIRM Panel 48201C0670M (effective June 9, 2014) and intersects the mapped 100-year FEMA floodplain associated with White Oak Bayou with a base flood elevation (BFE) of approximately 48 feet.

Proposed Shepherd/Durham Station

The proposed Shepherd/Durham station is located within FIRM Panel 48201C0670M (effective June 9, 2014) and intersects the mapped 100-year FEMA floodplain associated with White Oak Bayou with a BFE of approximately 48 feet.

Proposed Studemont Station

The proposed Studemont Station is located within FIRM Panel 48201C0670M (effective June 9, 2014) and intersects the mapped 100-year FEMA floodplain associated with White Oak Bayou with a BFE of approximately 41 feet. This proposed station is located within the designated floodway of White Oak Bayou.

Proposed Franklin/Bagby Station

The proposed Franklin/Bagby Station is located within FIRM Panel 48201C0690N (effective January 6, 2017) and does intersect with the FEMA 100-year floodplain associated with the Buffalo Bayou.

Environmental Consequences

The hydraulic design of the proposed project would be in accordance with current TxDOT and FHWA design standards. EO 11988, Floodplain Management, requires that federal agencies avoid activities that directly or indirectly result in the development of floodplain areas. Hydraulic design information would be coordinated with the Harris County Flood Control District prior to construction so that the proposed project would not have an adverse effect on floodplains/floodways in the project area. The proposed project would be designed such that natural drainage and/or ponding would not be affected and change the BFEs greater than one foot above the one-percent annual exceedance probability flood elevation at any point in the project area. The proposed project would not increase BFEs to a level that would violate applicable floodplain regulations and ordinances. No alteration or

relocation of water bodies is anticipated because of the proposed project. Refer to **Figure 4-19** in **Appendix B** for mapped floodplains. Refer to **Appendix K** for the *Wetland Delineation Report* (Stantec, 2022c).

4.12 Ecologically Sensitive Areas and Endangered Species

The Endangered Species Act of 1973, as amended, provides protection for federally listed species and their habitats. Texas state law includes provisions that prohibit direct harm to state-listed species. The Migratory Bird Treaty Act (MBTA) of 1918 prohibits harm to all migratory birds, their nests, eggs, and nestlings. The Bald and Golden Eagle Protection Act of 1940 further provides protection for bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*).

The Texas National Diversity Database (TxNDD) was created and is managed by the Texas Parks and Wildlife Department (TPWD) to provide known historical records for rare species, native plant communities, and animal aggregations for defensible, effective conservation action. Occurrence data are generally presented by TPWD as large polygons rather than point location data for protection of the species. TxNDD data cannot be interpreted as presence/absence data.

Existing Conditions

The proposed project is in the Gulf Coast Prairies and Marshes Natural Region (Gould et al., 1960). The Gulf Coast Prairies and Marshes region is located along the Texas Gulf Coast and is characterized by tallgrass prairies or post oak (*Quercus stellata*) savanna, much of which has been invaded by brush such as mesquite (*Prosopis glandulosa*), oaks (*Quercus* spp.), prickly pear (*Opuntia* spp.), and several acacias (*Acacia* spp.) The region consists of nearly level plains less than 150 feet in elevation, dissected by streams flowing into the Gulf (Gould, 1975). The entirety of the project occurs within the Houston city limits and has been highly disturbed for urban development, leaving minimal native habitat.

The United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool and TPWD's Rare, Threatened, and Endangered Species of Texas (RTEST) database identify 27 federally or state listed or proposed listed species as potentially occurring within the project limits. The table in **Appendix L** contains a list of these species along with their listing status, preferred habitat, whether appropriate habitat for the species was found within the project area, and whether the project would affect or impact each species. There is no critical habitat within the proposed project area.

Environmental Consequences

According to the TxNDD, no element occurrences are recorded within 500 feet of the proposed project area. There is encroaching vegetation within the ROW along fence lines and drainages that may be used by nesting migratory birds. Swallows may nest in colonies on the underside of bridges and culverts.

Landscaping and trees within TxDOT and City of Houston ROW may require mitigation if cleared during the proposed project.

Avoidance and minimization techniques to mitigate for potential impacts to migratory species are suggested, such as pre-construction nesting surveys and vegetation clearing outside of the nesting season (approximately March to September). The route crosses White Oak Bayou, where federally and state-listed aquatic species may occur. Avoiding impacts to the stream and implementing water quality Best Management Practices (BMPs) is recommended.

TPWD Coordination

After coordination with TPWD, the agency recommended actions to minimize adverse impacts to the State's fish and wildlife resources during construction and operation of the proposed project (**Appendix L**). Recommendations are summarized as follows:

- *Construction recommendations*: Use existing facilities whenever possible. If not practicable, route new construction along existing ROW and easements. Use a sediment control fence to exclude wildlife from construction areas. Erosion and seed/mulch stabilization materials should be used judiciously to avoid entanglement with wildlife; in place of blankets or mats, TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding. Open trenches and excavation areas should be covered overnight and/or inspected daily to ensure no wildlife is trapped.
- *Bridge recommendations*: Use bridges rather than culverts whenever feasible and incorporate a bat-friendly design.
- *Bank stabilization*: Biotechnical stabilization methods, such as live native vegetation in combination with structural materials such as reticulated concrete mats, may be used as an alternative to riprap that does not impede wildlife movement.
- *Lighting*: If lighting is used, minimize sky glow by focusing light downward with full cutoff luminaries. Appropriate lighting and BMPs may be found at the International Dark-Sky Association website.
- *MBTA compliance*: Clearing should be scheduled outside of the bird nesting season (March 15 to September 15). If it must occur during the nesting season, survey proposed disturbance areas for nests/young prior to clearing. Active nests should be avoided within a 100-foot buffer until eggs have hatched and young have fledged.
- *Aquatic resources*: Streams/wetlands should only be entered when essential to work being done. Use BMPs for riparian and/or wetland areas that include measures such as avoiding construction during spawning periods, use of double silt fences, and doubling soil stabilization measures along banks.
- *Species of Concern/Special features*: Avoid impacts to rare species, natural plant communities, and special features.
- *Monarch and pollinator conservation*: Consider incorporating pollinator habitat into project greenspace whenever possible and avoid using non-native milkweed species

in landscaping. Information on appropriate species for the project area is available at the Lady Bird Johnson Wildflower Center and Xerces Society's Guidelines.

- *Vision Zero Network*: Engage with and model from Vision Zero to include benefits to natural resources as well as citizens of Harris County.

Data Reporting: If rare or protected species are encountered during construction, report encounters to the TxNDD.

4.13 Wetlands and Waters of the U.S.

Existing Conditions

A delineation of the proposed project area was performed to evaluate the presence of potentially jurisdictional waters of the U.S. and to identify their boundaries within the project area. The delineation identified the presence of potentially jurisdictional waters of the U.S., including wetlands. **Figure 4-19** in **Appendix B** for Potential Waters of the United States. Refer to **Appendix K** for the *Wetland Delineation Report* (Stantec, 2022c).

Environmental Consequences

A delineation of waters of the U.S., including wetlands, was conducted for the proposed project area in March 2022. This delineation effort resulted in the identification of six aquatic features, including one ephemeral stream, one emergent wetland, one forested wetland, and three perennial streams within the limits of the project area. All identified aquatic features are likely jurisdictional waters of the U.S. and would be subject to Section 401/404 of the Clean Water Act (CWA).

Because a construction site plan was not available at the time of the delineation, it cannot be determined whether the placement of dredged and fill material could impact these likely waters of the U.S. If impacts to these potentially jurisdictional areas are avoided, it is likely that United States Army Corps of Engineers (USACE) authorization under Section 404 of the CWA will not be required. However, if construction site plans indicate impacts to these potential waters of the U.S., it is likely that USACE authorization under Section 404 of the CWA will be required. Proposed impacts may potentially be authorized by the USACE-Galveston District under USACE Section 404 of the CWA under nationwide permit (NWP) 14 Linear Transportation Projects, or under a Standard Individual Permit if impacts exceed 0.5-acre. If NWP 14 is used and impacts to waters of the U.S. exceed 0.10-acre, a pre-construction notification (PCN) would be required. If a PCN is required, it is likely that compensatory mitigation would also be required. The applicable NWP authorization, Regional Conditions, and Water Quality Certification for the State of Texas should be provided to the selected contractor to ensure compliance with Section 401/404 of the CWA.

4.14 Water Quality, Navigable Waterways and Coastal Zones

The Texas Commission on Environmental Quality (TCEQ) has developed surface water quality standards that apply to all surface waters in the state of Texas (TAC Title 30, Chapter 307). The standards provide a basis on which TCEQ regulatory programs can establish reasonable methods to implement and attain the established goals for water quality. In

compliance with Section 303(d) of the CWA, the TCEQ identifies water bodies in the state that do not meet the TCEQ's Texas Surface Water Quality Standards (TSWQS). The compiled listing of these water bodies is known as the 303(d) List.

Existing Conditions

White Oak Bayou is identified by TCEQ as stream segment 1017 and is not listed as a 303(d) impaired water. However, White Oak Bayou is included in the TCEQ Index of All impaired Waters (TCEQ, 2020).

The segment of White Oak Bayou traversing the project area, identified by the TCEQ as stream segment 1017, is a non-tidal stream. Therefore, the proposed project does not involve water bodies that are navigable and/or tidally influenced; thus, no coordination would be required with the USACE relative to waters regulated under Section 10 of the Rivers and Harbors Act or the U.S. Coast Guard for bridge structures over navigable waters. Section 14 of the Rivers and Harbors Act, as codified in 33 United States Code 408 (Section 408) allows the USACE to grant other entities permission for temporary or permanent alteration or use of a USACE civil works project. No federal civil works projects are present in the project area; therefore, no Section 408 coordination with the USACE would be required.

Numerous impaired waters were identified within a five-mile radius of the existing and proposed station locations.

Environmental Consequences

The proposed project area does not impact any currently identified impaired waters. The proposed project area is situated entirely within the limits of the mapped Texas Coastal Management Zone. The Texas General Land Office (GLO) typically requires Coastal Consistency determinations for projects located in the coastal zone, if the project is required to receive permit authorization under Section 10 of the Rivers and Harbors Act or Section 404 of the CWA for impacts to waters of the U.S. Permit authorization from USACE for unavoidable impacts to jurisdictional waters of the U.S. regulated under Section 404 of the CWA could occur but has not been determined at the time of this report. TxDOT reviewed this proposed action for consistency with the Texas Coastal Management Program (Texas CMP) goals and policies in accordance with the regulations of the Coastal Coordination Advisory Council and determined that the proposed action will not have a direct and significant adverse effect on the coastal natural resource areas identified in the applicable policies (31 TAC 505.30(b)(2)). Therefore, no formal coordination with the GLO would be required.

4.15 Visual

Existing Conditions

Major transit facilities and highways can affect the visual and aesthetic character of surrounding landscapes and the perceptions for individuals who live within and travel through these environments. In addition to considering aesthetic impacts under NEPA, the

2015 *U.S. Department of Transportation/ FHWA Guidance, Visual Impact Assessments for Highway Projects* (FHWA 2015b) provides a framework for evaluating impacts to visual and aesthetic resources for transportation projects. METRO has applied this guidance as best practice for evaluating the potential visual quality impacts presented by the proposed Inner Katy Project.

METRO considered constraints posed by the existing environment, namely the dense urban characteristics and land uses along the existing I-10 corridor. Parks and trails were considered as well, representing green spaces and areas of outdoor activity. Landforms such as topographic change, vegetation, and water crossings were also considered. The physiological limits of human sight and vistas that are currently available from neighborhoods along the south side of I-10 were considered because they would be the closest to the proposed guideway if constructed. METRO also considered the visual elements of the proposed project that would be most likely to represent the largest components of physical change in visual quality, specifically the elevated segments of the guideway and the proposed stations. The visual analysis area includes the proposed project footprint and the 150-foot buffer around elevated sections and proposed stations.

The project area is divided into visual assessment units including a 150-foot buffer where the proposed roadway is elevated:

- **The Western Segment** from the western terminus to the beginning of the elevated section just west of the Memorial Park Station.
- **The Elevated Segment** from west of Memorial Park to just west of where Option 1 and Option 2 diverge near Montrose and the Studemont Station; this segment includes Memorial Park Station and Shepherd/Durham Station.
- **The Curve Segment** includes the Studemont Station and just east where Option 1 and Option 2 diverge, and up to the point where they converge on I-45 near Washington Avenue and Franklin/Preston Streets.
- **The Downtown Segment** includes Rusk and Capitol Streets where buses would run along existing routes and includes the proposed Franklin/Bagby Station and the St. Emanuel/EaDo Station.

Environmental Consequences

The proposed project is within a highly urban transportation corridor and proposed ROW required is very limited, so visual impacts are not considered to be significant and adverse. Refer to **Figure 4-17** in **Appendix B** for Visual Assessment Units and to **Appendix M** for the *Visual Quality Technical Report* (Stantec, 2022d).

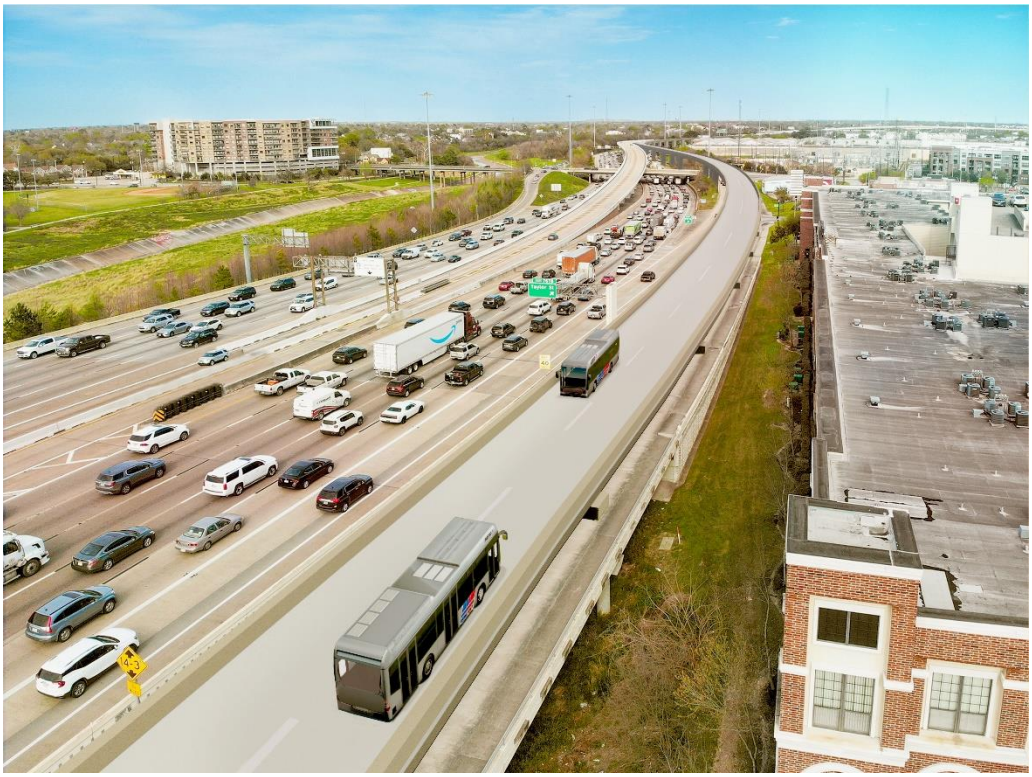
Where ROW impacts would occur, displaced entities would receive assistance through compliance with the Uniform Relocation Assistance and Real Property Acquisition Act. Along the project where landscaped medians exist and would need to be removed to construct

columns and footings, replacement of trees in accordance with City of Houston tree mitigation policy would take place. In addition, there are some segments of the Visual Assessment Units that would benefit from potential mitigation measures, some of which are consistent with aesthetic design elements and others that would be taking additional steps to limit disruptions of viewsheds for permanent viewers along the corridor. During construction, additional visual quality impacts may occur but would be temporary.

At the point where Option 1 and Option 2 diverge, the Sawyer Heights multi-family development is located immediately adjacent to I-10 within the 150-foot visual assessment buffer. In this area, the topography is varied and there are elevated sections of highway. Besides Sawyer Heights, land uses in this area are developed commercial uses with extensive parking lots. North of I-10 is dominated by White Oak Bayou and floodplain. M-K-T Trail runs along Spring Street under I-10 and across White Oak Bayou to the northwest. The visual quality associated with White Oak Bayou is moderate as it is channelized with trails. I-10 is elevated through this area over the Bayou and trail, then the main lanes descend below Taylor Street to the east.

Option 1 moves to the center of existing I-10 just beyond the M-K-T Trail and is therefore farther from Sawyer Heights than Option 2. Option 1 joins the existing elevated CBD ramp just west of Taylor Street and new construction is not proposed from this point east. Option 2 remains along the southern boundary of the I-10 eastbound frontage road. It would present a visual barrier for some of the residents at Sawyer Heights, adding to other elevated transportation infrastructure that already exists in this area (**Exhibit 4-21**).

Exhibit 4-21: Rendering of Option 2 at the Sawyer Heights Lofts



Northwest Transit Center

The proposed guideway facility would not be noticeable since it would be collocated with the existing elevated facilities serving NWTC.

Proposed Memorial Park Station

Memorial Park Station would be dominant in the landscape but as shown in **Exhibit 3-4**, the station would be aesthetically pleasing, would provide access to transit and Memorial Park, and for these reasons could be considered a beneficial rather than adverse impact.

Proposed Shepherd/Durham Station

The Shepherd/Durham Station would be dominant in the landscape because it would be elevated with an aerial pedestrian walkway connecting to a bus platform. As shown in **Exhibit 3-5**, the station would be aesthetically pleasing, would provide access to a bus platform, and would bring this transit amenity to a densely developed residential area.

Proposed Studemont Station

Studemont Station would be constructed on the elevated guideway and would include an aerial pedestrian walkway over White Oak Bayou floodplain and over Montrose Street. It would be considered co-dominant in the landscape with existing highway infrastructure. The existing condition and the visual rendering for Studemont Station are shown in **Exhibit 3-6**.

Proposed Franklin/Bagby Station

The Franklin/Bagby Station would be constructed on an existing parking lot located in the shadow of I-45 next to Buffalo Bayou, Downtown Aquarium, and the Downtown POST Houston development (former Post Office building). The visual quality is considered moderate given the park setting at Buffalo Bayou and the potential for travelers to view several notable buildings when riding the current METRO routes. The visual sensitivity in this location is considered low. Construction of an at-grade station in this location would be compatible with the urban environment.

Proposed St. Emanuel/EaDo Station

The St. Emanuel/EaDo Station would be constructed in a parking lot near the PNC Soccer Stadium and on the south side of I-69, opposite the George R. Brown Convention Center. There are some multi-family residential developments nearby. The visual quality is considered moderate because Minute Maid Stadium would be visible from the station across I-69 and the stadium is a popular cultural attraction hosting baseball games and other events. PNC Soccer Stadium is one block away from this station, but visually separated by a condominium complex. Visual sensitivity is considered low in this urban area. The provision of an at-grade station in this location would be compatible with the visual landscape and would provide a transit amenity giving travelers access to a larger geography through improved transit connectivity and service.

4.16 Safety and Security

Existing Conditions

METRO and partner public safety agencies routinely work together to ensure safety for all riders. Houston METRO has its own police force to monitor buses, bus stops, transit centers and other transit system infrastructure as well as surrounding areas. The METRORapid buses and key transit infrastructure are equipped with video surveillance equipment or would be constructed to enhance surveillance capabilities. These same safety and security measures would be implemented for the Inner Katy Project.

Environmental Consequences

No impacts to safety or security are anticipated as a result of this project. The Inner Katy Project has the potential to enhance the safety and security of the corridor for all pedestrian users. Infrastructure and pedestrian improvements undertaken for the project would contribute to enhanced safety for all roadway users. For instance, along Meridian Street, the dedicated bus-only travel lane may enhance safety for all roadway users by segregating uses and reducing the number of vehicular lanes, which may have a traffic-calming effect. The BRT stations would include new or revised pedestrian access, enhanced accessibility through sidewalks and ramps, pedestrian signals, and transit signals, where appropriate. Lighting, shelters, signage and increased use will contribute to both safety and security. Bus stop placement along side streets will consider pedestrian and traffic travel and enhance public access around the stops, even for those not utilizing the METRORapid service. Security measures, such as consideration of Crime Prevention Through Environmental Design (CPTED) will contribute to a safer environment. Safety and security risk assessments will be completed to determine appropriate safety and security measures to support the safety of the employees, riders and the public.

Safety and Security During Construction

The construction of the Inner Katy Project is not anticipated to result in any environmental health hazards. As with most construction projects, there would be some risk of equipment spilling or leaking hazardous waste. However, the degree of risk would not be any greater than under normal circumstances. In addition to implementing an approved Construction Safety and Security plan that will include precautions for safe storage of hazardous materials and construction equipment, the contractor will provide and implement a Site-Specific Health and Safety (SSHS) Plan which will define any associated construction safety hazards and vulnerabilities and provide controls to keep risk as low as possible during construction of the project. The proposed Inner Katy Project will not likely introduce any significant adverse safety and security impacts during construction.

4.17 Potential Construction Impacts

Potential impacts caused by construction will occur throughout the project, although the impacts along I-10 differ mostly in scale of construction when considering the I-10 Inner Katy 4.8-mile elevated busway would have three aerial stations with a street-level transit center and the construction in Downtown of two new ground-level stations with only minor modifications to six existing LRT platforms. While both the I-10 and Downtown segments

will be impacted by construction of the BRT project, due to the scope, length and duration of the I-10 segment, the impacts occurring Downtown are anticipated to be less than the construction phase impacts along the I-10 corridor. The following describes the construction impacts for both the I-10 Inner Katy corridor and the Downtown Segment.

I-10 Inner Katy Corridor: Temporary air, noise, vibration, water quality, traffic flow, and visual impacts are expected due to significant BRT bridge, retaining wall, station platform, drainage and ancillary construction in the I-10 Inner Katy corridor. Those impacts would temporarily affect tenants, residents, and visitors in the immediate vicinity of the project. These impacts also occur at the proposed Shephard/Durham transit center station constructed outside of the TxDOT ROW, but within the City of Houston's jurisdiction.

Downtown Segment: For the Downtown Segment of the Inner Katy BRT project, temporary air, noise, vibration, water quality, traffic flow, and visual impacts are expected from construction of two new ground-level stations and from minor modifications to the City of Houston streets and existing LRT platforms to allow the BRT buses to safely utilize each LRT station.

Due to the proposed major interstate redesign project referred to as NHHIP, the construction schedule for the proposed easternmost BRT station at St. Emanuel Street may be delayed, which could result in the need to construct a temporary layover station. At this time, the exact location of the temporary station is not yet selected or designed; however, this station would be anticipated to result in the same types of impacts and mitigation measures that are reflected elsewhere in this document. Any impacts that would occur to proposed ROW not addressed in this document may need to be assessed in a reevaluation.

Based on the planned construction, the following impacts are expected:

Air Quality Impacts

Air quality construction-related effects will be limited to short-term increased fugitive dust and mobile source emissions during construction. Construction activities associated with excavations, grading, and filling and other operations also disturb the soil, generate dust, and remove groundcover which causes the soil to be susceptible to wind and water erosion. The control of exhaust emanating from various types of construction equipment will be in accordance with EPA guidelines. To minimize exhaust, contractors will be required to use emission control devices and limit the unnecessary idling of construction vehicles. Construction of the project will not violate any federal, state, or local laws concerning air quality. Therefore, air quality impacts from construction activities will not be substantial.

Air Quality Mitigation

METRO will require the contractor to comply with appropriate federal, state, and local regulations concerning the generation of dust from construction activities. Typically, activities to minimize air quality impacts during construction include covering or treating disturbed areas with dust suppressors, using tarpaulins on loaded trucks, and sprinkling

water on dust generating surfaces such as roads and other areas where construction equipment is in operation.

Because emissions of CO from motor vehicles increase as vehicle speed decreases, disruption of traffic during construction (such as the temporary reduction of roadway capacity and the increased queue lengths) could result in short-term elevated concentrations of CO. To minimize the amount of emissions generated, reasonable efforts will be made during the construction phase to limit disruption to traffic, especially during peak travel periods.

Construction Noise Impacts

Construction of the aerial BRT guideway, stations, transit center and other BRT-related facilities will result in the generation of noise from construction equipment. Construction noise will vary greatly depending on the construction process, type and condition of equipment used, and layout of the construction site. Many of these factors are traditionally left to the contractor's discretion, which makes construction noise difficult to accurately estimate. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment. For most construction equipment, the engine, which is usually diesel, is the dominant noise source. This is particularly true of engines without sufficient muffling. For special activities such as impact pile driving and pavement breaking, noise generated by the actual process dominates.

Temporary noise during construction in and along I-10 and Downtown has the potential of being intrusive to residents near the construction sites. While most of the construction will consist of site preparation and construction of the aerial BRT guideway, consideration must also be made to the noise associated with the Downtown construction, especially the construction of the two new stations. City of Houston noise ordinances will be applicable to this project. The city's noise ordinances restrict construction at night and on weekends.

Vibration Impacts

Construction activities that could cause intrusive vibration include vibratory compaction, jack hammering and the use of tracked vehicles, such as bulldozers. The most substantial sources of construction vibration are blasting and pile driving. It is anticipated that limited pile driving will be required for this project. No blasting is anticipated to occur for the proposed project.

Vibration Mitigation

Vibration impacts during construction could be avoided through numeric limits and monitoring requirements that could be developed during final design and included in the construction documents for the project. Measures that will be considered as requirements to meet the vibration limits include the use of alternative equipment or processes, such as the use of drilled piles in place of impact pile driving and avoiding the use of vibratory compactors near vibration-sensitive areas.

Water Quality and Runoff

Area water could be impacted by the acceleration of erosion processes and additions of unnatural sediments that are introduced during construction projects. Typically, construction causes surface disruptions, including grading, filling and soil compaction, which impact soil permeability and cause an increase in the volumes of sediment runoff. Also, construction activities require the use of potential surface and subsurface water pollutants such as petroleum hydrocarbons for vehicle fueling and lubrication. Surface waters may also be aesthetically impacted by larger debris generated by construction activities. Local, state, and federal governments monitor and enforce water quality and runoff regulations. Mitigation measures to protect area water quality include measures to control erosion and minimization of the introduction of sediments, wastewater, and chemical to surface and subsurface waters.

Construction of the aerial BRT guideway system, stations, and transit center facilities will result in the generation of a short-term impact of water quality and sediment runoff. The construction staging areas will also cause short-term impacts. Impacts will be greatest in areas that are affected by grading and filling.

According to EPA regulations, cities with populations of 100,000 or greater must maintain and enforce the Municipal Separate Storm Sewer System (MS4) permitting program. The City of Houston participates in this program and regulates storm water discharges regarding various construction projects. This ordinance is enforced by the Storm Water Quality Department. In accordance with the ordinance, project specifications must be reviewed by the Storm Water Quality Department prior to initiation of construction. The project specifications should provide adequate mitigation measures to prevent long-term impacts to area surface and groundwater and the city's storm water system.

Water Quality Mitigation

METRO will require the contractor to comply with appropriate federal, state, and local regulations in the disposal of debris and spoil generated during construction. The TCEQ governs general construction activities within the State of Texas under provisions of Section 402 of the Clean Water Act and Chapter 26 of the Texas Water Code. A Notice of Intent (NOI) must be filed with the TCEQ for the project to qualify under General Permit TXR 150000. The permit requires that a Storm Water Pollution Prevention Plan (SW3P) be developed according to the provisions of the permit. The SW3P must clearly define and ensure the implementation of practices that will be used to reduce pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of the permit.

Construction of the project will necessitate obtaining coverage under the Texas Pollutant Discharge Elimination System (TPDES) General Permit for Storm Water Discharges Associated with Construction Activities. The TPDES program was established under the CWA to control and reduce the discharge of pollutants from point sources into the waters of the

U.S. The program, which is administered by the TCEQ, was expanded to include storm water related discharges by the Water Quality Act of 1987. To obtain coverage under the terms of the TPDES General Permit for Storm Water Discharges Associated with Construction Activities, the site operator must develop a SW3P and submit a NOI to the TCEQ at least 48 hours before commencing construction activities.

If unanticipated sources of hazardous or regulated materials are encountered during construction activities, the construction manager or designee will immediately notify METRO. Specific mitigation activities, which address the type, level, and quantity of contamination encountered, will be immediately implemented. The handling, treatment, and disposal of any hazardous materials will occur in full compliance with federal, state, and local requirements.

Construction Staging Areas

The storage of construction equipment and materials on the ground has the potential to disturb the soil and eradicate or prevent the growth of groundcover, which causes the soil to be susceptible to wind and water erosion. Construction equipment has the potential to leak oil and grease, hydraulic fluid, brake fluid and other petroleum hydrocarbons. There is also the possibility of spillage during fueling operations.

Mitigation for Construction Staging Areas

METRO will require the contractor to comply with appropriate federal, state, and local regulations regarding construction staging areas. The contractor will store equipment and materials in conformance with applicable local regulations. Materials will not be allowed to be stored on private property without written authorization of the owners of the property. Staging areas must not be in wetland areas or on any property listed or eligible to be listed in the NRHP.

The contractor will use BMPs to prevent storm water on construction materials and equipment such as covering materials and equipment of awnings, roofs, or tarps; storing materials and asphalt or concrete pads; surrounding material stockpiling areas with diversion dikes or curbs; and using secondary containment measures such as dikes or berms around fueling areas. The contractor will also mulch and reseed disturbed areas to prevent air and water erosion on the site after termination of construction operations.

For residents, some of the materials stored for construction may be visually displeasing; however, METRO will continue its practice of reaching out to businesses and community groups to alert them of this temporary situation and thus, should pose no substantial problems in the short or long term.

Safety and Security

The contractor will be required to be familiar with and comply with applicable federal, state, and local laws, ordinances, and regulations regarding safety and security during

construction. The project will not involve any unusual or particularly dangerous construction types, procedures, or locations that will pose any substantial safety or security impacts. Standard construction safety practices, as established by government regulations and codes, as well as METRO specifications, will minimize the potential for accidents and other safety problems. Some construction will require temporary detours or reduced roadway capacity. Traffic safety maintenance measures will be employed to minimize this risk.

Permits

For construction of the BRT, several construction permits will be necessary. These permits include Section 404 Nationwide Permit 25 and 33 for construction within the White Oak Bayou. In addition, TPDES General Permit for General Permit for Storm Water Discharges Associated with Construction Activities and municipal permits from the City of Houston for storm water management, sewer modifications, and roadway disruption/blockages will be required.

Maintenance of Traffic (MOT) and Sequencing of Construction (SOC)

METRO's maintenance of traffic and sequence of construction will be well defined in future final engineering documents to minimize disruption to traffic and pedestrians during construction throughout the project. However, the planning starts early, and the following concepts represent the current status of the MOT/SOC.

I-10 Inner Katy Corridor Construction

Within and adjacent to the I-10 BRT corridor, it is anticipated that construction will take place in three overlapping phases, which will include remedial work on I-10 (widenings, vertical adjustments, etc.,) as well as station and transit center construction and adjacent street modifications.

Phase 1: Utilities. I-10 BRT construction will start with the utility relocations. Frontage road lane closures of approximately two weeks each are anticipated for relocations crossing the eastbound frontage road. The utility relocation period will likely take approximately 9-12 months, during which the bridge foundations would be initiated. Currently, a quantitative list of crossings is incomplete and will be reviewed and updated during preliminary engineering.

Phase 2: Structural foundations, columns, etc. (substructure). Traffic impacts resulting from substructure construction (foundations, columns, beams, etc.) are anticipated since some bridge column foundations are near the eastbound frontage road. Lane closures could be month-long closures of one or two lanes at each foundation, depending upon foundation widths and depths and proximity to the frontage road. This construction can begin in year one at locations where utilities were previously relocated and could last two or more years to complete.

Phase 3: Bridge beams, decks, etc. (superstructure). The bridge superstructure (beams, bridge deck, etc.) construction can only start once several substructures are built and ready for

superstructure loading. Therefore, as the bridge substructures are being completed, bridge superstructure construction can follow close behind, shortening the time for construction and traffic impacts.

With much of the ground level work completed, the superstructure is expected to result in fewer and shorter duration traffic impacts. Phase 3 construction is expected to last approximately two years.

Inner Katy Corridor Construction Mitigation

To mitigate potential driver uncertainties and to increase safety, signage would be developed and placed bi-directionally at the beginning, end and along the construction route both prior to and during construction to warn drivers of upcoming or current lane and road closures, as well as other pertinent information. Houston TranStar and the local news media would be informed of the upcoming schedule of activities so that local travelers and visitors can plan alternative travel routes in advance.

Multiple construction contracts splitting the project into two or more construction contracts and working two shifts daily would allow for a shorter construction period.

In addition, METRO can prepare construction contracts in a way to encourage the contractor to complete the work on time using incentives or other methods to assure time and cost control, such as “A+B Bidding” during contractor selection.

Downtown Segment

In Downtown, the major construction will be of the two new ground-level stations, including user amenities, such as bike racks/lockers and restroom facilities for METRO operators. The construction of the stations will likely take place in Year 2 and take approximately 8-12 months to construct. Localized traffic impacts near the new stations would include temporary lane closures of times dependent upon the proximity of the demolition and construction to the affected street. Station construction impacts are considered minor.

The remaining construction in Downtown is for minor modifications to the six LRT station platforms along Rusk and Capitol Streets, including Theater, Central and Convention District, and ancillary work to provide signals and communications modifications for the interlocking of the BRT with the LRT operating and communications systems. Construction is expected to take 6-9 months to fully construct, test and approve, and will be ready for service by opening day at end of Year 3 of construction. Traffic impacts, such as lane closures and restrictions to LRT operations will be of very short durations, measured in partial days, not weeks.

Construction impacts are only expected to adversely affect businesses and residents in the vicinity of the new Downtown stations or in the LRT corridor for short durations.

Mitigation

Lane closures at the two new stations (Franklin/Bagby and St. Emanuel/EaDo) can potentially be mitigated by closures that can be paced and removed daily, taking in consideration peak times of travel. Traffic impacts approaching/departing stations and at the LRT station platform can be restricted mostly to off-peak hours. Times when the LRT operations must be halted or delayed will be determined in advance with advance notice to the public.

Specific measures will be developed and implemented to ensure safety of bus, LRT, vehicular, bicycle and pedestrian operations within the street network affected by the Downtown BRT construction and will comply with all City of Houston traffic regulations during construction and/or the Texas Manual on Unified Traffic Control Devices (TxMUTCD).

Utility Impacts

Utility impacts caused by construction differ when considering the I-10 Inner Katy 4.8-mile elevated busway with three aerial stations and the construction in Downtown of two new stations with only minor modifications to six existing LRT platforms. The following describes the utility impacts for both the I-10 Inner Katy corridor and Downtown Houston.

I-10 Inner Katy Corridor

Protection of utilities will follow the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) regulations for overhead power and communications lines and Texas 811 call-before-you-dig locate requests for underground utilities.

Utility impacts accommodations will follow the TxDOT guidelines found in the TxDOT ROW Utilities Manual, as this segment of the project is within the TxDOT I-10 ROW. Adjustments to utilities will follow Chapter 8: Procedures for Utility Adjustments.

Underground utilities within the corridor have been identified preliminarily by means of a Quality Level C and D Subsurface Utility Engineering (SUE) investigation performed in accordance with Construction Institute/American Society of Civil Engineers (CI/ASCE) 38-02. Utilities depicted in a Quality Level C and D SUE investigation are shown per information derived from existing records and per survey of visible above-ground utility features correlated to the records. Impacts to utilities were assessed and itemized in a Utility Conflict Matrix, which includes information on utility owner, type, size, conflict limits, conflict description and coordination notes. Additionally, during the upcoming preliminary and final design phases of the project, these and previously unknown utilities will be further investigated and located using standard Quality Level A (non-destructive test holes) and B (utility designation) SUE methods, as appropriate. Early identification of utility conflicts will allow for design around utilities to avoid or minimize conflicts and to accommodate relocations only when necessary.

The following utility owners and facility types have been identified within the project corridor and will require relocations or adjustments due to the proposed METRORapid Inner Katy Project improvements:

- AT&T Fiber Optic and Telephone
- CenturyLink Fiber Optic
- CenterPoint Energy Electric Distribution
- CenterPoint Energy Electric Transmission
- CenterPoint Energy Gas
- City of Houston Water and Sanitary sewer
- Phonoscope Fiber Optic
- Purespeed Fiber Optic
- TxDOT Intelligent Transportation Systems /Traffic and Fiber Optic
- Wave Media Fiber Optic
- Verizon Fiber Optic

Utility coordination during the conceptual design phase of the project has included early notification to all utility owners of the proposed project scope and limits, as well as a request for utility records and establishment of primary points of contact for coordination of any necessary relocations or adjustments. Individual coordination meetings will take place during the preliminary and final design phases of the project.

Additional coordination has taken place with CenterPoint Energy (CNP) Electric Transmission, whose existing major transmission towers and lines will likely be a major impact. CNP Transmission has been requested to provide an engineering feasibility study and cost estimate for relocation design of its affected lines. Utility coordination with CNP will be continued through the final design process.

Since the BRT foundations and proposed drainage structures are the primary source of underground utility conflicts through the Inner Katy Segment of the BRT, accommodations through careful design and spacing of bridge foundations were initiated during the conceptual engineering phase to minimize impacts, while also considering the cost impacts to the project. Further refinements will be made during the preliminary and final phases of design to avoid utility conflicts, such as: shifting storm sewers and inlets, modifying roadway and ditch profiles, adjusting sidewalks and ramps, and in some cases designing casings or concrete cover slabs to protect shallow utilities.

Downtown Houston

Protection of utilities will follow the U.S. Department of Labor OSHA regulations for overhead power and communications lines and Texas 811 call-before-you-dig locate requests for underground utilities.

Utility impacts were not specifically assessed during the Conceptual Engineering phase due to the limited construction in Downtown and the lack of adequate design. Specifically, the proposed two new stations (Franklin/Bagby and St. Emanuel/EaDo between Capitol and Rusk Streets) have not been designed to an acceptable conceptual level and construction at the six existing LRT station platforms are minor. However, during the preliminary and final design phases of the project, these utilities will be identified by means of Quality Levels C and D SUE investigations performed in accordance with CI/ASCE 38-02, and additionally Quality Levels A and B SUE methods, as appropriate.

Avoidance and mitigation options will be implemented by the design team in an effort to avoid any potential utility impacts with the two new stations, including: shifting of storm sewers and inlets, adjusting sidewalks and ramps, and modifying driveway and intersection radii to clear manhole frames, utility cabinets and utility poles.

Summary

Construction duration is expected to take approximately three years, resulting in moderate to occasionally severe traffic impacts within and adjacent to the I-10 corridor, mostly confined to the eastbound frontage road. In Downtown, construction impacts are considered minor along Capitol and Rusk Streets, with moderate construction impacts to traffic at the two new Downtown stations.

Access to all residential buildings and businesses would be maintained to the greatest extent possible using controlled construction scheduling. Traffic delays would be controlled to the greatest extent possible where several construction activities are in progress at the same time, including considerations for delays caused by potential TxDOT I-10 Inner Katy reconstruction projects.

Excavation and disposal of materials and debris for the construction of the BRT is required and would be performed in accordance with TxDOT and/or the City of Houston standard demolition specifications. Project construction will require the use of materials such as asphaltic concrete, concrete paving, rock, and concrete structures and constructed in accordance with TxDOT, City of Houston and Harris County standards and specifications to allow for regulatory agency permitting of construction. New materials and facilities such as light standards, station platforms and appurtenances, parking lot canopies, elevators, specialty materials and the like would be manufactured off site, trucked to the job site, and then undergo a brief staging just prior to final assembly and installation.

5. Public Involvement

Public involvement is a key component of the METRORapid Inner Katy Project. There have been multiple opportunities and platforms for public engagement throughout every phase of project development and the NEPA process. Public involvement efforts have been conducted in parallel with project development. Through each phase, including project initiation, alternatives development, analysis, study findings, and recommendations, information has been shared with the public and input has been received based on the information presented. One of the first tasks METRO undertook at the beginning of the METRORapid Inner Katy Project was to develop a Public Involvement Plan (PIP) that detailed the strategies and approaches for informing the public, including stakeholders, community groups, area agencies, and many others. The objective of the PIP was to ensure that the public stayed informed, were provided opportunities for input, and that community needs, and concerns were highlighted and taken into consideration as part of the project development process.

5.1 Public Involvement Plan

As the PIP was being developed, METRO recognized that the current environment was impacted by the threat of the COVID-19 pandemic and the need to maintain social distancing protocols. Innovative approaches needed to be implemented to effectively conduct public meetings and encourage public participation and stakeholder engagement. Opportunities were identified to connect virtually and effectively communicate using various interactive platforms.

The PIP highlighted several strategies for implementing the public involvement and stakeholder engagement process. These strategies included:

- Consult and coordinate with elected officials and key agency stakeholders on areas of interest and project issues and concerns.
- Increase project awareness by leveraging relationships and seeking assistance with information dissemination and notification of engagement opportunities.
- Use of online and digital communications to provide project status, conduct surveys, and solicit and gather input and feedback.
- Create a variety of online and face to face engagement opportunities.
- Communicate how input will be incorporated and concerns addressed throughout the process with the community.
- Collaborate with key stakeholders on preferred solutions and options.
- Conduct public engagement activities throughout the course of the project by raising awareness about the project at meetings and events in the area.

In addition to defining the strategies for conducting the public involvement process, the PIP also provided a timeline that highlighted the nature of the public involvement activities, along with the objectives and the outreach tools that would be employed for each activity. The PIP provided guidelines and details of the various engagement tools, which included electronic communication, press releases and media relations, and meetings and presentations. Refer to **Appendix N** to view the PIP.

5.2 Public Meetings and Stakeholder Engagement Events

The METRORapid Inner Katy Project's public and stakeholder involvement process kicked off in January 2021 with a virtual public meeting. Since then, over 40 public and stakeholder meetings have been conducted over a 17-month period to inform and solicit information from the public, specific stakeholders, and interest groups. Additional community meetings were held in early 2022 as follow-up sessions to discuss community concerns that have been raised, such as those regarding noise and air quality, and the potential solutions to mitigate these concerns.

The series of public meeting and stakeholder engagement opportunities are generally organized into the following categories:

- Interagency coordination meetings with representatives of relevant agencies including local, state, and federal agencies
- Public meetings open to all interested individuals
- Neighborhood Group meetings
- Smaller special interest stakeholder meetings

Tables 5-1 through **5-4** provide an overview of the type, purpose, topic, and number of meetings that were either conducted by METRO or that METRO participated in related to the project.

Table 5-1: Interagency Coordination Meetings

Meeting Title	Date	Topic
Interagency Coordination Meeting #1	1/31/2021	Provide overview of METRORapid Inner Katy Project
Interagency Coordination Meeting #2	7/20/2021	Provide alignment and station scenarios
Interagency Coordination Meeting #3	1/25/2022	Project updates and next steps, focus on alignment evaluation, station scenarios, and staff recommendations.
Interagency Coordination Meeting #4	5/3/2022	Present Locally Preferred Alternative (LPA) and introduce the environmental review process
Interagency Coordination Meeting #5	11/15/2022	Present Downtown Segment operational and safety analysis results

Table 5-2: Public Meetings

Meeting Title	Date	Topic
Joint Virtual Public Meeting #1 with TxDOT	2/25/2021	Provide overview of METRORapid Inner Katy Project
Virtual Public Meeting #2	8/16/2021	Provide alignment and station scenarios
Virtual Public Meeting #3	1/31/2022	Project updates and next steps, focus on alignment evaluation, station scenarios, and staff recommendations.
Virtual Public Meeting #4	5/4/2022	Present LPA and introduce the environmental review process
TxDOT White Oak Bayou Project Public Meeting	7/28/2022	Answer public questions about the METRORapid Inner Katy Project

Table 5-3: Neighborhood Group Meetings

Meeting Title	Date	Topic
Super Neighborhood 22 Meeting, led by TxDOT	3/4/2021	Help surrounding neighborhoods understand TxDOT's I-10 Inner Katy Projects and METRO's METRORapid Inner Katy Project. METRO attended as an invited guest.
Super Neighborhoods 14, 15, 22	4/27/2021	Provide overview of METRORapid Inner Katy Project
Neighborhood Station Workshop	8/3/2021	Project updates and solicit input on the I-10 Inner Katy corridor station performance metric priorities
Joint Super Neighborhood 14, 15, 22, 24 Meeting	1/20/2022	Project updates and next steps, focus on alignment evaluation, station scenarios, and staff recommendations.

Meeting Title	Date	Topic
Community Noise & Air Quality Committee Meeting # 1	3/28/2022	Present FTA noise procedures and existing noise conditions
Community Noise & Air Quality Committee Meeting # 2	4/4/2022	Present FTA/FHWA air quality procedures and air quality impact analysis process
Community Noise & Air Quality Committee Meeting #3	5/2/2022	Present existing air quality conditions and air quality impact analysis results
Community Noise & Air Quality Committee Meeting #4	11/17/2022	Present noise impact analysis results and potential mitigation measures
Houston Heights Association	6/13/2022	Provide overview of METRORapid Inner Katy Project
Transportation Forum for the Timbergrove and Rice Military Neighborhoods	8/25/2022	Provide overview of METRORapid Inner Katy Project

Table 5-4: Smaller Special Interest Stakeholder Meetings

Meeting Title	Date	Topic
MHRA Shepherd Durham Coordination Meeting with METRO	12 meetings between January 2021 and June 2022	Discuss updates on MHRA's Shepherd and Durham Major Investment Project, METRORapid Inner Katy Project, and BOOST
Memorial Park Conservancy and COH Parks Department	4/23/2021	Present the Memorial Park station concept to Memorial Park Conservancy and COH Parks Department for their input
Houston Society for the Prevention of Cruelty to Animals (SPCA)	5/10/2021	Project briefing and discussion of Houston SPCA's noise concerns
Greater Houston Coalition for Complete Streets (GHCCS)	5/18/2021	Project overview and hear feedback from GHCCS
Inner Katy Projects Coordination with TxDOT	5/20/2021	Discuss scenarios and considerations about the METRORapid Inner Katy Project and TxDOT's I-10 Inner Katy Managed Lanes Project and feedback received from the 2/25/2021 public meeting
Inner Katy Transportation Alternatives Set-Aside (TASA) Trail Discussion	6/9/2021	Coordinate on the TASA trail that TxDOT wants to extend to NWTC and discuss potential impacts of METRO's projects on the trail
Houston SPCA	6/10/2021	Site visit and discussion of potential locations for noise monitoring
The Houston Design District (THDD)	6/29/2021	Project overview and update requested by THDD
TxDOT Coordination Meeting	7/13/2021	Operational scenarios discussion

Meeting Title	Date	Topic
City of Houston	7/19/2021	Discuss the METRORapid Inner Katy Project's Downtown Segment alignment concepts, METRO's evaluation of operational feasibility, and signal timing
Downtown Management District	7/30/2021	Discuss the METRORapid Inner Katy Project's Downtown Segment alignment concepts and METRO's evaluation of operational feasibility
Hardy Redevelopment Authority/TIRZ 21 Community Meeting	10/25/2021	METRO presented the project overview and updates
H-GAC Transportation Advisory Committee (TAC) and Transportation Policy Council (TPC) Meetings	12/8/2021, 12/17/2021	METRO presented the project overview and updates
Houston First	2/10/2022	Project updates and coordination on Downtown transit operations.
FTA Environmental Kick-off Meeting	3/21/2022	Initiate federal environmental review process for the project
East Downtown Redevelopment Authority/TIRZ 15 Board of Directors	4/18/2022	Provide project overview and updates
Central Houston Board of Directors Meeting	5/3/2022	Discuss project overview with a focus on Downtown stations and operations.
Inner Katy Project Presentation and Corridor Tour for FTA	5/26/2022	Present project information, status, and corridor tour
City of Houston Transportation, Technology, And Infrastructure Committee Meeting	8/23/2022	Present project overview and status
FTA Project Site Tour	9/12-9/13/2022	Present project updates
A Tale of Two Bridges	9/19/2022	Toured the Shepherd/Durham station area and discussed bike and pedestrian access
Texas Southern University Meeting	9/22/2022	Present project overview and status

5.3 Advertisements and Publicity

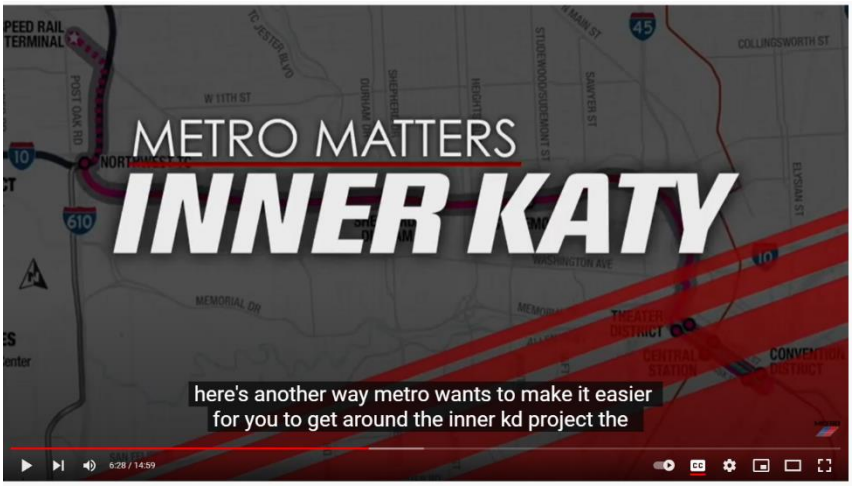
To support and enhance the public involvement process, METRO has also implemented a robust social media and publicity campaign. A variety of engagement tools have been employed to reach out to the community about the METRORapid Inner Katy Project providing opportunities to engage in the public involvement process. The METRORapid Inner Katy Project website (RideMETRO.org/InnerKaty) provides details about the project and the defined corridor. The website provides answers to many of the frequently asked questions, including but not limited to the definition of the project, benefits, schedule, route, connectivity, and environmental concerns. In addition, the website also provides updates on upcoming events, presentations from previous meetings, and an opportunity to provide comments about the project.

METRO has also taken advantage of social media, which has been a critical tool during the COVID-19 pandemic when in-person meetings were limited, and communications were conducted over a variety of platforms. Information about the project was posted on Facebook, Twitter, and Instagram. Notices about upcoming meetings were also shared on social media. **Exhibit 5-1** is a sample of an Instagram post prior to a virtual public meeting in August 2021.

Exhibit 5-1: Instagram Post

METRO also included information about the METRORapid Inner Katy Project in a segment of the METRO Matters podcast, which was also uploaded to YouTube. In the podcast, project manager Amma Cobbinah provided an overview of the project, its benefits, and the study process. The podcast received over 1,400 hits. **Exhibit 5-2** provides a snapshot of the introduction to Inner Katy METRO Matters presentation.

Exhibit 5-2: METRO Matters: Inner Katy



Sharing information with the media is also an important part of the public outreach effort. During the 15-month study and analysis process, several articles were published in the Houston Chronicle, Community Impact Newspaper, and on air and online at ABC 13 and Click2Houston/KPRC 2. These articles highlighted the project description, information about upcoming public meetings, and the regional benefits. For smaller interagency coordination and neighborhood meetings, prospective attendees were contacted by email and correspondence via METRO's Public Affairs department.

5.4 Overview of Public and Stakeholder Comments and METRO's General Response

To date, over 310 comments have been received by METRO through several platforms including the METRO's Public Comment System, project email, and during the public engagement meetings. METRO has responded to the many comments received. Additional comments about the project continue to be submitted, recorded, and reviewed.

The following sections highlight key concerns, requests, and comments that METRO heard and received from the public.

Requests for Additional Stations

In the METRONext Plan, it was envisioned that the METRORapid Inner Katy Project would be served by six stations: the Northwest Transit Center, Shepherd/Durham Station, Studemont Station, Theater District Station, Central Station, and Convention Center Station.

During the public involvement process, there were repeated requests for METRO to consider including additional stations along the corridor at Memorial Park, TC Jester Boulevard, Yale Street/Heights Boulevard, Houston Avenue, and Franklin Street/Bagby Street. Based on the number of requests received, these new station locations were included for consideration and evaluation. Detailed screening was conducted for all potential station locations, and the Memorial Park, Franklin Street/Bagby Street, and East Downtown/St. Emanuel Street station locations were ultimately added to the project concept.

At the January 2022 interagency coordination and the virtual public meetings, the recommended station locations were highlighted and the explanation of the process for selecting these locations was provided. Public comments received from this meeting suggest that the selection process was transparent and there was an understanding of the factors that supported the selection of station locations.

Concerns About Noise and Air Quality

One of the repeated comments that has been expressed by community leaders, stakeholders, neighborhood groups, residents, and the general public has been concerns about the project's impact on noise and air quality and how the project would mitigate these impacts both during construction once the facility is operational.

Overall, the project's impacts on noise and air quality are anticipated to be minimal compared to the existing freeway noise and air quality levels. However, METRO recognizes that these are important concerns raised by the public and additional analysis is being conducted to effectively address these concerns and coordinate an appropriate resolution, if needed. METRO formed a community noise and air quality committee to discuss noise and air quality analysis procedures, analysis results, and project implications. METRO conducted the noise and air quality analyses in accordance with the FTA guidelines to determine if any mitigation is needed. Findings will be shared with the committee.

General Support for the Project

At the beginning of the METRORapid Inner Katy Project, METRO began to gauge the public support of the project. Following meetings and various public engagement initiatives, METRO took note of expressed public opinion and overall, based on the input received, there is substantial support for the project.

A small sample of some of the positive comments received include[3]:

- Huge fan of the Inner Katy line. Thank you all for what you do.
- I approve and support the METRORapid Inner Katy Project because adding a bus rapid transit line next to I-10 will help increase bus travel times and trip reliability.
- I think that the Inner Katy Project is a step in the right direction to a better public transportation system in Houston.
- Build it! It will help connect Houston and make it better to live and build businesses along the route.
- BRT stop would be very attractive to us. We anticipate we would use the BRT to get to Memorial Park and to visit family in the Galleria area most often.

While there were many positive comments about the overall project, station locations, and the improvement to the regional transit system, there were also negative statements and concerns raised by the stakeholders and the general public. Many of the concerns dealt with

[3] METRO Inner Katy Public Comments, 2022-03-23

the previously discussed noise and air quality issues while some pertained to traffic impacts, transit operations, and safety. These are all critical topics and METRO has and will continue to analyze the issues to respond and effectively address such concerns.

Transit Operations and Traffic Impacts

Stakeholders expressed concerns regarding potential transit operations and its impacts to non-transit vehicular travel, traffic, and parking impacts. METRO is committed to evaluating and refining the alignment alternatives to minimize or avoid any adverse impacts. The project's operating plan is presently being developed, and transit operation impacts are being analyzed.

Meetings and discussions will continue with various stakeholders to review transit operating concerns and ensure transit operations complement multimodal mobility and safety. Further analysis is also being conducted to address concerns related to reducing traffic congestion and avoiding adverse impacts to non-transit vehicular travel.

Accessibility

Universal accessibility is a key objective for METRO on all transit services throughout the region. In designing the METRORapid system, several accessibility factors are standard features incorporated into the project requirements.

In addition, accessibility to and from stations is also critical in the form of providing first and last mile connections. Stakeholder and public comments stressed the need for improved connectivity and for ease of access to transit services, including improving connections to nearby trails and providing safer infrastructure for bicyclists and pedestrians. As the METRORapid design and operating plan continue to evolve, opportunities to improve accessibility to and from stations for people who walk, bike, and roll are being explored and evaluated. METRO continues to meet with various organizations and neighborhood groups to review options to enhance accessibility to transit. With the selection of the LPA and confirmation of station locations, more detailed analysis will be conducted to ensure greater accessibility to the METRORapid stations and in turn the regional transit system.

5.5 Next Steps

Public involvement continues to be an integral part of the METRORapid Inner Katy Project. METRO has conducted a robust public engagement process that has been inclusive and transparent. The public involvement process has included outreach from multiple sources and platforms designed to share information about the project, solicit input, and provide project updates at key milestones. Input received has been instrumental to the development and refinement of alternatives.

Public involvement will continue, and additional analysis and review will be conducted to address outstanding comments and questions, such as those regarding noise and traffic impacts. Stakeholders will also be included in discussions regarding the operating plan and regional service accessibility.

Public involvement is an ongoing process, and the community will continue to receive timely information about the project and will be engaged in further discussions as the project continues to evolve and phase into detailed engineering and construction. METRO will continue to accept comments and the project website will be maintained with current project status and regular updates. From inception to implementation, METRO supports and encourages public involvement and will continue to promote community participation in the project.

6. Summary

Table 6-1 includes a summary of the potential environmental consequences from the proposed project.

Table 6-1: Summary of Potential Environmental Consequences

Environmental Resource	Potential Environmental Consequences of the Project
Acquisitions and Relocations Required Section 4.1	The proposed project is expected to result in six potential displacements around the Shepherd/Durham Station.
Land Use Section 4.2	Approximately 3.77 non-transportation land use acres may be converted to transportation use. This would include industrial (1.31 acres), transportation and utility (0.63-acre), commercial (0.70-acre), undeveloped (0.62-acre), office (0.32-acre), public and institutional (0.07-acre), multi-family residential (0.06-acre), unknown and single-family residential (0.06-acre).
Traffic Section 4.3	The findings from the traffic analysis indicate that the BRT project and its associated improvements would not result in any significant impacts on traffic operations or parking on the existing roadways.
Air Quality Section 4.4	The proposed project would not contribute to a violation of the CO NAAQS within the study area. The project would meet all applicable air quality requirements for the CAA and federal and state transportation conformity regulations.
Historic Resources Section 4.5	One hundred and four (104) historic-age resources constructed in or before 1979 were recorded. Three of the recorded resources were recommended eligible for the NRHP: • The Heights Boulevard Esplanade Historic District and Houston Heights MRA, previously listed in the National Register of historic Places; no changes were recommended to either designated district. • Old Fashion Church of God in Christ church sanctuary and parsonage (two buildings, built ca. 1925) at 4520 Nolda Street; recommended eligible for the NRHP under Criterion A for Ethnic History/Black at the local level. (Determined eligible for the NRHP in October 2022) • Phyllis Palmer and William T. Price House (1947-1951) at 1611 Basse Street; a Houston City Landmark recommended eligible for the NRHP under Criterion A for Ethnic History/Black and Criterion C for Architecture, both at the local level. (Determined eligible for the NRHP in October 2022)
Archeological Resources Section 4.6	No further archeological work is recommended prior to construction.
Section 4(f) - Public Parks, Wildlife Refuges, and Historic Buildings Section 4.7	No use impacts to public parks, wildlife refuges, or historic buildings is anticipated.
Socioeconomics, Community Impacts, and Environmental Justice	No disproportionately high and adverse direct effects would occur to minority or low-income populations. Additional consideration is

Environmental Resource	Potential Environmental Consequences of the Project
Section 4.8	underway for potential noise and visual impacts to two residential areas.
Hazardous Materials Section 4.9	A total of 1,291 database records at 562 mapped sites were documented within the standard radii of the proposed project corridor. Fourteen of these sites are located within and an additional 668 sites are located immediately adjacent (within 0.125-mile) to the proposed right-of-way and easements. Many of these records are historically contaminated sites with some level of remediation work. These historic sites have the potential to retain groundwater and soil contamination that could affect the project site. No oil and gas wells or pipelines are located on the project site. Due to the historic and current use of the properties adjacent to the project site, there is a moderate risk of encountering conditions that are indicative of releases or threatened releases of hazardous substances and potentially contaminated soils and/or groundwater. A Phase II ESA is recommended for all areas where right-of-way is acquired, deep impacts (such as the placement of bridge bents/piers) are planned, and if soil removal or groundwater disturbance is anticipated in the downtown Houston area.
Noise and Vibration Section 4.10	The following three pavement options have been determined to be feasible and to warrant consideration for mitigating noise impacts from bus operations along the Inner Katy Segment: • Longitudinal Saw Grooving • Portland Cement Concrete (PCC) with Diamond Ground Surface • Next Generation Concrete Surface (NGCS) These pavement options are undergoing additional analysis for their effectiveness and feasibility and METRO may implement one of these approaches but a final decision is not available at this time.
Floodplains Section 4.11	100-year and 500-year floodplains associated with the White Oak Bayou and Buffalo Bayou are located within the project area. The proposed project would not increase BFEs to a level that would violate applicable floodplain regulations and ordinances.
Ecologically Sensitive Areas and Endangered Species Section 4.12	No impacts to ecologically sensitive areas or endangered species are anticipated.
Wetlands and Waters of the U.S. Section 4.13	Six potentially jurisdictional aquatic features were identified within the project area (one ephemeral stream, one emergent wetland, one forested wetland, and three perennial streams). Potential impacts to these areas are subject to Section 401/404 of the CWA and impacts should be verified prior to construction.
Water Quality, Navigable Waterways and Coastal Zones Section 4.14	No impacts to water quality, navigable waters, or coastal zones are anticipated; appropriate water quality BMPS would be in place during construction in compliance with Section 401 of the CWA.

Environmental Resource	Potential Environmental Consequences of the Project
Visual Quality Section 4.15	The proposed project is within a highly urban transportation corridor and proposed ROW required is very limited, so visual impacts are not considered overall to be significant and adverse. Overall visual effect of the project is anticipated to be neutral. The project is contextually compatible with its surroundings and viewer sensitivity in the study corridor is low to moderate.
Safety and Security Section 4.16	The Inner Katy Project has the potential to enhance the safety and security of the corridor for all pedestrian users. Infrastructure and pedestrian improvements undertaken for the project would contribute to enhanced safety for all roadway users. METRO security would be an essential component of the operations phase.

Based on the environmental evaluation conduct, METRO anticipates, pursuant to 23 C.F.R. § 771.118(c)9 that the proposed project will have no significant adverse impact on the environment and meets the criteria for processing as a d-list Categorical Exclusion.

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Appendix A – RTP Listing

Appendix B – Figures

Appendix C– Socioeconomics, Community Impacts, and Environmental Justice Memorandum

Appendix D – Land Use and Parks Technical Memorandum

Appendix E – Traffic Analysis Report

Appendix F – Air Quality Technical Report

Appendix G – Historic Resource Coordination

Appendix H – Archeological Resource Coordination

Appendix I – Phase I Environmental Site Assessment

Appendix J – Noise and Vibration Technical Report

Appendix K – Wetland Delineation Report

Appendix L – Biological Resources

Appendix M – Visual Quality Technical Report

Appendix N – Public Involvement Plan