Draft Alternatives Evaluation Technical Report

I-35 Capital Express Central Project
I-35 from US 290 East to US 290 West/SH 71

Texas Department of Transportation, Austin District

CSJ Number: 0015-13-388

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The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated 12-9-2019, and executed by FHWA and TxDOT.

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1 Introduction and Existing Roadway

Interstate Highway 35 (I-35) within Travis County is located in a heavily urbanized corridor that consistently ranks within the Top 3 Most Congested Roadways in Texas. It is currently ranked #1, as measured by Texas A&M Transportation Institute (TTI) and is among roadways with the highest annual congestion costs at more than $200M (TTI 2020). The proposed action, called the I-35 Capital Express Central Project, would construct two managed lanes in each direction along I-35 from US Highway 290 (US 290) East to US 290 West/State Highway (SH) 71 for a total distance of approximately 8 miles, including additional direct connectors at I-35/US 290 East, in Austin, Texas in Travis County.

The existing I-35 roadway from US 290 East to US 290 West/SH 71 is located in an urban area with adjacent commercial, residential, institutional, governmental, and parks/open space properties. Within the proposed project limits, I-35 is an access-controlled interstate highway. Beginning at the southern limit, US 290 West/SH 71, the roadway typically has three to four, 12-foot-wide mainlanes (concrete barrier-separated) with 4- to 12-foot-wide inside shoulders, 10- or 12-foot-wide outside shoulders, and two to three, 11- or 12-foot-wide frontage road lanes with curb and gutter in each direction. From Lady Bird Lake to 15th Street, I-35 generally includes three 12-foot-wide mainlanes in each direction with auxiliary lanes between some of the ramps. North of 15th Street, the roadway has four mainlanes in each direction and includes the upper/lower deck split just north of MLK Jr. Boulevard with a continuation of the upper decks to north of Airport Boulevard. From Airport Boulevard to US 290 East, I-35 includes four barrier-separated mainlanes in each direction. The roadway here typically has 2- to 6-foot-wide inside shoulders, 10-foot-wide outside shoulders, and two to four, 11- or 12-foot-wide frontage road lanes with curb and gutter in each direction. Sidewalks exist in most, but not all locations throughout the project area and shared-use paths (SUP) are located within the project area in “downtown” Austin, defined as between MLK Jr. Boulevard and Holly Street. Drainage along the roadway (mainlanes and frontage roads) is provided by storm sewer networks and some open ditches. The existing right of way (ROW) width is typically 200 to 350 feet but is wider at the interchanges. Existing permanent drainage easements are located at creek crossings. The posted speed limit along I-35 in the proposed project area is 60 mph on the mainlanes and 35 to 50 mph on the frontage roads.

1.1 Purpose and Need

The proposed project is needed because I-35 between US 290 East and US 290 West/SH 71 does not adequately accommodate current and future travel demand and does not meet current federal and state design standards, which has resulted in safety and operational deficiencies and can impact crash rates and peak period travel times for all users, including emergency response vehicles and transit.

The purpose of the proposed project is to improve this critical local, regional, national, and international thoroughfare by enhancing safety within the corridor; addressing demand by prioritizing the movement of people, goods, and services through and across the corridor; improving operational efficiency; and creating a more dependable and consistent route for the traveling public, including bicyclists and pedestrians, emergency responders, and transit.

2 Range of Alternatives

2.1 TxDOT Proposed Build Alternatives

Following more than a decade of study, evaluations, and public involvement with community and stakeholder input, the Texas Department of Transportation (TxDOT) has put forward three build alternatives for the I-35 Capital Express Central Project for consideration. All three alternatives would add two non-tolled managed lanes in each direction, removing the upper decks on I-35 (between Airport Boulevard and MLK Jr. Boulevard), and lowering I-35 through downtown (between MLK Jr. Boulevard and Holly Street). Each alternative would also add direct connectors at I-35 and US 290 East to enhance mobility at this high-volume interchange, and to facilitate the transition of one managed lane to/from US 290 and one managed lane to/from I-35 to the north. Alternative 1 would construct lowered mainlanes and tunneled managed lanes between Airport Boulevard and MLK Jr. Boulevard, and between Riverside Drive and Oltorf Street. Tunneled lanes are defined as being two levels below the frontage roads and cross streets, and one level below mainlanes; and lowered lanes are defined as one level below frontage roads and cross streets and at the same level as mainlanes. Alternative 2 would construct lowered mainlanes and lowered managed lanes between Airport Boulevard and Cesar Chavez Street, and between Riverside Drive and Oltorf Street. Alternative 3 would be similar to Alternative 2, but with managed lanes that overpass Airport Boulevard, at approximately the same elevation as the existing upper decks, and at Woodland Avenue, at the same elevation as the existing mainlanes.

All three proposed build alternatives would include: removing the upper deck in each direction from Airport Boulevard to MLK Jr. Boulevard; reconstructing the bridge across Lady Bird Lake; improving bicycle and pedestrian paths; accommodating current and future Capital Metro routes; and on-site and off-site drainage facilities. All of the alternatives are being evaluated for their ability to accommodate locally funded enhancements, which could include deck plazas or caps, as well as direct transit access at Riverside Drive and East Dean Keaton Street. Table 1 below describes these alternatives. Because we are currently in a non-tolled environment under the 2021 Unified Transportation Plan (TxDOT 2021) the current project is considering HOV (High Occupancy Vehicle)-two or more (2+) occupants for the managed lanes, which meets the eligibility requirement for this project.

2.2 Community Concepts

Several concepts for the I-35 Capital Express Central Project were proposed by community groups, including Reconnect Austin, Rethink 35, and the Downtown Austin Alliance (DAA)/Urban Land Institute (ULI). TxDOT requested that TTI conduct an independent evaluation of these concepts. TTI is an independent agency of the State of Texas that provides research for transportation projects, problems, and challenges. They reviewed elements of the community concepts that are currently incorporated or could be reasonably incorporated in the TxDOT-proposed build alternatives as well as those elements that are not incorporated, and whether the community concepts are feasible as standalone alternatives (TTI 2021). This report can be found on https://my35capex.com.

2.2.1 Reconnect Austin

The Reconnect Austin concept proposes to depress the highway and cover it with a six-lane boulevard throughout the entire section from MLK Jr. Boulevard to Holly Street. This design would support a number of strategies designed to humanize the city around the corridor. On the surface level, the urban boulevard would replace the highway, functioning to reconnect downtown with East Austin, which could increase east-west connectivity. Moving the boulevard into the middle of the ROW would provide reclaimed land on the edge of the existing TxDOT ROW. The proposal envisions that reclaimed land could allow construction of offices, shops, markets, and housing, which, as taxable land, would generate revenue. Creating more downtown housing could help eliminate the commutes of some of downtown Austin's workers if they could move close to their jobs, and within the authority of the City of Austin, some of that housing could be built as affordable housing. The design includes flood control, noise mitigation, and air cleaning features. Removing high-speed roads from the surface, the proposal aims to bring down the number of roadway injuries and fatalities, making walkable new districts safer for pedestrians and other vulnerable road users.

Many elements of the Reconnect Austin concept are feasible and the concept, as coded in the travel demand model, performs reasonably well. With a mainlane freeway option and collector-distributor roads or intersection bypass lanes and connecting ramps providing access to downtown, the Capitol area and the University of Texas area, the boulevard functions similar to the frontage roads in the TxDOT build alternatives. From a travel demand modeling perspective, the Reconnect Austin concept provides similar capacity elements, but causes higher vehicle traffic on the east Austin street network than the TxDOT build alternatives.

The Reconnect Austin elements that fail the feasibility test are those related to the funding contribution and redevelopment of the land between the boulevard and the existing ROW line. The Reconnect Austin concept is premised on the idea that the roadway ROW is narrower than the existing facility and the land between the boulevard and the existing ROW line would be sold by TxDOT. A full cap over the tunneled mainlanes allows the frontage roads to shift in and create a boulevard. The reclaimed land could be sold to private developers to create tax base or the City of Austin may purchase it for any number of purposes. However, there have been many new developments adjacent to the frontage road since the original Reconnect proposal was conceived, and these appear to have removed a significant amount of the possible development space. These new developments are unlikely to be vacated, demolished and developed in the timeframe when TxDOT could realize a return on selling or leasing any reclaimed land resulting from depressing and narrowing the roadway. In addition, any large building redevelopment over the freeway mainlanes and collector-distributor roads would require structural supports to be installed during the initial construction for buildings not yet planned, designed, or funded. These supports could also conflict with the spatial requirements of roadway off-ramps. The coordination in timing and responsibility seem not only daunting, but outside TxDOT's mission and authority.

In addition to the costs associated with acquiring properties and access, the costs for the cap itself may be prohibitively expensive. The cap would require approximately 30 acres of coverage. Using the example costs from Southern Gateway Cap of $350-450 per square foot, this equates to

$457,380,000 - $522,720,000. Nevertheless, although most of Reconnect Austin's concept goals of a boulevard with redeveloped land is outside TxDOT's scope and purpose and need for this project, some of these goals can be accommodated within the TxDOT build alternatives through ongoing partnership with the appropriate agencies.

2.2.2 Rethink35

The design Rethink35 proposes is a conversion of the central section of I-35 to an urban boulevard. Future hopes for the corridor include a rail line to points north or south of Austin. The proposal is very conceptual, with few details; the authors anticipate the concept will change as it undergoes evaluation and a public involvement process. There is no plan to sink high-speed roads underground, as in Reconnect Austin. Rather, the idea is that traffic will slow as it approaches the boulevard section and speed up again as it leaves, to the north and south of downtown. Cross streets connecting East Austin to the downtown area will provide east-west connectivity options and reintegrate East Austin into the fabric of the city.

Rethink35 seeks to dramatically reshape not only the I-35 corridor, but travel patterns and modes across the region. Eliminating the high-capacity corridor through the spine of central Austin and replacing it with a six-lane boulevard would provide new development space and reduce north-south traffic volume and noise levels in the existing I-35 corridor. The purchase of access rights and available land for development would be similar to those from Reconnect Austin. Although the physical rebuilding of I-35 into a boulevard with wide sidewalks, accommodations for transit, bicycles and pedestrians can be done, the traffic impacts to the surrounding streets and delays it would cause to through traffic make it unlikely that such a concept would meet the transportation needs of an interstate highway. The travel demand model results show that the Rethink35 concept would likely reduce traffic on I-35 and improve the environment directly around the envisioned project but congestion problems would be pushed to city streets. Further, this conceptual design would not adequately accommodate the needs of commuters from the suburbs to the major regional employment centers. It is also difficult to examine the effect of such a large change in the transportation network, because the ripple effects would extend far beyond vehicle and person travel.

In the near- and medium-term, the central Austin trip destinations – the University of Texas, the Capitol complex and other government agencies, offices, shops, hotels, restaurants, entertainment venues – would continue to pull vehicles, freight and people to the area. With no I-35 freeway capacity, the models indicate that portions of these trips would shift to MoPac, SH 71, US 290 and US 183. The remainder of those trips would shift to the street network through the neighborhoods east and west of I-35 to get to downtown Austin. In the longer-term it is likely that the changing trip destinations and the transportation network would create a different balance point. The *2013 Mobility Investment Priorities* (TTI 2013) report examined the traffic conditions that would exist on I-35 in 2035 if there were no improvements beyond those that were funded at the time. With no additional changes to either the transportation system or to trip patterns, an evening commute trip on I-35 from downtown to Round Rock that took 45 minutes in 2011 was estimated to take 2.5 hours in 2035. A much more likely scenario is that the jobs and population will grow differently across the region in response to long

travel times between the Austin suburbs and downtown Austin. Some people will move closer to their existing job, others will move their job closer to their home. And because of our COVID-19 pandemic experience, we also know that some workers with flexibility will choose to not commute every day.

2.2.3 Downtown Austin Alliance/Urban Land Institute

The DAA/ULI vision for revamping I-35 is best described as a set of planning and design recommendations tied to a set of desired outcomes. The report does not include a detailed plan or technical designs but does propose a number of foundational design elements including a narrower ROW than what TxDOT proposes (246 feet rather than 360); depressed mainlanes; three caps and eight stitches or pedestrian bridges along the entire project length; and frontage roads overhanging the mainlanes that are designed as low speed urban boulevards with both travel and parking lanes, and traffic calming devices like speed cushions.

The DAA/ULI concept employs design concepts known as caps and stitches that are possible because of the lowered mainlanes. In the case of I-35 a cap would be a large deck that runs north to south over I-35 but is not continuous, as proposed in the Reconnect Austin concept; instead caps are considered at multiple locations. The caps are connected by stitches. Stitches are wide bridges that would run east-west over the highway. Stitches over I-35 would include travel lanes and protected paths, at a minimum. Stitches may also include landscaping, and additional buffers to enhance place making. The frontage roads could be connected with caps in some locations. In sections where entrance or exit ramps are required between the freeway and the frontage roads, the cap would not be built, and the frontage roads would be farther apart. The DAA/ULI report included a set of principles supporting its overarching theme, which is to build and implement a robust planning and design process informed by specific policies of mobility, health, equity, and aesthetic integration. That process should enable a co-creation of a vision between government and representative community members.

DAA/ULI concept is not as dramatically different from the TxDOT build alternatives as are Rethink35 and Reconnect Austin. It envisions a narrower I-35 corridor than the TxDOT build alternatives, one with frontage roads that overhang the freeway mainlanes. This could allow space for non-TxDOT agencies to fund and build caps over the space between the mainlanes. The caps could include parks or low-intensity (one-or-two-stories) buildings. The “tucked in” frontage roads would have 30 mph speed limits to reduce negative traffic effects of vehicles and could provide space for wide sidewalks, shade trees and other pedestrian-scale amenities. With this collaboration from other funding partners, the DAA/ULI concept could be achieved. The difficulty with overhanging the frontage roads over the mainlanes is that it does not allow for entry and exit ramps to move traffic between downtown and the freeway mainlanes. About two city blocks of space is required to create a ramp from the lowered freeway to the surface frontage road, and the cap development could not exist on top of these ramps. Even more distance might be needed to move the frontage roads from their overhanging location to one that allows the ramps to change levels. The DAA/ULI concept is feasible for short distances where entry and exit ramps are not needed but a continuous cap would not be possible if the design intention is to move traffic from surface streets to the freeway mainlanes.

The DAA/ULI report proposes 11 acres of caps and 2 acres of stitches. Applying the same costs range

of $350-$400 per square foot, the costs for this is between $198,198,000 and $226,512,00. The report goes on to calculate operations and maintenance costs over 30 years for a total of capital and operations and maintenance of $313 million over 30 years (vii). The DAA/ULI report suggests that $171 million of this funding can be realized through a tax increment finance district with additional funding from federal sources. There is still a significant funding gap, along with possible funding sources.

2.3 Alternatives Feasible for Screening

TTI's analysis of the community concepts shows that, while none of the three concepts described above are feasible as standalone alternatives, much of what these separate entities are proposing is already included in or has recently been added to the TxDOT build alternatives, including:

- Lowered travel lanes.
- More than 15 widened east-west crossings, including a new crossing at 5th Street for all users; and new pedestrian crossings at Cap Metro Red Line/Future Gold Line south of Airport Boulevard, and between 51st Street and US 290 E.
- Bicycle and pedestrian enhancements including 20-foot buffers and 10-foot shared-use paths.
- Low design speeds on frontage roads.
- Enhanced person-carrying capacity along the corridor by providing a reliable route for transit in managed lanes.

Based on TTI recommendations, TxDOT is studying additional community enhancements such as frontage road relocation concepts, which will be presented at an upcoming public involvement opportunity. The build alternatives carried forward for evaluation by the criteria described in Section 3 below, include the TxDOT-proposed build alternatives 1, 2 and 3, along with elements of the community concepts, as described in the list above. The three build alternatives are described in Table 1.

Table 1. Community-Enhanced Alternatives to be Evaluated and Screened

Alternative	Description
No Build	Standard, routine maintenance
Build Alternative 1 - Managed Lanes Tunnel Section *Tunnel = two levels below frontage roads and cross streets and one level below mainlanes*	Two tunneled managed lanes* and lowered mainlanes in each direction with additional flyovers at I-35 and US 290 East and additional enhancements as listed in Section 2.3. ** Only northbound managed lanes tunneled through downtown*

Build Alternative 2 - Managed Lanes Lowered Section *Lowered = one level below frontage roads and cross streets and same level as mainlanes*	Two lowered managed lanes* and lowered mainlanes in each direction with additional flyovers at I-35 and US 290 East and additional enhancements as listed in Section 2.3. **Following coordination with the City of Austin, short, tunneled sections may be included at select locations in order to accommodate deck caps and mitigate ROW/displacement impacts.*
Build Alternative 3 – Managed Lanes Lowered Section, Modified at Airport Boulevard and Woodland Avenue	Two lowered managed lanes* and lowered mainlanes in each direction with additional flyovers at I-35 and US 290 East and additional enhancements as listed in Section 2.3. Managed lane overpasses at Airport Boulevard and Woodland Avenue. **Following coordination with the City of Austin, short, tunneled sections may be included at select locations in order to accommodate deck caps and mitigate ROW/displacement impacts.*

3 Alternatives Evaluation and Screening

The alternatives evaluation criteria were used to compare the three build alternatives' and the no build alternative's ability to meet the project purpose and need; high-level engineering criteria such as constructability, ROW needs, complexity of utility relocation and preliminary project costs; and an evaluation of environmental resource impacts. The criteria evaluated as many quantifiable impacts as possible, such as the acres of ROW required, travel times, number of potential displacements, number of historic resources affected, and acres of park impacts for each alternative. Each criterion is discussed below, along with the parameters within which it was evaluated. After this evaluation, reasonable alternatives were identified for further evaluation to be carried forward in the Draft Environmental Impact Statement (DEIS). For the DEIS, additional study will be conducted involving a detailed analysis of each proposed build alternative as compared to the no build.

3.1 Criteria Evaluated for the Purpose and Need

Each alternative was evaluated for its ability to meet the purpose and need. Criteria within this group include enhancing safety, addressing demand, and creating a more dependable travel route, as detailed below.

3.1.1 Enhancing Safety within the Corridor

Criterion 1: Aligned with TxDOT's Road to Zero Initiative and City of Austin's Vision Zero Initiative

Each alternative was evaluated for its ability to support TxDOT's mission to cut traffic fatalities in half by 2035 and then entirely by 2050 through its Road to Zero initiative (TxDOT 2021), and to support the City's mission to eliminate traffic deaths and serious injuries on Austin streets through its Vision Zero initiative (City of Austin 2016a).

All three build alternatives align with TxDOT's and City of Austin's missions to reduce/eliminate traffic

deaths. They also all address the *Texas Strategic Highway Safety Plan's* Pedestrian Safety (TxDOT 2017) emphasis area by providing SUPs that improve the pedestrian network (strategy number 4 in the emphasis area: "Improve pedestrian networks") and reconstructing diamond intersections to improve visibility of pedestrians at crossing locations (strategy number 3 in the emphasis area: "Improve pedestrian visibility at crossing locations"). The three build alternatives all address the *Austin Strategic Mobility Plan's* (ASMP) (City of Austin 2019) Designing for Safety Policy 2 ("Minimize the potential for conflicts between transportation network users") by providing SUPs that separate bicyclists and pedestrians from vehicular traffic and Designing for Safety Policy 4 ("Improve the ability of all transportation users to see and be seen") by reconstructing diamond intersections to improve visibility of pedestrians. Differences among the alternatives are provided below.

No Build – The no build alternative does not provide improvements that reduce/eliminate traffic deaths and does not align with TxDOT's Road to Zero Initiative and/or the City of Austin's Vision Zero Initiative.

Alternative 1 – Alternative 1 aligns with both initiatives and also provides wider shoulders in spot locations compared to Alternatives 2 and 3, resulting in a slightly greater reduction in fatal and injury crashes. Predictive safety analysis shows 35% fewer fatal and injury crashes in 2030 compared to the no build.

Alternative 2 – Alternative 2 aligns with both initiatives. Predictive safety analysis shows 34% fewer fatal and injury crashes in 2030 compared to no build.

Alternative 3 – Alternative 3 aligns with both initiatives. Predictive safety analysis shows 32% fewer fatal and injury crashes in 2030 compared to no build.

Criterion 2: Aligned with Additional Local Plans

Each alternative was evaluated for its ability to align with or be consistent with local plans. By developing and improving highway, pedestrian/bicycle, and ADA infrastructure, the project is generally in alignment with the following local plans: ASMP, *City of Austin Street Design Guide, Downtown Austin Plan, Parks Department Long-Range Master Plan, Strategic Direction 2023 Plan, Imagine Austin Comprehensive Plan, Sidewalk Master Plan and ADA* (Americans with Disabilities) *Transition Plan Update, Bicycle Master Plan,* and *Capital Area Metropolitan Planning Organization* (CAMPO) - *Regional Transportation Plan.*

All three build alternatives allow opportunities to improve alignment or consistency with local plans. For instance, the project's main additional capacity improvement, which is to provide managed HOV/transit lanes, addresses *Austin Strategic Direction 2023's* stated strategy of "encourage use of sustainable modes of transportation and discourage driving alone [. . .]." Coordination with local and regional agencies (such as the Austin Transportation Department and Capital Metro) is ongoing, thus aligning with the ASMP's Collaboration Policy 1 ("collaborate with internal departments, regional partners, and outside agencies"). All build alternatives would comply with many design aspects of the City of Austin's *Street Design Guide,* their *Sidewalk Master Plan and ADA Transition Plan Update,* and their *Bicycle Master Plan.* The *Imagine Austin Comprehensive Plan* lists the My35 Project as a "related city initiative" that supports its goal to "invest in new and reinvest in existing infrastructure to support

a compact and connected city through a planning-driven capital improvements program." The project aligns with the *Downtown Austin Plan's* goals of developing a multi-modal transportation system that improves access to and mobility within downtown and investing in downtown infrastructure by making utility and drainage improvements that support positive and sustainable development. The project also aligns with the *Parks Department Long-Range Master Plan's* goal to implement the *Sidewalk Plan/ADA Transition Plan Update* for areas of need adjacent to parks and improve mobility around and between parks and nearby activity areas. The I-35 Capital Express Central Project is currently listed in CAMPO's Transportation Improvement Program (TIP). Each plan can be examined online and is listed in the references section of this report. The no build alternative does not improve alignment with local plans.

Criterion 3: Improves Emergency Response Time for EMS, Police, Fire, and Hospitals

Each alternative was evaluated for its ability to correct geometric deficiencies, upgrade the facility to current standards, serve as a reliable route for emergency response organizations, and provide detours during accidents. Alternatives were scored within the range of High, Medium or Low, where High = more reliable response times and Low = delayed response times.

No Build – The no build alternative scores low as it resulted in the longest response times due to congestion, unreliable travel times, and narrow shoulder widths, which hinder the ability of emergency vehicles to maneuver along the facility.

Alternative 1 – Alternative 1 scored medium, as it resulted in response times that are shorter than the no build response times, but longer than those for Alternatives 2 and 3. Managed lanes (two lanes in each direction) improve reliability for emergency vehicles, but the managed lanes tunnel in Alternative 1, which extends along the project for 8.25 miles (in section), limits access to cross streets and requires interaction with the mainlanes for movement to/from the frontage roads. Wider shoulder widths improve emergency vehicles' maneuverability.

Alternatives 2 and 3 – Alternatives 2 and 3 both scored high, as they resulted in shorter response times than Alternative 1. For both of these alternatives, managed lanes (4) improve reliability for emergency vehicles since they are located at the same level as the mainlanes (not tunneled). Alternatives 2 and 3 both allow direct and continuous emergency access across the striped boundaries separating mainlanes from the managed lanes and improve access to cross streets. Further, direct access from the managed lanes to the frontage roads is provided near major regional health care facilities (e.g., southbound egress to 15th Street at Dell Seton Medical Center at The University of Texas, southbound egress to 32nd Street at St. David's Medical Center). Wider shoulder widths improve emergency vehicles' maneuverability.

Criterion 4: Emergency Egress Requirements

Each alternative was evaluated for its ability to provide emergency egress. Tunnels will require detailed evaluations and additional design elements to meet fire and life safety code requirements. Each alternative was scored within the range of High, Medium or Low, where High = fewer requirements for emergency egress and Low = more requirements for emergency egress.

No Build – The no build alternative scored high, as there are no additional requirements for

emergency egress based on current design standards.

Alternative 1 – Alternative 1 scored low, as it has the most emergency access requirements due to the proposed tunnel. Total tunnel miles proposed in this alternative is 8.25 continuous lane miles. Tunnel emergency egress requirements include but are not limited to:

- Distance to exit shall not exceed 1,000 feet
- Exits include:
  - Portals
  - Stairs to grade
  - Doors to non-incident roadway
  - Egress corridor
- Emergency lighting, including "Distance to Exit" photoluminescent signs
- Provisions for firefighting at exits

Alternatives 2 and 3 – Alternatives 2 and 3 both scored high as they do not have additional requirements for emergency egress. Existing shoulders, ramps, collector-distributor roads and frontage roads along the corridor provide egress in case of an emergency. No tunneled sections are currently proposed in either of these alternatives; however, following coordination with the City of Austin, short, tunneled sections may be included at select locations in order to accommodate deck caps and mitigate ROW/displacement impacts.

Criterion 5: Reduction in Fatalities and Injury Crashes

Each alternative was evaluated for its potential for fatal and injury crash reductions on mainlanes, managed lanes, ramps, and frontage road intersections using Interactive Highway Safety Design Model software. The software implements *Highway Safety Manual* methods to predict crashes on roadways based on regression models developed using historic crash data from similar sites.

No Build – N/A (Evaluation is based on percent change from no build alternative.)

Alternative 1 – Predictive safety analysis shows a 35 percent reduction in fatalities and injury crashes in 2030 compared to the no build. Alternative 1 provides wider shoulders in spot locations compared to the other two build alternatives, resulting in a slightly greater fatal/injury crash reduction.

Alternative 2 – Predictive safety analysis shows a 34 percent reduction in fatalities and injury crashes in 2030 compared to no build.

Alternative 3 – Predictive safety analysis shows a 32 percent reduction in fatalities and injury crashes in 2030 compared to no build.

3.1.2 Addressing Demand by Prioritizing the Movement of People, Goods, and Services through and across the Corridor; and Improving Operational Efficiency

Criterion 1: Mainlane Travel Time

Each alternative was evaluated for its travel time along the I-35 mainlanes in comparison to the no build. Traffic microsimulation using Vissim software provides year 2030 p.m. peak hour mainlane travel times along the I-35 Capital Express Central project limits under each alternative. The results

are a comparison of averages of northbound and southbound travel times between US 290E and US 290W/SH 71.

Vissim models of a.m. peak periods (6:30 – 9:30) and p.m. peak periods (3:30 – 6:30) along I-35 were constructed and calibrated to existing (2019) field volume and travel time conditions. The models include all I-35 mainlanes, ramps, frontage roads, and interchanges and major cross streets. Vissim is a traffic microsimulation software, modeling individual entities (automobiles, heavy vehicles, transit, pedestrians, bicycles, signals) within the study network. The 2030 p.m. peak period Vissim models are based on the existing (2019) p.m. peak model, incorporating traffic volume forecasts and the proposed alternative geometries. The 2030 p.m. peak period represents the most congested portion of a typical weekday along I-35 in the approximate opening year of the project.

No Build - N/A (Evaluation is based on percent change from no build alternative.)

Alternative 1 – Traffic microsimulation shows mainlane travel time decrease of 47% during the 2030 p.m. peak hour compared to the no build travel times.

Alternative 2 – Traffic microsimulation shows mainlane travel time decrease of 50% during the 2030 p.m. peak hour compared to the no build travel times.

Alternative 3 – Traffic microsimulation shows mainlane travel time decrease of 39% during the 2030 p.m. peak hour compared to the no build travel times.

Criterion 2: Managed Lane Travel Time

Each alternative was evaluated for its travel time along the proposed I-35 managed lanes in comparison to the no build. Traffic microsimulation using Vissim software provides year 2030 p.m. peak hour managed lane travel times along the I-35 Capital Express Central project limits under each build alternative. The results are an average of northbound and southbound managed lane travel times between US 290E and US 290W/SH 71.

Vissim models of a.m. (6:30 – 9:30) and p.m. (3:30 – 6:30) peak periods along I-35 were constructed and calibrated to existing (2019) field volume and travel time conditions. The models include all I-35 mainlanes, ramps, frontage roads, and interchanges and major cross streets. The 2030 p.m. peak period Vissim models are based on the existing (2019) p.m. peak model, incorporating traffic volume forecasts and the proposed alternative geometries. The 2030 p.m. peak period represents the most congested portion of a typical weekday along I-35 in the approximate opening year of the project.

No Build – N/A (No managed lanes are provided with the no build alternative.)

Alternative 1 – Traffic microsimulation shows managed lane travel times of 9 minutes in the 2030 p.m. peak hour.

Alternative 2 – Traffic microsimulation shows managed lane travel times of 8 minutes in the 2030 p.m. peak hour.

Alternative 3 – Traffic microsimulation shows managed lane travel times of 9 minutes in the 2030 p.m. peak hour.

Criterion 3: Person-carrying Capacity along Mainlanes and Managed Lanes, Including Vehicles and Transit

Each alternative was evaluated for its total mainlane and managed lane person-carrying capacity. The mainlane person-carrying capacity at a given point along the corridor was calculated based on basic freeway and transit capacity estimates for each alternative per the below methodology and assumptions. I-35 frontage roads, ramps, collector-distributors, and direct connectors were not considered as part of the analysis, as those facilities' main functions are to connect I-35 mainlanes and managed lanes with other facilities and adjacent developments rather than provide true travel capacity. The evaluation provides a high-level, theoretical assessment of alternatives and does not consider the effects of signal timing, access/ramping, and other operational details.

For the no build alternative, person-carrying capacity was based on the following assumptions:

- Lane vehicular capacity calculated using:
    - Base free-flow speed based on 60 mph design speed
    - Lane width adjustment
    - Right-side lateral clearance adjustment
    - Total ramp density
    - Conversion from passenger cars per hour per lane to vehicles per hour per lane based on:
        - Peak-Hour Factor (PHF) (0.98)
        - Heavy vehicle adjustment factor (based on classification counts showing an AM/PM peak period average of approximately 6% heavy vehicles in traffic stream)
- Lane corridor vehicular capacity multiplied by vehicle occupancy (based on 2019 count and available Austin-area demographics) to calculate person-carrying lane capacity
- Person-carrying lane capacity applied to 6 mainlanes through corridor (analysis excludes auxiliary lanes and non-through lanes) to determine total corridor person-carrying capacity

For the build alternatives, person-carrying capacity was based on the following assumptions:

- Mainlane facility person-carrying capacity calculated as above
- Managed lane vehicular capacity calculated using:
    - Base free-flow speed based on 60 mph design speed
    - Lane width adjustment
    - Right-side lateral clearance adjustment
    - Total ramp density
    - Conversion from passenger cars per hour per lane to vehicles per hour per lane based on:
        - PHF (0.98)
        - Heavy vehicle adjustment factor (based on assumed bus headways and Park & Ride locations, resulting in 6 buses per hour in the managed lanes)
    - Proportion of HOV/transit traffic mix based on assumed maximum bus headway
    - Lane corridor bus capacity multiplied by typical bus capacity to calculate transit person-

carrying lane capacity
    - Lane corridor HOV capacity multiplied by assumed HOV occupancy to calculate HOV person-carrying lane capacity
    - Lane corridor managed lane person-carrying capacity is the sum of transit and HOV person-carrying lane capacity
    - Person-carrying lane capacity applied to 4 managed lanes through corridor (analysis excludes auxiliary lanes and non-through lanes) to determine total managed lane corridor person-carrying capacity
- Total person-carrying capacity for each build alternative is the sum of mainlane and managed lane person-carrying capacities.

No Build – Person-carrying capacity of 6 mainlanes is approximately 13,455 people per hour.

Alternative 1 – Person-carrying capacity of 6 mainlanes and 4 managed lanes for Alternative 1 is approximately 33,860 people per hour—a 152% increase compared to the no build person-carrying capacity. Alternative 1 provides slightly higher theoretical capacity compared to the other two build alternatives due to lower managed lane ramp density and greater mainlane and managed lane width (12 feet compared to 11 feet provided in Alternatives 2 and 3).

Alternative 2 – Person-carrying capacity of 6 mainlanes and 4 managed lanes under Alternative 2 is approximately 33,695 people per hour—a 150% increase compared to the no build person-carrying capacity.

Alternative 3 – Person-carrying capacity of 6 mainlanes and 4 managed lanes under Alternative 3 is approximately 33,695 people per hour—a 150% increase compared to the no build person-carrying capacity.

Criterion 4: Travel Demand along Adjacent Transportation Roadway Network

Each alternative was evaluated based on its travel demand patterns/traffic volumes along major (Mopac Expressway, US 183) and minor (downtown arterials) parallel facilities (excluding I-35 mainlanes, ramps, frontage roads, and collector-distributors). The CAMPO 2045 travel demand model (TDM), a 6-county regional model of existing and future transportation demand based on population and employment demographics, was modified for the project and provided daily vehicle-miles traveled (VMT) output of a subarea bounded by Mopac, US 183, SH 71, and US 183. The TDM was developed at a macroscopic level and does not explicitly consider the impacts of signal timing, weaving/lane changing, and other operational details.

No Build – 14,600,820 daily VMT are forecasted within the subarea under no build conditions.

Alternative 1 – 14,370,965 daily VMT are forecasted within the subarea under Alternative 1 conditions, providing a 1.6% decrease compared to the no build VMT. Alternative 1 daily VMT is slightly lower on adjacent arterials parallel to I-35 compared to VMTs of Alternatives 2 and 3, likely due to additional mainlane ramp access provided in Alternative 1.

Alternative 2 – 14,396,516 daily VMT are forecasted within the subarea under Alternative 2 conditions, providing a 1.4% decrease compared to the no build VMT. Alternative 2 daily VMT

are slightly higher on adjacent arterials parallel to I-35 compared to VMT of Alternative 1.

Alternative 3 – 14,404,688 daily VMT are forecasted within the subarea under Alternative 3 conditions, providing a 1.3% decrease compared to the no build VMT. Alternative 3 daily VMT are slightly higher on adjacent arterials parallel to I-35 compared to VMT of Alternative 1 and Alternative 2.

Criterion 5: Annual Cost of Travel

Each alternative was evaluated based on the I-35 (mainlanes and managed lanes) total corridor travel time and associated societal costs. The CAMPO 2045 TDM was modified for the project and provided daily vehicle-hours traveled (VHT) output of all vehicles traveling along the I-35 mainlanes and managed lanes within the project area. The daily VHT was then converted into annual cost of travel based on assumed value of time ($30.54 in 2021 USD) and number of days per year realizing this travel time (250 workdays).

No Build – Year 2045 network delays cost $564 million.

Alternative 1 – Year 2045 network delays cost $530 million, providing a 6.0% decrease compared to the no build costs. Alternative 1 travel costs are slightly higher than costs of Alternatives 2 and 3 due to increased congestion on I-35 mainlanes.

Alternative 2 – Year 2045 network delays cost $497 million, providing an 11.8% decrease compared to the no build costs.

Alternative 3 – Year 2045 network delays cost $497 million, providing an 11.8% decrease compared to the no build costs.

3.1.3 Creating a more dependable and consistent route for the traveling public including bicyclists, pedestrians, emergency responders, and transit.

Criterion 1*:* Improves East-West Connectivity

Each alternative was evaluated on its ability to provide enhanced vehicular, bicycle and pedestrian crossings. Each alternative was scored within the range of High, Medium or Low, where High = more connectivity and Low = less connectivity.

The no build alternative scored low because many current east-west connections do not provide bicycle facilities and only minimal pedestrian facilities and amenities. All three build alternatives scored high, as they all provide opportunities for additional east-west crossings for vehicles, pedestrians, and bicycles. East-west crossings will also be widened and enhanced for bicycles and pedestrians for all build alternatives.

Criterion 2: Accommodates Capital Metro's Service Plan at East-West Crossings

Each alternative was evaluated for its ability to accommodate Capital Metro's Project Connect proposed light rail system at east-west crossings. All three build alternatives accommodate Capital Metro's Service Plan for the proposed Blue Line at the east-west crossing at Riverside Drive and to provide a grade separation (with mainlanes, ramps, and frontage roads) of the Red Line at Airport

Boulevard and 4th Street. The no build alternative does not accommodate Capital Metro's Service Plan.

Criterion 3: Improves Facilities for Disabled Populations

Each alternative was evaluated for its ability to conform with the Americans with Disabilities Act (ADA) as well as with the Texas Department of Licensing and Regulation (TDLR) *Texas Accessibility Standards* (TDLR 2012).

Alternatives were scored within the range of High, Medium or Low, where High = enhanced improvements and Low = no improvements at all. All three build alternatives scored high, as they conform to both ADA and TDLR requirements. SUP and intersection geometric and signal design for all three build alternatives conform to latest ADA requirements. Reconstruction of sidewalk segments along the I-35 Capital Express Central Project are prioritized in the *City of Austin Sidewalk Master Plan and ADA Transition Plan Update* (City of Austin 2016) from low to very high need depending on location. Pedestrian facilities, including sidewalks, SUPs, and curb ramps will be reconstructed in accordance with the Architectural and Transportation Barriers Compliance Board (Access Board) draft document entitled *Accessibility Guidelines for Pedestrian Facilities in Public Right-of-Way* (PROWAG), published in 2011. Alternatives 1, 2, and 3 will all meet the requirements set forth in PROWAG for ADA-compliance. The no build alternative scored low since many existing pedestrian facilities on I-35 are not in compliance with the ADA.

3.2 Criteria Evaluated for Feasibility, Design, and Engineering

Criterion 1: Constructability Risk

Alternatives were evaluated for their construction duration and construction staging/sequencing complexity. Highway constructability is defined as providing the required space to safely build the highway while:

1. Maintaining an equal number of through lanes as the existing facility during all phases of construction.
2. Maintaining access to local roadway network.
3. Limiting the cost of temporary facilities required to maintain through lanes and local access.
4. Limiting the overall duration of construction.

Alternatives were scored within the range of High, Medium or Low, where High based on these four conditions, where High = higher risk (alternative meets fewer conditions) and Low = lower risk (alternative meets more conditions). All three build alternatives are likely to require drainage tunnels which will further complicate constructability and increase construction duration.

No Build – N/A

Alternative 1 has high constructability challenges due to limited space and the proposed multilevel infrastructure. The existing I-35 highway has three through lanes from US 290 at the northern project limits to SH 71 at the southern project limits. These through lanes are augmented with an auxiliary lane creating a fourth lane between on/off ramps.

Alternative 1 would vertically stack the managed lanes, mainlanes, and frontage road lanes,

creating three distinct levels. The managed lanes would be on the bottom level within a cut and cover tunnel. Cut and cover is the oldest method of tunneling and involves digging a trench, constructing a tunnel, and returning the surface to its original state. It is a disruptive technique, but it is usually the most economical method of tunnel construction. In one location due to limited ROW and environmentally sensitive areas, the managed lanes tunnel would be constructed using a bored construction method where the tunnel is built by opening up a portal and digging horizontally, thus causing less surface disturbance. The mainlanes would be above the managed lanes supported by another cut and cover tunnel. The mainlanes would connect to the frontage roads above through a series of ramps. The frontage roads would remain at ground elevation supported by the tunnels below and would connect to the local roadway network.

The two cut and cover tunnels would use a central foundation located in the middle of existing I-35. This central foundation would need to be constructed in the first phase of construction in order to build all subsequent phases. This would require phase one traffic to be squeezed into less than half the footprint of the existing I-35 facility. This would reduce the number of through lanes in the northbound direction to two lanes for multiple years during construction or require an expensive two-mile-long temporary bridge that would be demolished later during the construction project.

Maintenance of local access during construction would be restricted as the proposed frontage roads would be located above the tunnel structures. The outside support foundations for the mainlanes tunnel and its connecting ramps would be directly below the existing frontage road. The frontage road construction would need to be broken up into longitudinal sections: each frontage road section would be temporarily closed sequentially one after another impacting the limited through-capacity the frontage roads provide. Access to the adjacent properties would be provided either by a temporary frontage road requiring additional ROW or long traffic detours using the Austin street network by way of opened sections of frontage road.

At least an eight-year construction duration is anticipated for Alternative 1, based on construction cost, complexity, and the construction phasing described above.

Alternative 2 poses medium constructability challenges featuring a single stretch of frontage roads bridged over mainlanes between Manor Road and 38 ½ Street. Proposed ROW for Alternative 2 would allow for construction of two levels versus three levels required by Alternative 1. The frontage roads would remain at the existing ground level providing the connectivity to the local roadway network. The managed lanes and mainlanes would be lowered in an open-air corridor with ramps to the frontage roads. The construction could be broken up into five phases, building in order from east to west: phase 1 - northbound frontage road, phase 2 - northbound mainlanes, phase 3 - managed lanes, phase 4 - southbound mainlanes; phase 5 - southbound frontage road. This would allow the highway to be safely constructed while maintaining an equal number of through lanes as the existing facility during all phases of construction.

Only between Manor Road and 38 ½ Street would the northbound and southbound frontage

roads be temporarily closed. This stretch of the northbound frontage road does not have any local access needs. The southbound frontage road would require coordination to provide access to adjacent properties through detours using the Austin street network.

At least a 6.5-year construction duration is anticipated for Alternative 2 based on construction cost, complexity of construction, and the five phases that would take over one year each to construct.

Alternative 3 also poses medium constructability challenges featuring the same construction methods, sequencing and detours as Alternative 2, and also has at least a 6.5-year construction duration.

Criterion 2: Utility Conflicts

Each alternative was evaluated for its anticipated utility relocation effort (Table 2 lists major Austin water and wastewater utilities within the project limits.) Each alternative was scored within the range of High, Medium or Low, where High = more effort and utility conflicts and Low = less effort and fewer utility conflicts. For all three build alternatives, utilities along both sides of the ROW will be impacted by the reconstruction and widening of frontage roads. In particular, lowered frontage roads to grade separate the Capital Metro Redline rails, located south of the intersection at Airport Boulevard and 4th Street, would present a challenge on the sanitary sewer gravity flow line. Evaluation of this line includes potential lift station installation.

No Build – N/A

Alternative 1 – Alternative 1 would require high effort and complexity to relocate utilities due to both mainlanes (approx. 25 feet below the surface) and managed lanes (approx. 50 feet below the surface) facility depths. All utilities crossing the freeway would be impacted and require relocation. Existing utilities would need to be relocated prior to installing the storm drain system crossings.

Alternatives 2 and 3 – Alternatives 2 and 3 would both require medium effort and complexity to relocate utilities due to both mainlanes and managed lane (approx. 25 feet below the surface) facility depths. There is potential to avoid impacts to a few major utility crossings with these alternatives. Existing utilities would need to be relocated prior to installing the storm drain system crossings.

Table 2. Major City of Austin Water Utilities from US 290E to SH 71/US 290W

Utility Type	Size and Material	Parallel/ Crossing/ Lateral	Length in Project Limits (LF)	Conflict Description
Water	36" DI	Crossing	271	Under Pavement
Water	24" CI	Crossing	216	Under Pavement
Water	48" CSC	Crossing	225	Under Pavement
Waste Water	96" CONC	Crossing	404	Under Pavement
Water	24" CSC	Crossing	366	Under Pavement
Waste Water	30" CONC	Parallel	966	Under Pavement
Waste Water	24" SANITARY	Parallel	344	Under Pavement

Waste Water	24" SANITARY	Parallel	145	Under Pavement
Waste Water	42" CONC	Parallel	404	Under Pavement
Water	66" CSC	Crossing	494	Under Pavement
Waste Water	42" CONC	Crossing	312	Under Pavement
Water	24" CI	Parallel/Crossing	1002	Under Pavement
Waste Water	24" SANITARY	Parallel	865	Under Pavement
Waste Water	33" SANITARY	Parallel	497	Under Pavement
Waste Water	36" SANITARY	Crossing	303	Under Pavement
Waste Water	36" SANITARY	Crossing	386	Under Pavement
Waste Water	48" SANITARY	Crossing	429	Under Pavement
Waste Water	TUNNEL	Crossing	547	Under Pavement
Waste Water	30" CONC	Crossing	222	Under Pavement
Waste Water	54" CONC	Crossing	477	Under Pavement
Waste Water	30" CONC	Parallel	430	Under Pavement
Water	48" CSC	Parallel	432	Under Pavement
Water	24" CSC	Parallel	1015	Under Pavement

Source: Utilities CAD File provided by TxDOT

Criterion 3: Drainage Infrastructure Complexity

Each alternative was evaluated for its construction and maintenance of drainage infrastructure. A qualitative analysis was performed for the proposed drainage plan. This analysis was focused on identifying any fatal flaws, identifying issues and concerns that will result in drainage complexity, and identifying drainage features such as tunnels, detention and stormwater pump stations that would result in long-term operation and maintenance demands. Each alternative was scored within the range of High, Medium or Low, where High = more complex drainage infrastructure required and Low = less complex drainage infrastructure required.

No Build – N/A. Existing drainage systems are traditional gravity storm drain systems which are passive systems and thus have no complex operational demands associated with drainage tunnels, detention facilities, and stormwater pump stations, but do require some periodic inspection and maintenance to ensure their continued operation.

Alternative 1 – Alternative 1 scored high for drainage complexity as this alternative consists of lowered roadway lanes (mainlanes at approx. 25-foot depth) and an 8.25-mile continuous tunnel system (tunneled lanes at approx. 50-foot depth) which would sever all existing drainage systems. Extensive gravity tunnel systems and stormwater pump stations present complex construction and long-term maintenance challenges. Specific complexities encountered include:

- A 9,000-linear-foot stormwater gravity drain tunnel system along Cesar Chavez Street to just downstream of Longhorn Dam would be required to drain the downtown area from just north of Lady Bird Lake to 12th Street. Isolation gates and a stormwater pump station would likely also be required to keep the downtown roadway from flooding during extreme storm events.

- An extensive 9,000-linear-foot stormwater gravity drain tunnel system would be required along the southbound frontage road from 12th Street to just south of 38th Street to drain lowered roadway lanes and tunneled sections to Waller Creek.
- Drainage of the tunnel systems presents additional complexities with hazard containment and pumping systems required at several low points.
- A stormwater pump station or an additional 2,700-linear-foot tunnel section would be required to drain the lowered roadway lanes just south of the Capital Metro Red Line.
- South of Lady Bird Lake several large box culvert crossings of Harper's Branch would require complex relocations. Some in-line detention located within existing ROW would also be required.
- North of 38th Street, several large box culvert crossings to Boggy Creek would require complex relocations.

Alternative 2 – Alternative 2 scored medium-high for drainage complexity as this alternative consists of lowered roadway lanes (mainlanes at approx. 25-foot depth) which sever all existing drainage systems. Alternative 2 requires fewer gravity tunnel systems and stormwater pump systems than Alternative 1, reducing construction and long-term maintenance challenges. Unlike Alternative 1, Alternative 2 eliminates the need for a stormwater pump station for the downtown drainage; would not require draining a deeper tunnel section from 12th Street to south of 38th Street; and decreases the overall length of relocations for the Airport Boulevard area. Due to the lowered roadway lanes south of Lady Bird Lake, major drainage challenges would include:

- Mainlanes lower than Harper's Branch. Proposed local drain systems running parallel along each side of I-35 to Lady Bird Lake.
- Lower existing box culvert below mainlanes and tie into existing system on the east side of I-35. Flatter storm drain grades reduces system capacity, which may require upsizing the entire system outside of the project limits.

Alternative 3 – Alternative 3 scored medium for drainage complexity. Drainage needs for this alternative are relatively the same as Alternative 2. However, Alternative 3 removes major drainage impacts south of Lady Bird Lake by utilizing the existing drainage systems, which reduces construction and long-term maintenance challenges when compared to Alternatives 1 and 2.

Criteria 4: Opportunity and Complexity of Future Expansion

This was a qualitative evaluation based on each alternative's ability to allow for future modification and technologies. Each alternative was scored within the range of High, Medium or Low, where High = less complexity and more opportunities for expansion and Low = more complexity and fewer opportunities for expansion.

No Build – N/A

Alternative 1 – Alternative 1 scored low as it would provide few opportunities for future modification including technologies, with managed lanes being in a continuous tunneled

section just below the mainlanes and the frontage roads. Modifications to the structure would be a challenge and may not be feasible.

The managed lanes would be adaptable to new technologies, such as connected/autonomous vehicles. However, due to the limited horizontal and vertical space in the tunnel, it would be hard to retrofit any new technological infrastructure. Any modifications to the tunnel's footprint are very unlikely to be feasible due to the structural complexity and limited space. General purpose lane expansion is likely infeasible due to limited ROW.

Alternative 2 and 3 – Alternatives 2 and 3 both scored medium, as they would provide greater opportunities for future modifications, including technologies, than Alternative 1. Future modifications of the managed lanes would be feasible. The managed lanes would be adaptable to new technologies, such as connected/autonomous vehicles. It would be feasible to retrofit any new technological infrastructure on these alternatives. Mainlane expansion is likely infeasible due to limited ROW, however, modifications are feasible.

Criterion 5: Amount of New Right of Way Required

Each alternative was evaluated for the amount of new ROW required. This was determined by conducting a GIS comparison of currently proposed ROW lines for each build alternative with existing ROW lines and parcel lines from Travis Central Appraisal District (TCAD) (www.traviscad.org, accessed September 2020). Design of the alternatives is preliminary and for planning purposes only. Once the designs have been refined and properties surveyed for ROW acquisition, the impact acreages will be increasingly accurate.

The total number of parcels along the existing ROW of the proposed project was calculated: A total of 520 parcels abut the existing ROW of the proposed project area, including proposed direct connectors along US 290 and proposed improvements along cross streets throughout the corridor.

No Build – There are 520 parcels along the existing ROW; no new ROW or parcel impacts would be required for the no build alternative.

Alternative 1 – Of 520 total abutting parcels along the proposed ROW, Alternative 1 would require 16 acres of new ROW from 181 parcels.

Alternative 2 – Of 520 total abutting parcels along the proposed ROW, Alternative 2 would require 32 acres of new ROW from 199 parcels.

Alternative 3 – Of 520 total abutting parcels along the proposed ROW, Alternative 3 would require 30 acres of new ROW from 190 parcels.

3.3 Criteria Evaluated for Environmental Resources

Criterion 1: Minimize Displacements

Each alternative was evaluated for number of potential displacements, including residential and business or commercial properties. Residential and business/commercial property impacts were analyzed by conducting a comparison of currently proposed ROW lines for each alternative with existing ROW lines and available parcel data from TCAD (www.traviscad.org, accessed September

2020). Where the proposed ROW of an alternative came within 10 or fewer feet of a parcel's improvement (building), it was considered to be a potential displacement.

Potential Residential and Business/Commercial Displacements:

No Build – N/A

Alternative 1 – Of 520 total abutting parcels along the proposed ROW, Alternative 1 would potentially displace a total of 96 properties, including 50 commercial and 46 residential (single- and multifamily).

Alternative 2 – Of 520 total abutting parcels along the proposed ROW, Alternative 2 would potentially displace a total of 147 properties, including 75 commercial and 72 residential (single- and multifamily).

Alternative 3 – Of 520 total abutting parcels along the proposed ROW, Alternative 3 would potentially displace a total of 142 properties, including 72 commercial and 70 residential (single- and multifamily).

Criterion 2: Minimize Minority and Low-Income Property Displacements

Each alternative was evaluated for number of potential minority and/or low-income property displacements. These were analyzed by conducting a comparison of currently proposed ROW lines with parcel lines within minority and/or low-income block groups. Parcel data was obtained from TCAD (www.traviscad.org, accessed September 2020) and minority and low-income block group data was obtained from American Community Survey 2019 5-year estimates (ACS 2020). In accordance with TxDOT's "Environmental Handbook – Community Impacts, Environmental Justice, Limited English Proficiency, and Title VI Compliance," (TxDOT 2020) block groups where minority persons (Black, Hispanic, Asian American, American Indian or Alaskan Native, and Native Hawaiian or other Pacific Islander) approached or exceeded 50 percent of the population were considered to contain a minority population. Low-income populations were those where the median household income of the block group was at or below the Department of Health and Human Services poverty guideline for a family of four in 2021 (https://ftp.txdot.gov/pub/txdot-info/env/toolkit/710-01-gui.pdf, accessed June 2021). Where the proposed ROW of an alternative came within 10 or fewer feet of a parcel's improvement (building), it was considered to be potentially displaced.

No Build – N/A

Alternative 1 – Of 520 total abutting parcels along the proposed ROW, Alternative 1 would potentially displace 96 properties, 45 of which are considered minority/low-income properties (47% of the total displacements).

Alternative 2 – Of 520 total abutting parcels along the proposed ROW, Alternative 2 would potentially displace 147 properties, 52 of which are minority/low-income properties (35% of the total displacements).

Alternative 3 – Out of 520 total abutting parcels along the proposed ROW, Alternative 3 would potentially displace 142 properties, 52 (37% of the total displacements) of which are

minority/low-income properties.

Criterion 3: Minimize Visual Impacts

The quality of views from frontage road and cross streets were assessed for each alternative. Visual Impacts were analyzed by evaluating the value of and/or change in views from frontage roads and cross streets for each alternative. FHWA's *Guidelines for the Visual Impact Assessment of Highway Projects* (USDOT 2015) provides concepts for creating beneficial impacts as a result of the project through opportunities to enhance or improve visual quality. Visual enhancements as a result of this project would be removing the upper decks, between Airport Boulevard and MLK Jr. Boulevard and tunneling or lowering the proposed managed lanes and mainlanes below the level of the existing roadway for all build alternatives. This was a qualitative assessment of visual impacts where each alternative was scored within the range of High, Medium or Low. Alternatives scored High where views remained unchanged, since the existing views are obstructed by the raised decks between Airport Boulevard and MLK Jr. Boulevard; and alternatives scored Medium or Low where views were enhanced by lowering current obstructions.

In 1983, protections were placed on the remaining views of the Texas State Capitol building, called Capitol View Corridors (TEX GV. CODE ANN. § 3151.002: Texas Statutes – Section 3151.002). The Capitol View Corridor is a plane that extends from a defined viewpoint or points to the base of the Capitol dome. None of the build alternatives would impact views of the Capitol.

No Build – Visual impacts are considered high for the no build alternative. With no improvements, views would continue to be obscured at frontage roads and cross streets by the elevated upper decks and elevated portions south of MLK Jr. Boulevard.

Alternative 1 – Visual impacts were considered to be low for Alternative 1, due to the removal of the existing decks and tunneling of the mainlanes and managed lane facilities.

Alternative 2 – Visual impacts were considered to be low for Alternative 2, due to the removal of the existing decks and the mainlanes and managed lane facilities being depressed.

Alternative 3 – Visual impacts were considered to be medium for Alternative 3, due to removal of the existing decks and the mainlanes and managed lane facilities being located below grade; however, proposed elevated managed lanes at Airport Boulevard and Woodland Avenue, could obscure some views.

Criterion 4: Archeological Sites and Cemeteries

Each alternative was evaluated for the risk and probability of encountering or directly disturbing sites containing intact archeological resources. Impacts were determined by the number of pre-recorded archeological sites within the currently proposed project footprint for each alternative using the THC Archeological Sites Atlas online (https://atlas.thc.state.tx.us/Account/Login, accessed May 2020).

All three build alternatives would potentially impact three archeological sites. One site was found to be ineligible for listing in the National Register of Historic Places (NRHP), one site has unknown eligibility, and the third site, the Mount Calvary Cemetery, was determined eligible under Criterion A (and Criterion Consideration D). A recent ground penetrating radar study showed that no grave sites would be

impacted at the cemetery.

Criterion 5: Historic Properties

Each alternative was evaluated for direct impacts to historic properties/districts. Direct impacts were analyzed by determining the number of historic properties (those already listed or identified as eligible for listing in the NRHP) within the currently proposed project footprint for each alternative, and whether or not the alternatives would result in a displacement or a ROW acquisition from one or more of these properties. Note that this analysis only includes *direct* impacts by the proposed alternatives, and not *indirect* impacts such as visual and aural impacts from proposed alternatives and/or their construction. Indirect impacts would be determined by further analysis of the reasonable alternatives carried forward into the DEIS. Additional survey work to be conducted after the alternatives analysis, could identify more historic properties that are currently unrecorded/unknown.

Sources consulted for recorded historic properties include:

- THC Historic Sites Atlas online (https://atlas.thc.state.tx.us/Map, accessed September 2020)
- TxDOT databases of historic properties, sites and bridges (https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=077104987672487b9b320cc424d588a2 and https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=cc9cf3452a324d0bb961a0c8b4edd898, accessed October 2020)
- City of Austin Landmarks Database (https://data.austintexas.gov/Locations-and-Maps/Historical-Landmarks/vvuz-m3y4, accessed October 2020).

Parcel data was obtained from TCAD. The Mount Calvary Cemetery is included as a non-archeological historic property as well as an archeological property since it is NRHP-eligible under Criterion A (and Criterion Consideration D) for its association with important events in history.

No Build – N/A

Alternative 1 – 6 historic properties (those listed in or eligible for listing in the NRHP) would be impacted by Alternative 1. Five historic residences and the Mount Calvary Cemetery would incur ROW acquisition by this alternative (none are currently proposed to be displaced).

Alternative 2 – 5 historic properties would be impacted by Alternative 2. Three historic residences and the Mount Calvary Cemetery would incur ROW acquisition by this alternative, and one commercial building, The Austin Chronicle, is currently proposed to be displaced.

Alternative 3 – 4 historic properties would be impacted by Alternative 3. Two historic residences and the Mount Calvary Cemetery would incur ROW acquisition by this alternative, and one commercial building, The Austin Chronicle, is currently proposed to be displaced.

Table 3 shows the approximate acreages of each historic property in the alternative footprints. The red highlighted acreages would result in a potential displacement.

Table 3. Potential ROW Acquisition of Historic Properties

TCAD Property ID	TCAD Property Zoning	Total Parcel Acreage	Alternative 1 ROW Acquisition Acreage	Alternative 2 ROW Acquisition Acreage	Alternative 3 ROW Acquisition Acreage
190931	Residential	0.14	0.097	0	0
190943	Residential	0.14	0.043	0.003	0.003
909548	Residential	0.22	0	0.002	0.081
211825	Commercial	0.33	0	0.260*	0.097*
213507	Residential	0.49	0.087	0	0
213509	Residential	0.35	0.006	0	0
213508	Residential	0.36	0.001	0.001	0
203930	Cemetery	7.33	0.069	0.248	0.251

Source: TCAD Property Data
Note - *= Potential Displacement

Criterion 6: Hazardous Materials

Each alternative was evaluated for number of potential regulated materials sites that may be disturbed. GIS data was obtained from an environmental regulatory database search, performed by GeoSearch in May 2021, to determine the number of potential regulated materials sites within 200 feet of the proposed ROW for each alternative. The sites may each contain multiple listings, however the data for each listing is preliminary and will require further analysis during hazardous materials technical evaluations. The databases searched included federal, state, and local, databases as defined by ASTM E 1527-13 (American Society for Testing and Materials 2020). Listings for pointer databases and those anticipated to have minimal impacts on a roadway project were eliminated from the review.

No Build – N/A

Alternative 1 – There are approximately 90 hazardous materials sites within 200 feet of the proposed ROW.

Alternative 2 – There are approximately 95 hazardous materials sites within 200 feet of the proposed ROW.

Alternative 3 – There are approximately 95 hazardous materials sites within 200 feet of the proposed ROW.

Criterion 7: Traffic Noise

Each alternative was evaluated for its potential to reduce traffic noise impacts to sensitive receptors. The evaluation consisted of a qualitative review of each alternative's ability to lower noise levels through its design, its potential to provide noise abatement, or both, as compared to each other. Studies have shown that depressing roadways can decrease traffic noise impacts. A 1997 study performed by TTI, entitled *Traffic Noise Effects of Elevated, Depressed, and At-Grade Level Freeways in Texas,* states:

> If a choice of grade condition is available between at-grade (same as other ground level in the area), depressed (below surrounding ground), or elevated (above surrounding ground), the choice should be depressed. By placing the flowing traffic below ground level, a natural sound barrier is created between the traffic and people adjacent to the roadway. Studies have shown that as the depth of the cut increases, between 3 meters (9.8 feet) and 9 meters (30 feet), the noise levels were not greatly affected because the improved screening provided by the increased depth of cut is offset by the increase in reflected noise from the opposite wall of the cut. With a depressed roadway of 3 meters (9.8 feet) or more, traffic noise has been shown to decrease from 74 dBA, at the cut, to 63 dBA at 10 meters (32.8 feet) from the edge of the cut. This noise level remains at about the same level out to 50 meters (164 feet). (TTI 1997)

The study further noted that while traffic noise along depressed mainlanes of a freeway are shielded for noise reduction, the frontage roads are usually still at-grade and near noise sensitive areas, thus depending on the volume and speed of traffic on these frontage roads, efforts can be negated. As a result, noise barriers may still be necessary and were considered in the evaluation.

Each alternative was scored within the range of High, Medium or Low, where High = more potential to reduce traffic noise impacts and Low = less potential to reduce traffic noise impacts.

No Build – With no additional improvements other than routine maintenance, the no build alternative scored low for noise impacts. The upper decks between Airport Boulevard and MLK Jr. Boulevard would remain in place and the noise impacts would be unchanged with little potential to reduce traffic noise impacts.

Alternative 1 – Noise impacts from Alternative 1 are anticipated to be reduced and Alternative 1 would have a high potential to reduce noise impacts. The tunnel would reduce noise, although frontage lanes may still require barriers depending on their speed and amount of traffic. In areas of ROW acquisition, sensitive receivers previously second row, may become first row.

Alternative 2 – Alternative 2 scored medium-high, as noise impacts are anticipated to be reduced since traffic noise would improve but may be slightly less improved than with tunnels as in Alternative 1. The depressed section of the proposed alternative would reduce noise, but possibly not as much as tunnels. Frontage lanes may still require barriers depending on their speed and amount of traffic. In areas of ROW acquisition, sensitive receivers previously second row, may become first row.

Alternative 3 – Alternative 3 scored medium, as noise impacts are anticipated to be reduced since traffic noise would improve in most areas but would remain unchanged in other areas. The depressed section would reduce noise, but not as much as the tunnels would. Frontage lanes may still require barriers depending on their speed and amount of traffic. This alternative also has overpass sections proposed at Woodland Avenue and Airport Boulevard, which could keep traffic noise at current levels in those areas. In areas of ROW acquisition, sensitive receivers previously second row, may become first row.

Criterion 8: Parks Purchased with Land and Water Conservation Funds (Section 6(f) Impacts)

Potential impacts to park resources protected by Section 6(f) of the Land and Water Conservation Fund (LWCF) are being evaluated and coordinated with the City of Austin. Section 6(f) parks were identified by consulting the LWCF database (https://www.doi.gov/lwcf, accessed July 27, 2021) the City of Austin Parks Department, and the Texas Parks and Wildlife Department. Section 6(f) protected parks adjacent to the project include Waller Beach at Town Lake Metro Park, and Edward Rendon Sr. Metro Park at Festival Beach.

Criterion 9: Parks Impacts (Section 4(f))

Each alternative was evaluated for park impacts by acre of park within each currently proposed alternative footprint. Park impacts for this criterion consider parks that are protected by Section 4(f) of the U.S. Department of Transportation Act of 1966. These estimates are subject to change as designs progress. Section 4(f) protected parks adjacent to the project include:

- *Northwest Greenway along Philomena Street* – City of Austin park (in partnership with Mueller) with hike/bike trail and play areas
- *Swede Hill Pocket Park* – City of Austin park with urban green space
- *Waller Creek Greenbelt* – City of Austin park with greenbelt, parkland and trail (included in proposed Waterloo Greenway project)
- *Waterloo Greenway* - Proposed City of Austin public-private park system currently under construction (expected completion: 2026)
- *Waller Beach at Town Lake Metro Park* – City of Austin riverfront park with kayaking facilities (included in proposed Waterloo Greenway project)
- *Sir Swante Palm Neighborhood Park* – City of Austin park with urban greenspace with playground (included in proposed Waterloo Greenway project)
- *Edward Rendon Sr. Metro Park at Festival Beach* - City of Austin riverside park and trail for picnicking, gardening and sports
- *Norwood Tract at Town Lake Metro Park* - City of Austin urban waterfront park and dog park
- *Ann and Roy Butler Hike and Bike 1300 Riverside Easement* - City of Austin hike and bike trail

  No Build – N/A

  Alternative 1 – Approximately 0.54 combined acres of parks would be impacted, including Norwood Tract at Town Lake Metro Park and Sir Swante Palm Neighborhood Park.

  Alternative 2 – Approximately 0.10 acres of Norwood Tract at Town Lake Metro Park would be impacted.

  Alternative 3 – Approximately 0.15 combined acres of Norwood Tract at Town Lake Metro Park would be impacted.

TxDOT and the City of Austin are coordinating on potential impacts to Waller Beach at Town Lake Metro Park and Edward Rendon Sr. Metro Park at Festival Beach, which are protected by both Section 4(f) and Section 6(f), as described above.

Criterion 10: Reduce Air Quality Impacts to Adjacent Communities

Each alternative was evaluated for the estimated total future year emissions compared to existing conditions. Previous studies have shown that that even though VMT and population are expected to increase significantly into the future, emissions of volatile organic compounds (VOC) and nitrous oxides (NOx), precursor emissions to ozone, carbon monoxide (CO) and particulate matter less than 2.5 micrometers (PM2.5), are showing declining trends. This is due to the vehicle and fuel improvements expected along with associated fleet turnover over time (TCEQ 2015).

FHWA has performed a national analysis of Mobile Source Air Toxics (MSAT) trends for all of the priority MSAT and show that even with increasing VMT over time, all of the MSAT are expected to decline over that same time period. The reason for these projected improvements over time is the same, vehicle and fuel improvements expected along with associated fleet turnover (USDOT 2016).

The analysis of air quality impacts consists of estimated total future year emissions for the build alternatives analyzed compared to existing conditions. Each alternative was scored within the range of High, Medium or Low, where High = more air quality impacts and Low = fewer air quality impacts.

No Build – The no build scored medium, as air quality is likely to improve along the corridor due to increasingly stringent vehicle and fuel regulations along with fleet turnover, but the increasing amount of congestion within the corridor could limit, but not cancel out that anticipated improvement.

Alternative 1 – Alternative 1 scored medium, as air quality is anticipated to improve along the corridor overall, however, at vents and tunnel openings, there could be isolated locations where pollutant concentrations are increased.

Alternatives 2 and 3 – Alternatives 2 and 3 scored medium, as air quality is anticipated to improve along the corridor overall, but the increasing amount of VMT as compared to the no build within the corridor could limit, but not cancel out that anticipated improvement.

3.4 Criteria Evaluated for Deck Cap Local Enhancements

Criterion 1: Deck Cap Local Enhancements

Each alternative was evaluated for its ability to accommodate deck cap construction by minimized ROW needs, ease of constructability, and lower cost to the City of Austin. Each alternative was scored within the range of High, Medium or Low, where High = more opportunities for enhancements and Low = fewer opportunities for enhancements.

No Build – With no deck cap additions, the no build would remain unenhanced, and therefore scored low.

Alternative 1 – Alternative 1 scored high, as it would accommodate deck cap additions.

Alternative 2 – Alternative 2 scored high, as it would accommodate deck cap additions.

Alternative 3 – Alternative 3 scored medium-high, as it would accommodate deck cap additions; however, the overpasses required for Alternative 3 would limit (by very few) the number of crossings.

3.5 Criteria Evaluated for Preliminary Design/Build Project Costs

Criterion 1: Minimize Design/Build Costs

Each alternative's engineer's estimate of probable design/build project costs were estimated by measuring preliminary construction and design/build costs using statewide averages where applicable. Estimates include inflation and contingency. Estimates do not include acquisition of ROW, easements, or utility relocation costs.

No Build – N/A

Alternative 1 – Estimated design/build cost is approximately $8.08 billion. The estimate for Alternative 1 was higher than Alternatives 2 and 3 due to the additions of the tunnels and cut and cover sections between Airport Boulevard and Lady Bird Lake as well as the tunnels located near Oltorf Street.

Alternative 2 – Estimated design/build cost is approximately $3.92 billion.

Alternative 3 – Estimated design/build cost is approximately $3.94 billion. Alternative 3 is more than Alternative 2 due to the additional mainlane overpasses.

Criterion 2: Minimize Operation and Maintenance Costs

Each alternative's preliminary operation and maintenance costs were estimated using existing studies performed on tunnels around the U.S. with costs varying from approximately $700,000 to $2.2 million per lane mile depending on location and environmental conditions. The tunnel operation and maintenance costs per lane mile used in the calculation is approximately $900,000. The non-tunneled sections were estimated at approximately $9,000 per lane mile ($7,500 plus inflation).

No Build – Estimated operation and maintenance cost is approximately $1.7 million/year.

Alternative 1 – Estimated operation and maintenance cost is approximately $14.4 million/year. This cost includes $21 million/year for the manage lane tunnel section.

Alternative 2 – Estimated operation and maintenance cost is approximately $2.2 million/year.

Alternative 3 – Estimated operation and maintenance cost is approximately $2.2 million/year.

4 Alternatives to be Analyzed in the Draft Environmental Impact Statement

Based on the alternatives evaluation criteria detailed above, TxDOT has decided to eliminate Alternative 1 from further study and analyze Alternatives 2 and 3 in the DEIS. Table 4 revisits the criteria considerations that proved to differentiate among Alternatives 1, 2 and 3, and the no build. (Although it does not meet the need and purpose of the project, the no build alternative is still an option and will be carried forward, through the DEIS, as a baseline for comparison.)

Table 4. Alternative Scores among Differentiating Criteria

Alternatives that Best Meet the Purpose and Need				
Criterion	No Build	Alternative 1	Alternative 2	Alternative 3
Improves Emergency Response Time	**Low**	**Medium** Proposed 8.25 miles of continuous tunnels would limit access to cross streets.	**High** Direct and continuous access between mainlanes and managed lanes improves access to cross streets.	**High** Direct and continuous access between mainlanes and managed lanes improves access to cross streets.
Emergency Egress Requirements	**High**	**Low** Proposed 8.25 miles of continuous tunnels limit entrance and exit ramp locations.	**High** Depressed sections provide egress using ramps and collector-distributor roads.	**High** Depressed sections provide egress using ramps and collector-distributor roads.
Alternatives that Best Meet Feasibility, Design, and Engineering Criteria				
Criterion	No Build	Alternative 1	Alternative 2	Alternative 3
Constructability Risk	N/A	**High** 8.25 continuous tunneled section. Limited space, multilevel infrastructure and an additional 1.5 years of construction time.	**Medium** Single stretch of frontage roads bridged over mainlanes between Manor Road and 38 ½ Street, and reduced construction time of 1.5 years.	**Medium** Single stretch of frontage roads bridged over mainlanes between Manor Road and 38 ½ Street, and reduced construction time of 1.5 years.
Utility Conflicts	N/A	**High** All utilities crossing the freeway would require relocation.	**Medium** Potential to avoid impacts to major utility crossings.	**Medium** Potential to avoid impacts to major utility crossings.
Drainage Infrastructure Complexity	N/A	**High** Extensive gravity tunnel systems and stormwater pump stations present complex construction and long-term maintenance challenges.	**Medium-High** Fewer gravity tunnel systems and stormwater pump systems than Alternative 1 reduce construction and long-term maintenance challenges. Lowered mainlanes may require extensive drainage improvements including upsizing and new drainage systems south of Lady Bird Lake and areas outside the project limits.	**Medium** Fewer gravity tunnel systems and stormwater pump systems than Alternative 1 reduce construction and long-term maintenance challenges. Major drainage impacts south of Lady Bird Lake are removed by utilizing the existing drainage system, compared to Alternatives 1 and 2.

Amount of New Right of Way	N/A	**16 acres** of new ROW from 181 parcels	**32 acres** of new ROW from 199 parcels	**30 acres** of new ROW from 190 parcels
Alternatives that Best Meet Environmental Resources Criteria				
Criterion	No Build	Alternative 1	Alternative 2	Alternative 3
Minimize Displacements	N/A	**96** potential displacements	**147** potential displacements	**142** potential displacements
Minimize minority and low-income property displacements	N/A	**45** minority/low-income displacements (**47%** of total displacements)	**52** minority/low-income displacements (**35%** of total displacements)	**52** minority/low-income displacements (**37%** of total displacements)
Alternatives that Best Meet Cost Considerations				
Criterion	No Build	Alternative 1	Alternative 2	Alternative 3
Minimize Design-build Costs	N/A	**$8.08 billion,** approx.	**$3.92 billion,** approx.	**$3.94 billion,** approx.
Minimize Operation and Maintenance Cost	**$1.7 million/year,** approx.	**$14.4 million/year,** approx.	**$2.2 million/year,** approx.	**$2.2 million/year,** approx.

Within the Purpose and Need criteria listed in Table 4, Alternatives 2 and 3 allow for faster emergency response times and fewer emergency egress requirements than Alternative 1, largely because there are currently no tunneled sections proposed for Alternatives 2 and 3 (however, following coordination with the City of Austin, short, tunneled sections may be included at select locations in order to accommodate deck caps and mitigate ROW/displacement impacts). The 8.25-mile continuous proposed tunnel for Alternative 1 would limit access to cross streets and provide fewer egress options, thus delaying emergency response times. Alternatives 2 and 3 both resulted in shorter emergency response times than Alternative 1 because Alternative 2 and 3 allow direct and continuous emergency access across the striped boundaries separating mainlanes and managed lanes thereby improving access to cross streets. Additionally, Alternatives 2 and 3 do not have extra requirements for emergency egress: existing shoulders, ramps, collector-distributor roads and frontage roads along the corridor would provide egress in case of an emergency and there are currently no tunneled sections proposed for these alternatives.

Within the Feasibility, Design and Engineering differentiating criteria, Alternatives 2 and 3 scored well above Alternative 1 for Constructability Risk, Utility Conflicts, and Drainage Infrastructure Complexities. This is mainly because the continuous tunnel proposed by Alternative 1 require multi-level and more complex construction phasing as well as an additional 1.5 years of construction time. During construction for Alternative 1, the northbound mainlanes would be reduced to just 2 lanes for multiple years. The tunnels also conflict with utilities and drainage infrastructure more than Alternatives 2 and 3, because they require more extensive gravity tunnel systems and stormwater pump stations than proposed lowered sections in Alternatives 2 and 3. Among this evaluation criteria group, Alternative 1 scored better under Amount of ROW Required: Alternative 1 would require approximately 15 acres less of ROW acquisition than what is proposed for Alternatives 2 and 3.

Under Environmental Resources criteria, Alternative 1 scored better for minimizing the number of potential displacements.

Finally, under Cost Considerations, the alternatives differentiated under both design-build and operations and maintenance costs. At an estimated $8.08 billion, Alternative 1 is approximately twice ice than twice the cost of Alternatives 2 and 3, which have similar estimated costs. Furthermore, at an estimated $14 million/year, Alternative 1 is almost seven times the annual cost to operate and maintain either Alternative 2 or 3.

5 Conclusions

Based upon the analysis of data developed and presented as part of the alternatives evaluation screening process, TxDOT has determined that Alternative 1 will not be carried forward. Alternatives 2 and 3 will be carried forward, based on:

- Faster response times for EMS, police, fire department and hospitals.
- Shorter construction duration by 1.5 years.
- Improved traffic operations during construction with fewer lane closures.
- Fewer utility conflicts and lower relocation costs.
- Fewer drainage conflicts.
- Lower design-build costs.
- Lower annual and lifetime maintenance requirements and cost.

TxDOT will be moving forward with further evaluation and technical analyses of the build alternatives 2 and 3 since they best meet the evaluation criteria and represent the safest and most constructible options of the three feasible, standalone alternatives.

6 Next Steps

In the coming months, TxDOT will be furthering the design of Alternatives 2 and 3 to refine the designs and further minimize potential impacts to the human and natural environment. In the development of the DEIS, TxDOT will analyze the following:

- Biological Resources
- Waters Resources
- Community Impacts
- Air Quality
- Traffic Noise
- Park Impacts (Section 4(f) and Section 6(f))
- Archeological Resources
- Historic Resources
- Indirect Impacts, and
- Cumulative Impacts

The results of these technical analyses will be shown and described in the DEIS, including the identified of the Preferred Alternative, which will be made available for agency and public review and comment as part of the public hearing process.

Following the public comment period, TxDOT will compile and respond to all public and agency comments and incorporate design revisions occurring as a result of the public hearing process. Ultimately, TxDOT will release the anticipated Final Environmental Impact Statement and Record of Decision, which will mark the end of the National Environmental Policy Act process.

Literature Cited

American Community Survey

2019. 5-Year Estimates, Tables B19013 and B03002. Available online at: https://data.census.gov/cedsci/. Accessed December 22, 2020.

Architectural and Transportation Barriers Compliance Board

2011. *Accessibility Guidelines for Pedestrian Facilities in Public Right-of-Way*. https://www.access-board.gov/files/prowag/PROW-SUP-SNPRM-2013.pdf. Accessed July 14. 2021.

Capital Area Metropolitan Planning Organization

2020. *Regional Transportation Plan 2045.* Available online at: https://www.campotexas.org/regional-transportation-plans/2045-plan/. Accessed March 3, 2021.

City of Austin

2011. *City of Austin Downtown Austin Plan.* Available online at: https://www.austintexas.gov/sites/default/files/files/Housing_%26_Planning/Urban%20Design/dap_approved_12-8-2011.pdf. Accessed March 3, 2021.

———

2012. *Imagine Austin Comprehensive Plan.* Available online at: https://www.austintexas.gov/sites/default/files/files/Planning/ImagineAustin/webiacpreduced.pdf. Accessed March 3, 2021.

———

2014. *Austin Bicycle Plan.* Available online at: https://www.austintexas.gov/page/austin-bicycle-plan. Accessed March 3, 2021.

———

2016. *City of Austin Sidewalk Master Plan and ADA Transition Plan Update.* Available online at: https://austintexas.gov/sites/default/files/files/Public_Works/Street_%26_Bridge/Sidewalk_MPU_Adopted_06.16.2016_reduced.pdf. Accessed March 3, 2021.

———

2016a. *Vision Zero Action Plan 2016-2018.* Available online at: https://www.austintexas.gov/sites/default/files/files/Imagine_Austin/VisionZero/ActionPlan_5.19.16adoption.pdf. Accessed June 28, 2021.

———

2017. *City of Austin Strategic Housing Blueprint.* Available online at: https://www.austintexas.gov/blueprint. Accessed March 3, 2021.

———

2017a. *City of Austin Draft Street Design Guide.* Available online at: https://austintexas.gov/sites/default/files/files/Transportation/Austin_Street_Design_Guide

_June_2017_Public_Launch_reduced_size_06202017.pdf. Accessed March 3, 2021.

———

2018. *City of Austin Strategic Direction 2023 Plan.* Available online at: https://assets.austintexas.gov/financeonline/downloads/Austin-Strategic-Direction_2023.pdf. Accessed March 3, 2021.

———

2019. *Austin Strategic Mobility Plan.* Available online at: https://www.austintexas.gov/department/austin-strategic-mobility-plan. Accessed November 20, 2020.

———

2019a. *City of Austin Parks and Recreation Department Long-range Master Plan 2020-2040.* Available online at: https://austintexas.gov/page/our-parks-our-future-long-range-plan. Accessed March 3, 2021.

———

2020. *City of Austin Climate Equity Plan.* Available online at: http://austintexas.gov/page/austin-community-climate-plan. Accessed March 3, 2021.

Texas Commission on Environmental Quality

2015. *MOVES2014 On-road Trend Emissions Inventories for 1990 to 2050.* Available online at: https://www.tceq.texas.gov/airquality/airmod/project/pj_report_mob.html. Accessed June 8, 2021.

Texas Department of Licensing and Regulation

2012. *Texas Accessibility Standards.* Available online at: https://www.tdlr.texas.gov/ab/2012TAS/2012tascomplete.pdf. Accessed June 14, 2021.

Texas Department of Transportation

2017. *Texas Strategic Highway Safety Plan 2017-2022.* Available online at: https://ftp.txdot.gov/pub/txdot-info/library/pubs/gov/shsp.pdf. Accessed November 20, 2020.

———

2020. *Environmental Handbook – Community Impacts, Environmental Justice, Limited English Proficiency, and Title VI Compliance. Available online at: https://ftp.txdot.gov/pub/txdot-info/env/toolkit/710-01-gui.pdf.* Accessed June 28, 2021.

———

2021. *Educational Series: Safety and Travel Information, 2021-2022.* Available online at: https://ftp.txdot.gov/pub/txdot-info/sla/education_series/safety.pdf. Accessed June 28, 2021.

———

2021a. *Unified Transportation Program.* Available online at: http://ftp.dot.state.tx.us/pub/txdot/tpp/utp/2021-utp.pdf. Accessed September 13, 2020.

Texas Transportation Institute

2013. *Mobility Investment Priorities Project.* Available online at: https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2013-25.pdf. Accessed July 27, 2021.

———

2020. "Texas' Most Congested Roadways" Available online at: https://mobility.tamu.edu/texas-most-congested-roadways/. Accessed February 19, 2021.

———

2021. *I-35 Capital Express Central Project - Evaluation of TxDOT Build Alternatives and Community Concepts, Community Concepts Analysis Summary*. College Station: Texas Transportation Institute, 2021.

Travis Central Appraisal District. Property Data. Available online at: https://www.traviscad.org/. Accessed September 2020.

U.S. Department of Transportation

2015. Federal Highway Administration. *Guidelines for the Visual Impact Assessment of Highway Projects.* Available online at: https://www.environment.fhwa.dot.gov/env_topics/other_topics/VIA_Guidelines_for_Highway_Projects.aspx. Accessed March 3, 2021.

———

2016. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents.* Available online at: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/. Accessed June 8, 2021.

Zimmer, Richard A. and Jesse L. Buffington

1997. *Traffic Noise Effects of Elevated, Depressed, and At-Grade Level Freeways in Texas.* College Station: Texas Transportation Institute, 1972. Available online at: https://static.tti.tamu.edu/tti.tamu.edu/documents/1327-3.pdf. Accessed June 28, 2021.