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610

Texas Department of Transportation

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CIVIL ENGINEERS, INC

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Appendix I: Conceptual Alternatives Report

I-610 South

From FM 521/Almeda Road to Telephone Road

CSJ: 0271-16-158 & 0271-16-159

Texas Department of Transportation
Houston District
November 2024

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1 INTRODUCTION

The Texas Department of Transportation (TxDOT) is performing a feasibility study for the 5.8-mile Interstate–610 South (I-610S), from Farm-to-Market 521 (FM 521/Almeda Road) to Telephone Road. This comprehensive study includes the development of various alternatives to meet the corridor needs and community goals. The following Conceptual Alternatives Report describes the development and screening of the conceptual alternatives to identify the viable alternative(s) to be carried forward into project development.

1.1 Study Limits

I-610 South, located in Harris County, is the southern segment of the overall 38-mile I-610 Loop around the inner City of Houston.

The I-610S study limits extend from FM 521 (Almeda Rd) to Telephone Road (west of SH 288 to west of I-45 South), for an approximate length of 5.8 miles. See **Figure 1-1** for a map of the study limits.

Figure 1-1: I-610S Study Limits

2 NEEDS AND GOALS

The study identified transportation deficiencies along I-610 South that were used in the development of alternatives for improvement. The study goals, based on the priorities and needs of the community, were also identified.

2.1 Study Needs and Goals

Based on the analysis of the existing and future conditions of the study area, public comments, and stakeholder/agency feedback, the following needs were identified in the I-610S corridor:

1. Infrastructure deficiencies
2. Safety issues
3. Increased congestion
4. Limited multimodal connectivity

Meeting the needs of the corridor is considered a prerequisite to moving forward with any potential alternative and ultimately identifying a recommended alternative. In addition to the needs, goals were established for the study based on input received from stakeholders and the public who helped define the priorities and needs of the area. Goals are objectives or intentions that describe the desired outcomes for the transportation system and community. The study team identified three goals following public and stakeholder engagement and existing conditions analysis. The goals include:

Figure 2-1: Needs and Goals

1. Minimize right of way (ROW) footprint
2. Minimize environmental and community impacts
3. Ensure compatibility with adjacent projects and studies

3 CONCEPTUAL ALTERNATIVES

Conceptual alternatives are broad solutions that address the overall corridor needs while satisfying study goals. Four conceptual build alternatives were developed for I-610 South based on data analysis and public input. Each alternative had to meet at least one need to be considered. The No Build Alternative was included as a baseline for comparison of the build alternatives.

3.1 Description of Alternative Concepts

To address infrastructure deficiencies, all of the build alternative concepts would reconstruct the I-610S corridor to meet current standards. The build alternatives would also provide shared use paths (SUPs) for bicyclists and pedestrians. As described in the following sections, the build alternative concepts differ primarily in terms of the number and type of proposed lanes and potential right-of-way needs.

3.1.1 No Build Alternative

The No Build Alternative assumes completion of all proposed projects in the Houston-Galveston Area Council (H-GAC) Regional Transportation Plan but would not provide any further improvements to the I-610S corridor beyond regular maintenance activities. This alternative would not increase capacity and would generally maintain existing conditions, which are depicted in Figure 3-1. The existing facility consists of four general purpose lanes and two to three lane frontage roads in each direction. The frontage roads are discontinuous in some areas. The existing sidewalks do not meet Americans with Disabilities Act (ADA) standards and there is a lack of bicycle facilities in the corridor.

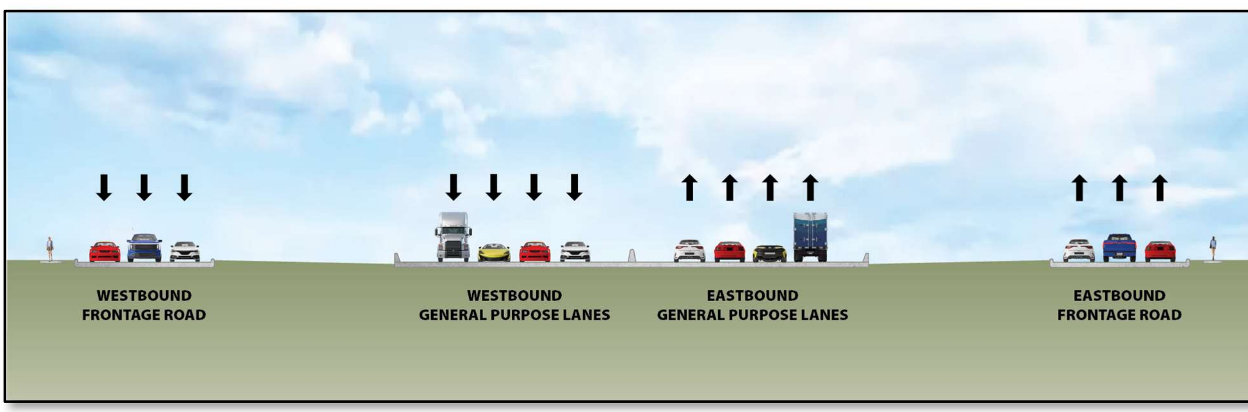


Figure 3-1: No Build Alternative

3.1.2 Alternative 1 - Operational Improvements

Alternative 1 would reconstruct the corridor to current design standards while maintaining the existing number of general purpose and frontage road lanes. Alternative 1 would add SUPs for bicyclists and pedestrians and would implement operational improvements at localized problem areas at ramps and intersections and along the frontage roads. As depicted in

Figure 3-2, these improvements could include the addition of auxiliary lanes between ramps, intersection improvements such as turn lanes and U-turns, and connection of discontinuous frontage roads. Alternative 1 would require approximately 20 to 45 feet of additional right of way in some areas.

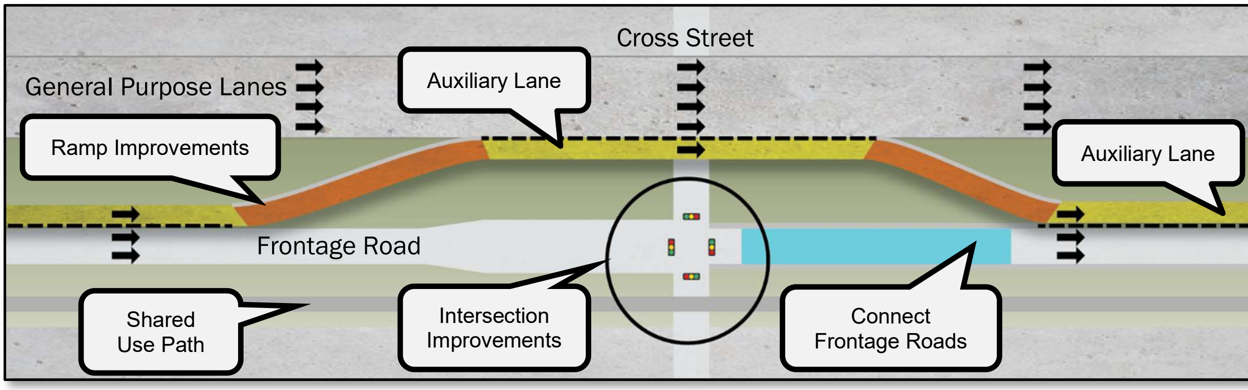


Figure 3-2: Alternative 1 – Operational Improvements

3.1.3 Alternative 2 - Convert One General Purpose Lane to Managed Lane

Alternative 2 would convert one general purpose lane in each direction to a managed lane. Managed lanes are a set of lanes within the freeway that are separated from the general purpose lanes. They help improve safety, reduce congestion, and provide options for multimodal opportunities and connectivity. The operations of any proposed managed lanes on I-610 South would be defined during project development and would be based on factors such as vehicle type, time of day, and access points. For this alternative, the managed lanes would be at the same level as the general purpose lanes as illustrated in Figure 3-3. Alternative 2 would also include reconstruction of the general purpose lanes and frontage roads to current design standards, addition of SUPs for bicyclists and pedestrians, and operational improvements similar to Alternative 1. Alternative 2 would typically require approximately 25 feet of additional right of way and up to 45 feet in some areas.

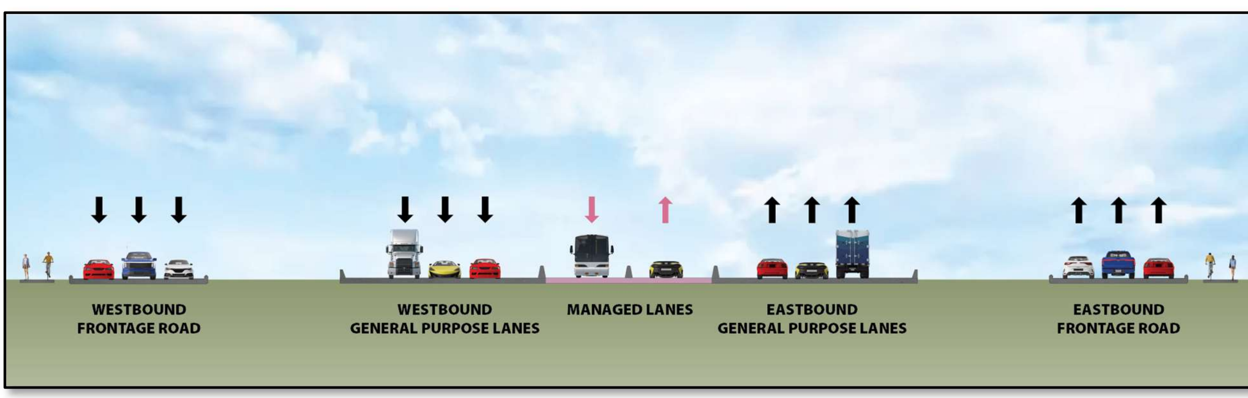


Figure 3-3: Alternative 2 - Convert One General Purpose Lane to Managed Lane

3.1.4 Alternative 3 - Add Two New Managed Lanes in Each Direction

Alternative 3 would construct two managed lanes in each direction. For this alternative, the managed lanes would be on an elevated structure that could be placed either in the middle of the highway as shown in Figure 3-4 or between the general purpose lanes and the frontage road lanes. Alternative 3 would also include reconstruction of the general purpose lanes and frontage roads to current design standards, addition of SUPs for bicyclists and pedestrians, and operational improvements similar to Alternative 1. Alternative 3 would typically require approximately 15 feet of additional right of way and up to 45 feet in some areas.

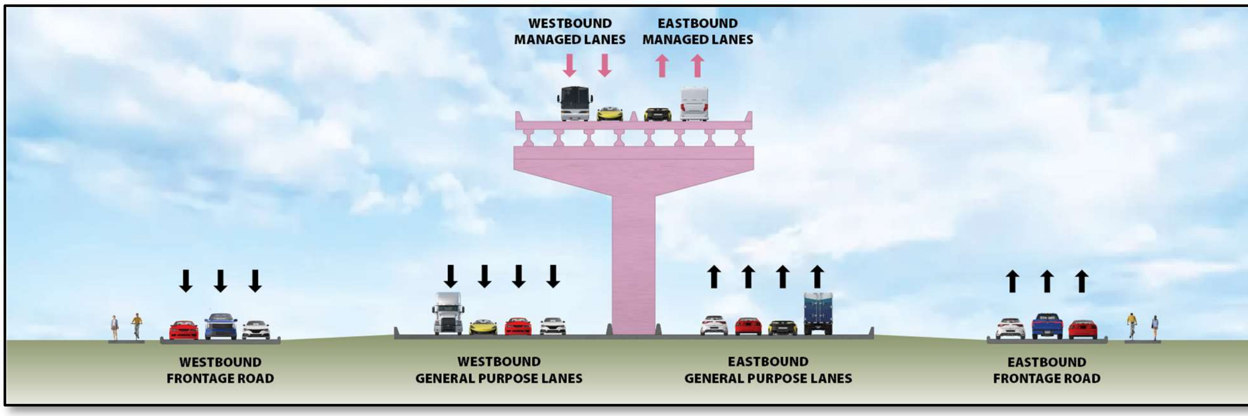


Figure 3-4: Alternative 3 - Add Two New Managed Lanes in Each Direction

3.1.5 Alternative 4 – Add One New General Purpose Lane in Each Direction

Alternative 4 would add one general purpose lane in each direction as shown in Figure 3-5. Alternative 4 would also include reconstruction of the general purpose lanes and frontage roads to current design standards, addition of SUPs for bicyclists and pedestrians, and operational improvements similar to Alternative 1. Alternative 4 would typically require approximately 25 feet of additional right of way and up to 45 feet in some areas.

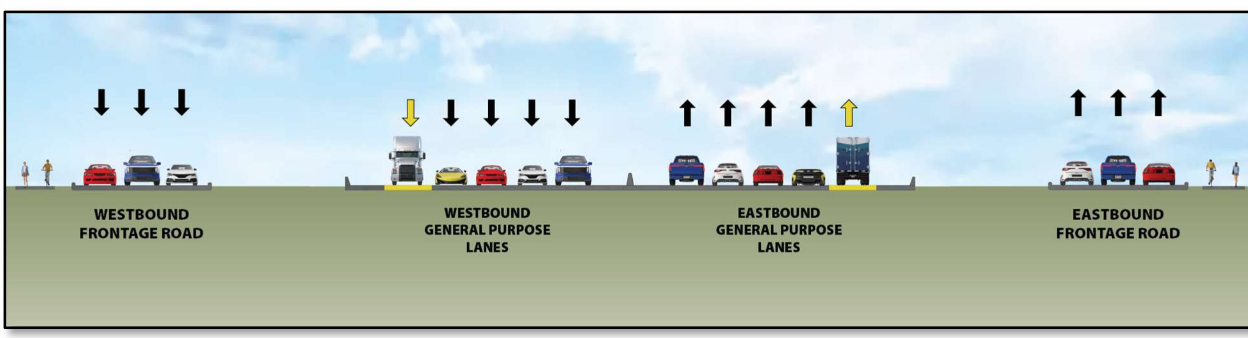


Figure 3-5: Alternative 4 – Add One New General Purpose Lane in Each Direction

4 CONCEPTUAL ALTERNATIVES SCREENING

The alternatives screening process assesses how well an alternative can achieve the study goals and the roadway needs. As the number of alternatives are reduced, the screening process becomes more detailed. The alternative screening methodology utilized for the I-610S study incorporates a two-level screening process to arrive at a recommended alternative. Figure 4-1 provides an overview of the screening process.

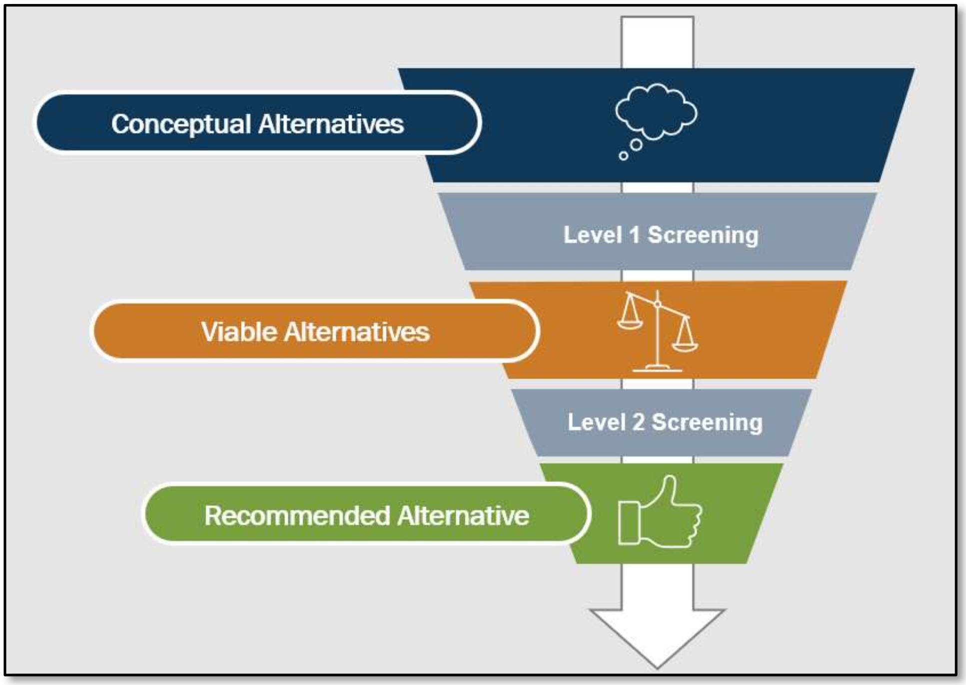


Figure 4-1: Alternative Screening Process

The screening of the conceptual alternatives, or Level 1 screening, is further broken down into two steps.

- Step 1 – A qualitative and quantitative analysis of alternatives based on technical data
- Step 2 – Consideration of input from stakeholders, agencies, and the public

4.1 Step 1: Screening Technical Data

Step 1 is a screening based on qualitative and quantitative variables associated with the needs and goals identified for this study. In addition to the needs and goals, a high-level comparative cost analysis was performed. The conceptual alternatives previously described were screened based on the criteria shown in Table 4-1.

Table 4-1: Screening Criteria

Needs and Goals	Criteria	Metric
Infrastructure Deficiencies	Replacement/removal of aging infrastructure	Qualitative
Safety Issues	Frequency and/or severity of crashes	Qualitative
Increased Congestion	Volume-to-capacity ratio	Quantitative
	Peak period travel delay	Quantitative
	Person throughput	Quantitative
Limited Multimodal Connectivity	HOV/transit connectivity	Qualitative
	Bicycle/pedestrian connectivity	Qualitative
	Truck volume	Quantitative
	Technology	Qualitative
Minimize Right of Way Impacts	Proposed Right of Way	Qualitative
Minimize Environmental Impacts	Biological resources	Qualitative
	Water resources	Qualitative
	Community resources	Qualitative
	Cultural resources	Qualitative
Compatibility	Ongoing projects and studies	Qualitative
Cost	Comparative cost	Quantitative

Quantitative evaluation criteria were allocated thresholds associated with the range of values to ensure an unbiased scoring as outlined in the following sections. The results of the evaluation analysis were summarized using a three-point rating scale from 1 (low) to 3 (high), shown in **Table 4-2.** Qualitative evaluation criteria were allocated relative values based on the scoring system shown in **Table 4-2**, based on an estimated degree of impact in comparison to the other alternatives.

Table 4-2: Three-Point Rating Scale

Points	Description
1	Does not meet or minimally meets needs and goals
2	Somewhat meets needs and goals
3	Best meets needs and goals

4.1.1 Infrastructure Deficiencies

The infrastructure deficiencies need was screened by evaluating if the alternative would replace or improve aging infrastructure as shown in Table 4-3. The results are shown in Table 4-4. The No Build Alternative was poorly rated as it would not improve the current conditions of the corridor. Alternatives 1 through 4 were highly rated since they would include reconstruction of the mainlanes and frontage roads along the entire corridor.

Table 4-3: Rating Thresholds: Infrastructure deficiencies

Points	Description
1	Would not replace or improve aging infrastructure
2	N/A
3	Would replace or improve aging infrastructure

Table 4-4: Rating Results: Infrastructure Deficiencies

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	3
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	3

4.1.2 Safety Issues

Safety was evaluated based on each alternative's potential to reduce the frequency and/or severity of crashes as shown in Table 4-5. The result for each alternative is shown in Table 4-6. The No Build Alternative was rated poorly as the current conditions would remain unchanged. Alternatives 1, 2, and 4 rated better as they would reconstruct the corridor to current design standards, increase shoulder widths, and implement localized operational improvements. Alternative 3 was highly rated since it would include the same improvements as Alternatives 1 through 3 as well as provide a separate structure for the managed lanes, which would reduce potential conflicts.

Table 4-5: Rating Thresholds: Safety Issues - Crash Reductions

Points	Description
1	May not reduce
2	May provide some reduction
3	May provide significant reduction

Table 4-6: Rating Results: Safety Issues - Crash Reductions

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	2
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.3 Increased Congestion

To determine capacity needs in the I-610S corridor and establish a baseline for comparing the alternatives, the H-GAC Travel Demand Model (TDM) was used. For the purpose of analysis, the corridor was divided into three segments, and four screen lines were placed across corridor sections. The segment limits and screen line locations are identified in **Table 4-7** and illustrated in **Figure 4-2.**

Table 4-7: Segment Limits

Segment	From	To	Screen Line	Screen Line Location
1	Almeda Rd	Cullen Blvd	Screen line 1	East of Fannin St
			Screen Line 2	East of Scott St
2	Cullen Blvd	Mykawa Rd	Screen Line 3	West of Martin Luther King Blvd
3	Mykawa Rd	Telephone Rd	Screen Line 4	West of Broad St

Figure 4-2: Corridor Segmentation and Screen Lines

The Level of Service (LOS) at the four screen lines was calculated using the No Build TDM volumes based on the Highway Capacity Manual 7th Edition. In the future year 2045, traffic operations at all four screen line locations are projected to be at a LOS E/F, indicating stopped or nearly stopped traffic with minimal movement.

The alternative scenarios were modeled in the H-GAC TDM (future year 2045) and the performance of each was evaluated. The following TDM performance measures were used for the analysis:

a) Peak Period Volume-to-Capacity (V/C) Ratio
b) Peak Period Travel Delay
c) Daily Person Throughput
d) Daily Non-Single Occupancy Vehicle Percent (Non-SOV%) Person Travel
e) Daily Freight Truck Volume

4.1.3.1 Peak Period Volume-to-Capacity (V/C) Ratio

The V/C ratio of a road segment is a measure of the capacity of the roadway to accommodate vehicular demand. The alternatives were evaluated based on how well they would improve the morning or evening peak period V/C ratio. The ratings are based on the percent change in the V/C ratio relative to the No Build, ranging from +4% to less than -11% as shown in Table 4-8. The result for each alternative is shown in Table 4-9. Alternatives 1 and 2 performed the same as or slightly worse than No Build. Alternatives 3 and 4 performed better than No Build since they would provide additional lane capacity.

Table 4-8: Rating Thresholds: Peak Period V/C Ratio

Points	Percent change in V/C relative to No Build
1	+4% to -3%
2	-4% to -11%
3	<-11%

Table 4-9: Rating Results: Peak Period V/C Ratio

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	1
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.3.2 Peak Period Travel Delay

The alternatives were also evaluated based on how well they would improve the morning or evening peak period travel delay. The percent change in the travel delay ranged from 2% to less than -19% and the points were allocated based on the rating thresholds shown in **Table 4-10**. The performance result of each alternative is shown in **Table 4-11**. Similar to the V/C ratio results, Alternatives 1 and 2 performed the same as or slightly worse than No Build and Alternatives 3 and 4 performed better than No Build.

Table 4-10: Rating Thresholds: Peak Period Travel Delay

Points	Percent change in travel delay relative to No Build
1	+2% to -8%
2	-9% to -19%
3	<-19%

Table 4-11: Rating Results: Peak Period Travel Delay

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	1
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.3.3 Corridor Person Throughput

Corridor person throughput indicates the total number of people that can be moved along the corridor. Table 4-12 shows the rating thresholds based on the percent change in person trips relative to the No Build Alternative. The performance result of each alternative is shown in Table 4-13. Alternative 3 rated the highest since it has the potential to move the most people along the corridor across all transportation modes.

Table 4-12: Rating Thresholds: Corridor Person Throughput

Points	Percent change in person trips relative to No Build
1	0% to 8%
2	9% to 16%
3	>16%

Table 4-13: Rating Results: Corridor Person Throughput

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	1
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.3.4 Daily Non-Single Occupancy Vehicle Percent (Non-SOV%)

This performance measure evaluates how well the alternatives increase the non-single occupancy vehicle (non-SOV) trips taken in a day. Non-SOV travel modes include high-occupancy vehicle (HOV) and transit modes. The percent change in the daily non-SOV% relative to the No Build ranged from 2% to less than -19% and the points were allocated based on the thresholds shown in **Table 4-14**. The performance of each alternative is shown in **Table 4-15.** Alternatives 2 and 3, which incorporate managed lanes, performed better than both the No Build and Alternatives 1 and 4.

Table 4-14: Rating Thresholds: Daily Non-SOV%

Points	Percent change in non-SOV% relative to No Build
1	0% to 4.6%
2	4.7% to 9.3%
3	>9.3%

Table 4-15: Rating Results: Daily Non-SOV%

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	1
Alternative 2: Convert One General Purpose Lane to Managed Lane	3
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	1

4.1.4 Limited Multimodal Connectivity

For limited multimodal connectivity, the study team evaluated whether the alternative would improve HOV/transit connectivity, bicycle and pedestrian connectivity, and movement of freight. The team also evaluated the alternative's ability to accommodate or support future electric vehicle (EV) connected and automated vehicle (CAV) technology and intelligent transportation systems (ITS).

4.1.4.1 HOV/Transit

A qualitative analysis was performed for HOV/Transit connectivity. The rating thresholds and results for each alternative are shown in Table 4-16 and Table 4-17. No Build Alternative, Alternative 1, and Alternative 4 rated poorly compared to Alternatives 2 and 3 as they would maintain the current mixed vehicle environment. Alternative 2 would slightly improve HOV/transit connectivity since it would convert a general purpose lane to a managed lane, which could be used for HOV/transit. Alternative 3 was highly rated since the elevated managed lanes could not only accommodate HOV/transit but also facilitate intersystem connectivity with direct connections to other roadways, transit centers, and hubs.

Table 4-16: Rating Thresholds: Multimodal - HOV/transit connectivity

Points	Description
1	Would not improve
2	Would slightly improve
3	Would significantly improve

Table 4-17: Rating Results: Multimodal - HOV/transit connectivity

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	1
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	1

4.1.4.2 Bicyclists and Pedestrians

Table 4-18 shows the rating scale for evaluating bicycle/pedestrian connectivity. As shown in Table 4-19 the No Build Alternative was poorly rated as it would not improve the current condition. Alternatives 1 through 4 were highly rated since they would provide SUPs along all reconstructed frontage roads and at intersections with crossing roadways.

Table 4-18: Rating Thresholds: Multimodal - Bicycle/Pedestrian Connectivity

Points	Description
1	Would not improve
2	Would slightly improve
3	Would significantly improve

Table 4-19: Rating Results: Multimodal - Bicycle/Pedestrian Connectivity

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	3
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	3

4.1.4.3 Daily Freight Truck Volume

Freight movement was measured by how well each alternative would improve daily freight truck volume along the I-610S corridor. The percent change in truck volume relative to the No Build Alternative ranged from -9% to greater than 5% and the points were allocated based on the scale shown in **Table 4-20**. The performance result of each alternative is shown in **Table 4-21**.

Table 4-20: Rating Thresholds: Daily Freight Truck Volume

Points	Percent change in travel delay relative to No Build
1	-9% to -2%
2	-3% to +5%
3	>+5%

Table 4-21: Rating Results: Daily Freight Truck Volume

Alternative	Rating
No Build Alternative	2
Alternative 1: Operational Improvements	2
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	3

4.1.4.4 Technology

The ability to accommodate and support future EV/CAV technology and ITS was evaluated using the qualitative criteria shown in Table 4-22. The results are shown in Table 4-23. The No Build Alternative would not make the roadway future-ready and may hinder the deployment of self-driving technology. Alternatives 1, 2 and 4 would support limited deployment of self-driving technology but implementation could be potentially more complex in a mixed vehicle environment. Alternative 3 would support the deployment of self-driving technology since it provides a separate facility that could have lanes designated for EV/CAV use in the future.

Table 4-22: Rating Thresholds: Multimodal - Deployment of self-driving technology

Points	Description
1	Would hinder
2	Would support limited
3	Would support

Table 4-23: Rating Results: Multimodal - Deployment of self-driving technology

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	2
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.5 Minimize Right of Way Impacts

The potential right of way footprint for each alternative was estimated based on proposed typical sections meeting current design criteria for urban freeways. The rating thresholds were based on the relative amount of potential additional right of way needed for each alternative as shown in Table 4-24. The results are shown in Table 4-25. The No Build Alternative would not require additional right of way since no improvements would be made. Alternative 1 would require a minimal amount of additional right of way relative to the other alternatives since operational improvements would be limited to specific locations. Alternative 2 would require more right of way than Alternatives 1 and 3 due to the additional shoulder widths required to convert a general purpose lane to a managed lane. Alternative 3 would require a medium amount of additional right of way relative to the other alternatives since the managed lanes would be elevated. Alternative 4 would require more right of way than Alternatives 1 and 3 since the added general purpose lanes would be at-grade.

Table 4-24: Rating Threshold: Right of Way Impacts - Additional Right of Way

Points	Description
1	Would require a significant amount
2	Would require a medium amount
3	Would require minimal amount

Table 4-25: Rating Results: Right of Way Impacts – Additional Right of Way

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	1

4.1.6 Minimize Environmental Impacts

The second goal for the I-610S corridor was to minimize environmental impacts. The environmental impacts were broken down into four categories: biological resources, water resources, community impacts, and cultural resources, which the study team evaluated for each alternative. These evaluations were based on an estimated "worst-case scenario" ROW footprint, which was used to determine areas that would be potentially affected.

4.1.6.1 Biological Resources

The alternatives were evaluated for their potential affect to biological resources. The study team evaluated if the alternative is anticipated to have the highest, moderate, and fewest potential effects on biological resources, including listed, potentially listed, and candidate species. The ratings threshold is shown in Table 4-26. The rating for each alternative is shown in Table 4-27. All of the alternatives are anticipated to have little to no potential effects on listed, potentially listed, and candidate species. No suitable habitat for these species are anticipated to be within the project area due to the high level of development along the corridor. The anticipated effects on biological resources other than listed species could include wildlife vehicular strikes and vegetation/habitat modifications due to changes in the roadway to meet current design standards and/or maintenance activities. Alternative 3 could see the creation of a habitat of nesting swallows and/or bat species in the bridge structures for the elevated managed lanes.

Table 4-26: Rating Threshold: Environmental Impacts - Biological Resources

Points	Description
1	Highest potential effects anticipated
2	Moderate potential effects anticipated
3	Fewest potential effects anticipated

Table 4-27: Rating Results: Environmental Impacts - Biological Resources

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	3
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	3

4.1.6.2 Water Resources

Water resources were evaluated in each alternative to anticipate which had the highest, moderate, and fewest potential effects as shown in Table 4-28. The rating for each alternative is shown in Table 4-29. The No Build Alternative is anticipated to have the fewest effects as there would not be any changes. Alternatives 1, 2, and 3 are anticipated to have minimal potential to affect the floodplain and no effects to the National Hydrography Dataset (NHD) or the National Wetlands Inventory (NWI) features are anticipated. Alternative 4 is anticipated to have a moderate effect to approximately 9 feet of a single NHD feature and could affect the floodplain. The NHD feature is the only water crossing identified along the project corridor and traverses under I-610 within the existing ROW through culverts. Alternative 4 is anticipated to have the potential to impact the feature outside the culverted portion of this feature, but it is assumed water flow would be maintained.

During the schematic design phase of the project, any potential water features identified, including the NHD feature mentioned above, would be evaluated to determine if they are potentially waters of the U.S. (WOTUS). If impacts to WOTUS features are identified during project development, minimization and mitigation measures would be considered based on regulatory requirements and coordination with the U.S. Army Corps of Engineers, as needed. In addition, mitigation for impacts to floodplains would be considered, including but not limited to minimizing fill or excavation to offset fill in the floodplain.

Table 4-28: Rating Threshold: Environmental Impacts - Water Resources

Points	Description
1	Highest potential effects anticipated
2	Moderate potential effects anticipated
3	Fewest potential effects anticipated

Table 4-29: Rating Results: Environmental Impacts - Water Resources

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	3
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.6.3 Community Resources

Community resources were evaluated for each alternative from the highest to fewest potential effects. Evaluation was generally limited to potential impacts caused by the “worst-case scenario” ROW (e.g. potential displacements and/or parcel impacts) due to the conceptual nature of each alternative. The rating threshold is reflected in Table 4-30 and the rating for each alternative is shown in Table 4-31. The No Build Alternative is anticipated to have minimal to no effects on community resources. Operation and maintenance activities within the project limits may have short-duration effects on commuters utilizing the roadway. Alternative 1 is anticipated to have minimal effects on the community since this alternative primarily reconstructs the corridor to current standards and minimal additional ROW would be required. Alternatives 2 and 4 are anticipated to have moderate potential to affect the community. Based on the width of these conceptual alternatives, there are 19 residential and 26 commercial structures that could be potentially impacted. Community facilities that could be affected include Bethany Baptist Church and minor effects to Beech-White Park and an H-GAC park area. Alternative 3 is also anticipated to have moderate potential to affect the community. There are 20 residential and 24 commercial structures that could be potentially impacted. Community facilities that could be affected include Bethany Baptist Church and minor effects to the Baha'i Faith Recreation Facilities property and an H-GAC park area. TxDOT will work with individual property owners to provide relocation assistance and would attempt to relocate displaced persons or businesses within the same neighborhood if possible.

Table 4-30: Rating Threshold: Environmental Impacts - Community Resources

Points	Description
1	Highest potential effects
2	Moderate potential effects
3	Fewest potential effects

Table 4-31: Rating Results: Environmental Impacts - Community Resources

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.6.4 Cultural Resources

The cultural resources for each alternative were evaluated from the highest to fewest potential effects. The rating threshold is reflected in **Table 4-32** and the rating for each alternative is shown in **Table 4-33**. The No Build Alternative is not anticipated to affect cultural resources. Ground-disturbing activities that may be a result of operational or maintenance activities are not anticipated to affect any unknown cultural resources, if present. Alternative 1 is anticipated to have minimal effects on cultural resources. No archeological resources, historic resources, or cemeteries were identified within the area of this alternative. Alternatives 2, 3, and 4 could potentially affect an archeological site (point) just outside of the existing ROW. A detailed investigation of potential effects to cultural resources would be performed during the schematic design stage of project development.

Table 4-32: Rating Threshold: Environmental Impacts - Cultural Resources

Points	Description
1	Highest potential effects
2	Moderate potential effects
3	Fewest potential effects

Table 4-33: Rating Results: Environmental Impacts - Cultural Resources

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	3
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	2

4.1.7 Compatibility

The study team also evaluated if the alternatives were compatible with ongoing adjacent projects and studies, such as the REAL Plan, State Highway (SH) 35 at I-610S interchange, SH 288 at I-610S interchange, I-45S Planning and Environmental Linkages (PEL) Study, SH 225 and I-610E PEL Study, and METRONext. Each alternative was rated on whether they would not be, somewhat be, or would be compatible with the ongoing projects and studies. The rating threshold is reflected in **Table 4-34** and the rating for each alternative is shown in **Table 4-35**.

The No Build Alternative was poorly rated as it would not be compatible with any of the ongoing adjacent projects and studies. Alternative 4 was also poorly rated since it would only accommodate METRO's proposed Purple Line extension but not fit through the proposed SH 35 interchange and recently constructed SH 288 interchange. It would also not be compatible with concepts recommended by the REAL Plan and adjacent PEL studies. Alternative 1 was moderately rated as it would accommodate METRO's proposed Purple Line extension, fit through the proposed SH 35 interchange and recently constructed SH 288 but not be compatible with concepts recommended by the REAL Plan and adjacent PEL studies. Alternative 2 was also moderately rated as it would accommodate METRO's proposed Purple Line extension, but not fit through the proposed SH 35 interchange and recently constructed SH 288 interchange. It would also be somewhat compatible with concepts recommended by the REAL Plan and adjacent PEL studies. Alternative 3 was highly rated as it would accommodate METRO's Purple Line extension, fit through the proposed SH 35 interchange and recently constructed SH 288 interchange, and would be compatible with concepts recommended by the REAL Plan and adjacent PEL studies.

Table 4-34: Rating Threshold: Compatibility with Ongoing projects and Studies

Points	Description
1	Would not be compatible
2	Would be somewhat compatible
3	Would be compatible

Table 4-35: Rating Results: Compatibility with Ongoing projects and Studies

Alternative	Rating
No Build Alternative	1
Alternative 1: Operational Improvements	2
Alternative 2: Convert One General Purpose Lane to Managed Lane	2
Alternative 3: Add Two New Managed Lanes in Each Direction	3
Alternative 4: Add One New General Purpose Lane in Each Direction	1

4.1.8 Cost

The evaluation also factored in the estimated cost of each alternative. The approximate high-level conceptual construction cost for the alternatives would range from $0 to $1.297 billion in today's dollars. This high-level conceptual construction cost estimate does not include ROW or utility relocation costs. Each alternative was rated if the cost would be greater than or equal to $866 million, between $866 million and $433 million, and, or less than or equal to $433 million. The rating threshold is reflected in Table 4-36 and the rating for each alternative is shown in Table 4-37. The No Build Alternative would have no construction costs as there are no proposed changes. The approximate construction cost of Alternative 1 is $444 million. Alternative 2 is $1.297 billion, Alternative 3 is $855 million and Alternative 4 is $1.260 billion.

Table 4-36: Rating Threshold: Potential Construction Cost

Points	Description
1	>= $866M
2	> $433M and < $866M
3	<= $433M

Table 4-37: Rating Results: Potential Construction Cost

Alternative	Rating
No Build Alternative	3
Alternative 1: Operational Improvements	2
Alternative 2: Convert One General Purpose Lane to Managed Lane	1
Alternative 3: Add Two New Managed Lanes in Each Direction	2
Alternative 4: Add One New General Purpose Lane in Each Direction	1

4.2 Step 2: Public Input

To collect input on the conceptual alternatives, the study team held public meetings at locations in the community area. The study team employed various techniques and outreach notification methods to solicit participation in the study. A complete list of notifications can be found in the Public Meeting documentation report, which can be found online at https://www.txdot.gov/projects/hearings-meetings/houston/2023/i610-061323.html. The team also held a workshop with stakeholders including elected officials, agencies, and neighborhood groups. The study team gathered input at the following meetings:

1. Stakeholder Workshop #2, Virtual, Jan 25, 2024
2. Public Meeting #2, Worthing High School, Feb 20, 2024
3. Public Meeting #2, Houston Texans YMCA, Feb 22, 2024
4. Public Meeting #2, Virtual

During the stakeholder workshop and the public meetings, conceptual alternatives were presented. Participants were asked to provide feedback on the alternatives through a comment form or a survey. The survey asked participants to select which alternative best meets the needs and goals of I-610S. Participants were also given the opportunity to select "other" and write in their suggestions. Table 4-38 shows the selection comparison of the conceptual alternatives across all the meetings. Of the 27 responses received, 18, or 67%, selected Alternative 3. Three respondents selected "other.", two selected Alternative 4, two selected Alternative 2, one selected Alternative 1, and one selected the No Build alternative.

Table 4-38: Alternative Selection Comparison and Totals

Alternative	Stakeholder Workshop #2 Survey	Public Meeting #2 Comments	Public Meeting #2 Survey	Total
No Build	1	0	0	1
1: Operational Improvements	0	1	0	1
2: Convert One General Purpose Lane to Managed Lane	1	0	1	2
3: Add Two New Managed Lanes in Each Direction	5	4	9	18
4: Add One New General Purpose Lane in Each Direction	0	0	2	2
Other	0	0	3	3

4.3 Overall Screening

Table 4-39 summarizes the screening results of the feasibility study for the I-610S corridor. A detailed screening matrix is included in Appendix A. The results show that all the build alternatives scored higher than the No Build Alternative, which had an overall score of 31. Of the build alternatives, Alternatives 2 and 4 scored the lowest, with an overall score of 34. Alternative 1 scored slightly higher with an overall score of 37. Alternative 3 scored significantly higher than both the no-build and other build alternatives with an overall score of 47.

Table 4-39: I-610S Overall Screening

Screening Criteria		ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Step 1: Technical Data		No Build	Operational Improvements	Convert General Purpose Lane to Managed Lane	Add Managed Lanes	Add General Purpose Lane
Increased Congestion	Volume to Capacity (v/c)	1	1	1	2	2
	Travel Delay	1	1	1	2	2
	Person Trips	1	1	1	3	2
	Non-SOV	1	1	3	3	1
Infrastructure Deficiencies	Infrastructure	1	3	3	3	3
Safety Issues	Safety	1	2	2	3	2
Limited Multimodal Connectivity	HOV/Transit	1	1	2	3	1
	Bicyclists and Pedestrians	1	3	3	3	3
	Freight	2	2	1	2	3
	Technology	1	2	2	3	2
Minimize ROW Impacts	ROW	3	3	1	2	1
Minimize Environmental Impacts	Biological resources	3	3	3	3	3
	Water Resources	3	3	3	3	2
	Community Resources	3	3	2	2	2
	Cultural Resources	3	3	2	2	2
Compatibility with Ongoing Projects and Studies		1	2	2	3	1
Cost		3	2	1	2	1
Total Step 1 Score		30	36	33	44	33
Step 2: Community Input		1	1	1	3	1
Overall Score		31	37	34	47	34

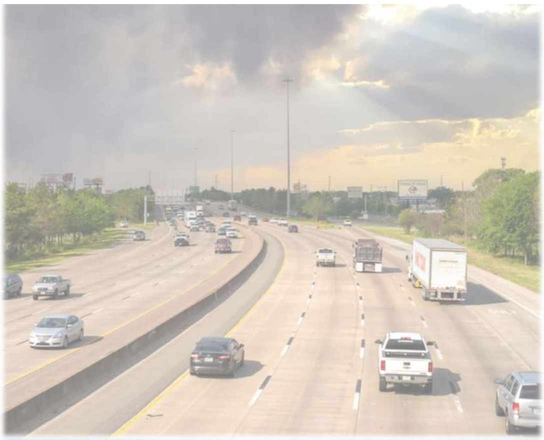
5 CONCLUSION AND NEXT STEPS

Of the build conceptual alternatives, Alternative 1 - Operational Improvements and Alternative 3 – Add Managed Lanes scored the highest in the overall screening and are recommended to be carried forward as viable alternatives and further studied.

Alternative 1 would provide the improvements necessary to bring the facility to current design standards and is anticipated to have the fewest ROW and environmental impacts and the lowest construction cost of the build alternatives. Although Alternative 1 did not score as well in addressing increased congestion at the corridor level, it would implement localized operational improvements to alleviate bottlenecks and improve traffic flow at the segment or local level.

Alternative 3 would provide the same improvements as Alternative 1 while also providing increased capacity with the addition of two elevated managed lanes in each direction. Alternative 3 scored the highest overall. However, it is anticipated to have more ROW impacts than Alternative 1.

In the next phase of the study, Alternatives 1 and 3 will be developed into viable alternatives and elements such as roadway alignments, access points, and preliminary right of way footprints will be defined. The No Build Alternative will also be carried forward to serve as a baseline for comparison. The viable alternatives will be presented at future public involvement events to obtain feedback. Along with public input, the Level 2 screening of the viable alternatives will include more detailed engineering, traffic, and environmental analysis to ultimately identify a recommended schematic alternative.



Appendix A
Conceptual Alternatives Evaluation

EVALUATION				CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS	QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
				No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
					Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
INCREASED CONGESTION	Would the alternate improve the AM or PM peak period volume to capacity (V/C) ratio?	Quantitative	Percent change in V/C relative to No Build (ranges from +4% to -17%): 1 - (+4% to -3%) 2 - (-4% to -11%) 3 - (<-11%)	1 Projected volume-to-capacity (V/C) ratio in 2045 is **0.83** assuming no build.	1 Alternative doesn't change capacity compared to no build so V/C ratio in 2045 is projected to remain **unchanged (0.83).**	1 V/C ratio is projected to increase by **4% to 0.87** (compared to no build).	2 V/C ratio is projected to decrease by **9% to 0.76** (compared to no build).	2 V/C ratio is projected to decrease by **9% to 0.76** (compared to no build).
	Would the alternative improve the AM or PM peak period travel delay?	Quantitative	Percent change in travel delay relative to No Build (ranges from +2% to -27% change): 1 - (+2% to -8%) 2 - (-9% to -19%) 3 - (<-19%)	1 Peak period travel delay for both general purpose and managed lanes is projected to be **108,500 veh-mins** assuming no build.	1 Alternative doesn't change capacity compared to no build so peak period travel delay in 2045 is projected to remain **unchanged (108,500 veh-mins).**	1 Peak period travel delay is projected to increase by **2% to 110,900 veh-mins** (compared to no build).	2 Peak period travel delay is projected to decrease by **10% to 97,500 veh-mins** (compared to no build).	2 Peak period travel delay is projected to decrease by **16% to 91,600 veh-mins** (compared to no build).
	Would the alternative increase person throughput for the corridor?	Quantitative	Percent change in person trips relative to No Build (ranges from 0% to 24% change): 1 - (0% to 8%) 2 - (9% to 16%) 3 - (16%<)	1 Total number of people moved along the corridor across all transportation modes is projected to be **234,300 people per day.**	1 Alternative maintains same number of general purpose lanes as no build (Alternative 0) so it is assumed that projected person throughput in 2045 will not change.	1 Conversion of general purpose lane to managed lane free for HOVs during the peak hours is expected to encourage more HOV trips but congestion due to reduced general purpose lane capacity is expected to result in a **0.2% reduction in daily total people moved (233,800 people per day)** compared to the no build.	3 Alternative increases lane capacity. Total number of people moved along the corridor across all transportation modes is projected to **increase to 274,800 people per day (17 percent higher** than no build).	2 Alternative increases general purpose lane capacity. Total number of people moved along the corridor across all transportation modes is projected to **increase to 259,400 people per day (11 percent higher** than no build).

EVALUATION				CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS	QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
				No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
					Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
INCREASED CONGESTION (CONTINUED)	Would the alternative increase the daily non-single occupancy vehicle percent (non-SOV%)?	Quantitative	Percent change in non-SOV relative to No Build (ranges from 0% to 14% change): 1 - (0% to 4.6%) 2 - (4.7% to 9.3%) 3 - (>9.3%)	**1** Percent of non-SOV (i.e. HOV + transit) person travel along all facilities within the corridor is projected to be **33%** assuming no build.	**1** Alternative doesn't change capacity compared to no build so non-SOV person travel in 2045 is projected to remain **unchanged.**	**3** Conversion of general purpose lane to managed lane free for HOVs during the peak hours is expected to encourage more HOV compared to SOV trips. Increase in HOV trips is expected to result in a **11% increase** in non-SOV person travel compared to the no build.	**3** Alternative increases lane capacity. Percent of non-SOV person travel is projected to **increase by 14%** compared to the no build.	**1** Alternative increases general purpose lane capacity. Percent of non-SOV person travel is projected to **increase by 1%** compared to the no build.
INFRASTRUCTURE DEFECIENCIES	Would the alternative replace/improve aging infrastructure?	Qualitative	1 - Alternative would not replace/improve aging infrastructure 2 - N/A 3 - Alternative would replace/improve aging infrastructure along the entire corridor	**1** Alternative would not replace aging infrastructure.	**3** Alternative would reconstruct general purpose lanes and frontage roads along the entire corridor.	**3** Alternative would reconstruct general purpose lanes and frontage roads along the entire corridor.	**3** Alternative would reconstruct general purpose lanes and frontage roads along the entire corridor.	**3** Alternative would reconstruct general purpose lanes and frontage roads along the entire corridor.
SAFTETY ISSUES	Would the alternative potentially reduce the frequency and/or severity of crashes?	Qualitative	1 - Alternative may not reduce crashes along the corridor 2 - Alternative may provide some reduction in crashes 3 - Alternative may provide significant reduction in crashes	**1** Alternative would not reduce crashes along the corridor.	**2** Alternative may provide some reduction in crashes since it would reconstruct to current design standards, increase shoulder widths, and implement localized operational improvements.	**2** Alternative may provide some reduction in crashes since it would reconstruct to current design standards and increase shoulder widths.	**3** Alternative may provide significant reduction in crashes since it would not only reconstruct to current standards and increase shoulder widths, but also provide a separate structure which would reduce conflicts.	**2** Alternative may provide some reduction in crashes since it would reconstruct to current design standards and increase shoulder widths.

EVALUATION				CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS	QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
				No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
					Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
LIMITED MULTIMODAL CONNECTIVITY	Would the alternative improve HOV/transit connectivity?	Qualitative	1 - Alternative would not improve HOV/transit connectivity 2 - Alternative would slightly improve HOV/transit connectivity 3 - Alternative would significantly improve HOV/transit connectivity	**1** Alternative would not improve HOV/transit connectivity.	**1** Alternative would not improve HOV/transit connectivity since it would maintain the same general configuration of the freeway.	**2** Alternative would slightly improve HOV/transit connectivity as it would convert a general purpose lane to a managed lane which could be used for HOV/transit. However, it would not provide as much connectivity as elevated managed lanes, which could be directly connected to other roadways, transit centers and hubs.	**3** Alternative would significantly improve HOV/Transit connectivity since it would provide elevated managed lanes which could be used for HOV/transit with direct connections to other roadways, transit centers and hubs.	**1** Alternative would not improve HOV/transit connectivity since it would maintain the current mixed vehicle environment and may not have the flexibility of intersystem connectivity as the elevated lane alternatives.
	Would the alternative improve bicycle/pedestrian connectivity?	Qualitative	1 - Alternative would not improve bicycle/pedestrian connectivity 2 - Alternative would slightly improve bicycle/pedestrian connectivity 3 - Alternative would significantly improve bicycle/pedestrian connectivity	**1** Alternative would not improve bicycle/pedestrian connectivity.	**3** Alternative would significantly improve bicycle/pedestrian connectivity since at a minimum it would provide sidewalks for bicycles/pedestrians along all reconstructed frontage roads and at intersections with crossing roadways.	**3** Alternative would significantly improve bicycle/pedestrian connectivity since at a minimum it would provide sidewalks for bicycles/pedestrians along all reconstructed frontage roads and at intersections with crossing roadways.	**3** Alternative would significantly improve bicycle/pedestrian connectivity since at a minimum it would provide sidewalks for bicycles/pedestrians along all reconstructed frontage roads and at intersections with crossing roadways.	**3** Alternative would significantly improve bicycle/pedestrian connectivity since at a minimum it would provide sidewalks for bicycles/pedestrians along all reconstructed frontage roads and at intersections with crossing roadways.
	Would the alternative improve movement of trucks along the corridor?	Quantitative	Percent change in Truck Volume relative to No Build (ranges from -9% to +11% change): 1 - (-9% to -2%) 2 - (-3% to +5%) 3 - (>+5%)	**2** Projected heavy truck volume in 2045 assuming no build conditions is 6,410 trucks per day.	**2** Alternative maintains same number of general purpose lanes as no build (Alternative 0) so it is assumed that projected heavy truck volume in 2045 will not change.	**1** Reduction of general purpose lane capacity and conversion to managed lane is projected to **reduce truck volumes by 9% to 5,850 trucks per day** (compared to 6,410 in the no build).	**2** Addition of lanes managed by access increases capacity on the corridor but truck volumes are projected to result in **approximately the same truck volume as no build** (6,410 trucks per day).	**3** Addition of general purpose lanes increases capacity for all vehicles, resulting in an increase in **truck volumes of 8% to 6,900 trucks per day** (compared to 6,410 in the no build).

EVALUATION					CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS		QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
					No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
						Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
LIMITED MULTIMODAL CONNECTIVITY (CONTINUED)		Would the alternative accommodate/support future EV/CAV technology and ITS?	Qualitative	1 - Alternative would hinder deployment of self-driving technology 2 - Alternative would support limited deployment of self-driving technology along the entire corridor 3 - Alternative would support deployment of self-driving technology along the entire corridor	1 Alternative does nothing to make the roadway future ready and may hinder deployment of self-driving technology.	2 Alternative would support limited deployment of self-driving technology but implementation could be potentially more complex in a mixed vehicle environment vs an alternative with managed lanes on a separate structure.	2 Alternative would support limited deployment of self-driving technology but implementation could be potentially more complex in a mixed vehicle environment vs an alternative with managed lanes on a separate structure.	3 Alternative would support deployment of self-driving technology since it provides a separate facility that could have lanes designated for EV/CAV use in the future.	2 Alternative would support limited deployment of self-driving technology but implementation could be potentially more complex in a mixed vehicle environment vs an alternative with managed lanes on a separate structure.
MINIMIZE ROW IMPACTS		Would the alternative minimize the amount of ROW needed?	Qualitative	1 - Alternative would require a significant amount of proposed ROW 2 - Alternative would require a medium amount of proposed ROW 3 - Alternative would require minimal amount of proposed ROW	3 Alternative would not require additional ROW.	3 Alternative would require minimal amount of proposed ROW relative to the other alternatives since operational improvements would be limited to specific locations.	1 Alternative would require more ROW than Alts 1 and 3 due the additional shoulder widths required to convert a general purpose lane to a managed lane.	2 Alternative would require a medium amount of proposed ROW relative to the other alternatives since the managed lanes would be elevated.	1 Alternative would require more ROW than Alts 1 and 3 since the added general purpose lanes would be at-grade.
MINIMIZE ENVIRONMENTAL IMPACTS	BIOLOGICAL RESOURCES	Would the alternative potentially affect biological resources?	Qualitative	1 - Alternative is anticipated to have the highest potential effects to biological resources, including listed, potentially listed and candidate species 2 - Alternative is anticipated to have moderate potential effects to biological resources, including listed, potentially listed and candidate species 3 - Alternative is anticipated to have the fewest potential effects to biological resources, including listed, potentially listed and candidate species	3 Alternative is anticipated to have little to no potential effects to listed, potentially listed and candidate species. Anticipated effects to biological resources other than listed species may include potential wildlife mortalities due to vehicular strikes and alteration of vegetation/habitat or urban wildlife due to on-going operations and maintenance on the highway.	3 Alternative is anticipated to have little to no potential effects to listed, potentially listed and candidate species. Anticipated effects to biological resources other than listed species could include wildlife vehicular strikes and vegetation/habitat modifications due to changes in the roadway to meet current design standards.	3 Alternative is anticipated to have little to no potential effects to listed, potentially listed and candidate species. Anticipated effects to biological resources other than listed species could include wildlife vehicular strikes and vegetation/habitat modifications due to changes in the roadway to meet current design standards and conversion of a general purpose lane to a managed lane.	3 Alternative is anticipated to have little to no potential effects to listed, potentially listed and candidate species. Anticipated effects to biological resources other than listed species could include wildlife vehicular strikes and vegetation/habitat modifications due to changes in the roadway to meet current design standards and add elevated managed lanes. Habitat could be created for nesting swallows and/or bat species in the bridge structures for the elevated managed lanes.	3 Alternative is anticipated to have little to no potential effects to listed, potentially listed and candidate species. Anticipated effects to biological resources other than listed species could include wildlife vehicular strikes and vegetation/habitat modifications due to changes in the roadway to meet current design standards and add a general purpose lane.

EVALUATION					CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS		QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
					No Build	Reconstruct (GP & FR) to current standards with operational improvements	Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane	Reconstruct (GP & FR) and add Managed Lanes	Reconstruct (GP & FR) and add General Purpose Lane
						Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
MINIMIZE ENVIRONMENTAL IMPACTS (CONTINUED)	WATER RESOURCES	Would the alternative potentially affect water resources?	Qualitative	1 - Alternative is anticipated to have the highest potential effects to water resources 2 - Alternative is anticipated to have moderate potential effects to water resources 3 - Alternative is anticipated to have the fewest potential effects to water resources	3 Alternative is anticipated to have minimal to no effects to water resources. Operation and maintenance activities, if they need to affect water resources, would be minimal.	3 Alternative is anticipated to have minimal potential to affect the floodplain. No effects to NHD or NWI features are anticipated.	3 Alternative is anticipated to have minimal potential to affect the floodplain. No effects to NHD and NWI features are anticipated.	3 Alternative is anticipated to have minimal potential to affect the floodplain. No effects to NHD and NWI features are anticipated.	2 Alternative is anticipated to have moderate effect to 8.78 ft of NHD features. May affect the floodplain.
	COMMUNITY IMPACTS	Would the alternative potentially affect community resources?	Qualitative	1 - Alternative would have the highest potential effects to the community 2 - Alternative would have moderate potential effects to the community 3 - Alternative would have the fewest potential effects to the community	3 Alternative is anticipated to have minimal to no effects to community resources. Operation and maintenance activities within the project limits may have short-duration effects to commuters utilizing the roadway.	3 Alternative is anticipated to have minimal effects to the community since this alternative primarily reconstructs to current standards and minimal additional ROW would be required.	2 Alternative is anticipated to have moderate potential to affect the community. Alternative may have potential effects to 19 residential and 26 commercial structures. Effects to Bethany Baptist Church are possible. Minor effects to Beech-White Park and HGAC Park Area are possible.	2 Alternative is anticipated to have moderate potential to affect the community. Alternative may have potential effects to 20 residential and 24 commercial structures. Effects to Bethany Baptist Church are possible. Minor effects to the Baha'i Faith Recreation Facilities property and HGAC Park Area are possible.	2 Alternative is anticipated to have moderate potential to affect the community. Alternative may have potential effects to 19 residential and 26 commercial structures. Effects to Bethany Baptist Church are possible. Minor effects to Beech-White Park and HGAC Park Area are possible.
	CULTURAL RESOURCES	Would the alternative potentially affect cultural resources?	Qualitative	1 - Alternative is anticipated to have the highest potential effects to the community 2 - Alternative is anticipated to have moderate potential effects to the community 3 - Alternative is anticipated to have the fewest potential effects to the community	3 Alternative is not anticipated to affect cultural resources. Ground disturbing activities that may be a result of operational or maintenance activities are not anticipated to affect any unknown cultural resources, if present.	3 Alternative is anticipated to have minimal effects to cultural resources. No archeological resources, historic resources or cemeteries were identified within the area of this alternative.	2 Alternative could potentially affect an archeological site (point) just outside of the existing ROW.	2 Alternative could potentially affect an archeological site (point) just outside of the existing ROW.	2 Alternative could potentially affect an archeological site (point) just outside of the existing ROW.

EVALUATION				CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS	QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
				No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
					Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
COMPATABILITY WITH ONGOING PROJECTS AND STUDIES	Would the alternative provide compatibility with ongoing adjacent projects and studies (REAL Plan, SH 35, SH 288, I-45S PEL, SH 225 and I-610E PEL, METRONext)?	Qualitative	1 - Alternative would not be compatible with ongoing projects and studies 2 - Alternative would be somewhat compatible with ongoing projects and studies 3 - Alternative would be compatible with ongoing projects and studies	1 Alternative would not be compatible with ongoing adjacent projects and studies.	2 Alternative would: -accommodate METRO's Purple Line extension -fit through the proposed SH 35 interchange -not impact the recently constructed SH 288 Interchange -not be compatible with concepts recommended by the REAL Plan and adjacent PEL studies	2 Alternative would: -accommodate METRO's Purple Line extension -not fit through the proposed SH 35 interchange -impact the recently constructed SH 288 interchange -be somewhat compatible with concepts recommended by the REAL Plan and adjacent PEL studies	3 Alternative would: -accommodate METRO's Purple Line extension -fit through the proposed SH 35 interchange -not impact the recently constructed SH 288 interchange -be compatible with concepts recommended by the REAL Plan and adjacent PEL studies	1 Alternative would: -accommodate METRO's Purple Line extension -not fit through the proposed SH 35 interchange -impact the recently constructed SH 288 interchange -not be compatible with concepts recommended by the REAL Plan and adjacent PEL studies
COST	What is the potential comparative construction cost of the alternative?	Quantitative	Approximate high level conceptual construction cost for the alternatives would range from $0 to $1.297B in today's dollars. 1 - Approximate construction cost would be >= $866M 2 - Approximate construction cost would be > $433M and less than < $866M 3 - Approximate construction cost would be <= $433M	3 Alternative would have no construction costs.	2 Alternative would have construction cost of approximately $444M in today's dollars. This is a high level, conceptual construction cost estimate and does not include ROW or utility relocation costs.	1 Alternative would have construction cost of approx $1.297B in today's dollars. This is a high level, conceptual construction cost estimate and does not include ROW or utility relocation costs.	2 Alternative would have construction cost of approx $855M in today's dollars. This is a high level, conceptual construction cost estimate and does not include ROW or utility relocation costs.	1 Alternative would have construction cost of approx $1.260B in today's dollars. This is a high level, conceptual construction cost estimate and does not include ROW or utility relocation costs.
COMMUNITY INPUT	Which alternative did the public and stakeholders select as best meeting the needs and goals?	Quantitative	Percentage of total respondents (27) at Public Meeting #3 and Stakeholder Workshop #3 who selected the alternative is between: 1. 0% and 33% 2. 34% and 66% 3. 67% and 100%	1 4%	1 4%	1 7%	3 67%	1 7%

EVALUATION				CONCEPTUAL ALTERNATIVES				
NEEDS/ GOALS	QUESTION	METRIC	RATINGS AND DEFINITIONS	ALTERNATIVE 0	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
				No Build	**Reconstruct (GP & FR) to current standards with operational improvements**	**Reconstruct (GP & FR) and Convert General Purpose Lane to Managed Lane**	**Reconstruct (GP & FR) and add Managed Lanes**	**Reconstruct (GP & FR) and add General Purpose Lane**
					Reconstruct to current standards with operational improvements. No additional capacity would be added.	Reconstruct to current standards and convert one general purpose lane in each direction to a managed lane in each direction.	Reconstruct to current standards and add two elevated managed lanes in each direction.	Reconstruct to current standards and add a general purpose lane in each direction.
TOTALS				**31**	**37**	**34**	**47**	**34**