

**APPENDIX L**  
**VISUAL IMPACT ASSESSMENT TECHNICAL REPORT**



# Visual Impact Assessment

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## North Houston Highway Improvement Project

From US 59/I-69 at Spur 527 to I-45 at Beltway 8 North

CJS 0912-00-146

Prepared by: TxDOT Houston District

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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 December 16, 2014 and executed by FHWA and TxDOT.

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# 1 INTRODUCTION

The proposed project begins at the interchange of Interstate Highway 45 (I-45) and Beltway 8 North and continues south along I-45 to Downtown Houston where it terminates at the interchange of United States Highway (US) 59/I-69 and Spur 527 south of Downtown Houston. The proposed project area includes portions of I-10 and US 59/I-69 near the Downtown Houston area. The proposed project is composed of three segments, Segments 1, 2, and 3, for which reasonable alternatives are evaluated in the Draft Environmental Impact Statement (EIS). This Visual Assessment Report evaluates three alternative actions for each of the three project segments, including one Proposed Recommended Alternative for each segment.

## 1.1 EXISTING FACILITIES

### *1.1.1 Segment 1: I-45 from Beltway 8 North to north of I-610 (North Loop)*

I-45 within this segment consists of eight general purpose lanes (i.e., mainlanes; four lanes in each direction), four frontage road lanes (two lanes in each direction), and a reversible high occupancy vehicle (HOV) lane in the middle, all within a variable right-of-way of 250 to 300 feet. The existing posted speed limit along the general purpose lanes and reversible HOV lane is 60 miles per hour (mph). The existing posted speed limit for the frontage roads is 45 mph. The existing right-of-way area for Segment 1 encompasses approximately 347 acres.

### *1.1.2 Segment 2: I-45 from north of I-610 (North Loop) to I-10*

I-45 within this segment primarily consists of eight at-grade general purpose lanes (four lanes in each direction), six frontage road lanes (three lanes in each direction), and a reversible HOV lane in the middle, all within a variable right-of-way of 300 to 325 feet. Segment 2 also includes a depressed section that consists of eight general purpose lanes (four lanes in each direction) and a reversible HOV lane in the middle, all below grade, within a 245-foot right-of-way. The six frontage road lanes associated with the depressed section (three lanes in each direction) are located at-grade. The existing posted speed limit is 60 mph along the general purpose lanes, 55 mph along the reversible HOV lane, and 40 mph along the frontage road lanes. The I-45 and I-610 frontage roads are discontinuous at the I-45/I-610 interchange. The existing right-of-way area for Segment 2 encompasses approximately 220 acres.

### *1.1.3 Segment 3: Downtown Loop System (I-45, US 59/I-69, and I-10)*

The Downtown Loop System consists of three interstate highways that create a loop around Downtown Houston. I-45 forms the western and southern boundaries of the loop and is known locally as the Pierce Elevated because it partially follows the alignment of Pierce Street. I-10 forms the northern boundary of the loop, and US 59/I-69 forms the eastern

boundary of the loop. The loop includes three major interchanges: I-45 and I-10, I-10 and US 59/I-69, and US 59/I-69 and I-45. The interchange of US 59/I-69 and SH 288 is located south of Downtown Houston.

I-45 along the west side of Downtown Houston consists of six elevated general purpose lanes (three lanes in each direction) within an existing right-of-way of 205 feet. I-45 along the south side of Downtown Houston (the Pierce Elevated) consists of six elevated general purpose lanes (three lanes in each direction). I-10 north of Downtown Houston, between I-45 and US 59/I-69, consists of 10 general purpose lanes (five lanes in each direction) within an existing right-of-way of 420 feet. US 59/I-69 along the east side of Downtown Houston consists of six general purpose lanes (three lanes in each direction) within an existing right-of-way of 225 feet. Generally, local streets serve as one-way frontage roads within Segment 3, except near the I-10 and US 59/I-69 interchange, where the frontage roads are discontinuous. The existing right-of-way area for Segment 3, which includes the Downtown Loop System, is approximately 637 acres.

## **1.2 PROPOSED ALTERNATIVES**

### ***1.2.1 Segment 1: I-45 from Beltway 8 North to north of I-610 (North Loop)***

#### ***1.2.1.1 Segment 1, Alternative 4: Widen I-45 Mostly to the West (Proposed Recommended)***

Alternative 4 would widen the existing I-45 on the west side of the roadway to accommodate four managed express (MaX) lanes. The proposed typical section would include eight general purpose lanes (four lanes in each direction), four MaX lanes (two lanes in each direction), and six frontage road lanes (three lanes in each direction), all at-grade. Alternative 4 would require approximately 200 to 225 feet of new right-of-way to the west of the existing I-45. This alternative would require small amounts of land to the east of the existing I-45 right-of-way at major intersections and between Crosstimbers Street and I-610. Approximately 212 acres of new right-of-way would be required for this alternative. The length of this alternative would be approximately 8.8 miles.

#### ***1.2.1.2 Segment 1, Alternative 5: Widen I-45 Mostly to the East***

Alternative 5 would widen the existing I-45 along the east side of the roadway to accommodate four MaX lanes. The proposed typical section would include eight general purpose lanes (four lanes in each direction), four MaX lanes (two lanes in each direction), and six frontage road lanes (three lanes in each direction), all at-grade. Alternative 5 would require approximately 200 to 225 feet of new right-of-way to the east of the existing I-45. This alternative would require small amounts of land to the west of the existing I-45 right-of-way at major intersections. Approximately 239 acres of new right-of-way would be required for this alternative. The length of this alternative would be approximately 8.8 miles.

### ***1.2.1.3 Segment 1, Alternative 7: Widen I-45 on Both Sides***

Alternative 7 would widen the existing I-45 along both the east and west sides of the roadway to accommodate four elevated MaX lanes. The proposed typical section would include eight general purpose lanes (four lanes in each direction) at-grade, four elevated MaX lanes (two lanes in each direction) on a single structure constructed along the center of the roadway, and six frontage road lanes (three lanes in each direction) at-grade. Alternative 7 would require approximately 45 to 80 feet of new right-of-way along both sides of the existing I-45. Approximately 120 acres of new right-of-way would be required for this alternative. The length of this alternative would be approximately 8.8 miles.

### ***1.2.2 Segment 2: I-45 from north of I-610 (North Loop) to I-10 (including the interchange with I-610)***

#### ***1.2.2.1 Segment 2, Alternative 10: Add Four MaX Lanes to I-45 (Proposed Recommended)***

Alternative 10 would widen the existing I-45 to accommodate four MaX lanes. Within the at-grade section of I-45, the proposed typical section would include eight general purpose lanes (four lanes in each direction), four MaX lanes (two lanes in each direction), and four frontage road lanes (two lanes in each direction), all at-grade. For this alternative, I-45 would be depressed from north of Cottage Street to Norma Street, a distance of approximately 1,800 feet. Within the depressed section of I-45, the proposed typical section would include eight below-grade general purpose lanes (four lanes in each direction), and four below-grade MaX lanes (two lanes in each direction), while the four frontage road lanes (two lanes in each direction) would be at-grade. The proposed I-45 and I-610 frontage roads would be continuous through the I-45/I-610 interchange. Alternative 10 would require new right-of-way for the at-grade section between I-610 and Cottage Street, and between Little White Oak Bayou and Norma Street. Approximately 19 acres of new right-of-way would be required for this alternative. The length of this alternative, including interchange improvements, would be approximately 4.5 miles.

This alternative provides an opportunity to include a structural “cap” over a portion of the depressed lanes of I-45 from north of Cottage Street to south of N. Main Street. This area could be used as open space. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space would require development and funding by parties other than TxDOT.

#### ***1.2.2.2 Segment 2, Alternative 11: Add Four Elevated MaX Lanes in the Center of I-45***

Alternative 11 would widen the existing I-45 and add four elevated MaX lanes. Within the at-grade section of I-45, the proposed typical section would include eight general purpose lanes (four lanes in each direction) and four frontage road lanes (two lanes in each direction), all at-grade, while the four MaX lanes (two lanes in each direction) would be elevated on a single structure at the center of the roadway. Within the depressed section of I-45, the proposed typical section would include eight general purpose lanes (four lanes in

each direction) below grade, four MaX lanes (two lanes in each direction) elevated on a single structure at the center of the roadway, and four frontage road lanes (two lanes in each direction) at-grade. The proposed I-45 and I-610 frontage roads would be continuous through the I-45/I-610 interchange. New right-of-way would be required for the at-grade section between I-610 and Cavalcade Street to accommodate the proposed improvements at the I-45/I-610 interchange. No new right-of-way would be required for the depressed section. Approximately 10 acres of new right-of-way would be required for this alternative. The length of this alternative, including interchange improvements, would be approximately 4.5 miles.

### ***1.2.2.3 Segment 2, Alternative 12: Add Four MaX Lanes (Two Elevated) in the Center of I-45***

Alternative 12 would widen the existing I-45 and add two elevated and two at-grade MaX lanes. Within the at-grade section of I-45, the proposed typical section would include eight general purpose lanes (four lanes in each direction) and four frontage road lanes (two lanes in each direction), all at-grade, while the four MaX lanes (two lanes in each direction) would be stacked (the two northbound MaX lanes would be at-grade and the two southbound MaX lanes would be elevated on a single structure along the center of the roadway). Within the depressed section of I-45, the proposed typical section would include eight general purpose lanes (four lanes in each direction) below grade, four MaX lanes (two lanes in each direction) that would be stacked (the two northbound MaX lanes would be below grade and the two southbound MaX lanes would be elevated on a single structure along the center of the roadway), and four frontage road lanes (two lanes in each direction) that would be at-grade. The proposed I-45 and I-610 frontage roads would be continuous through the I-45/I-610 interchange. New right-of-way would be required for the at-grade section between I-610 and Cavalcade Street to accommodate the proposed improvements at the I-45/I-610 interchange. No new right-of-way would be required for the depressed section. Approximately 12 acres of new right-of-way would be required for this alternative. The length of this alternative, including interchange improvements, would be approximately 4.5 miles.

### ***1.2.3 Segment 3: Downtown Loop System (I-45, US 59/I-69, and I-10)***

#### ***1.2.3.1 Segment 3, Alternative 10: Widen I-45 to 10 Lanes***

Alternative 10 is an “improve existing” alternative, with the existing interstate highways around Downtown Houston remaining in their current configuration. Alternative 10 would widen the existing I-45 within its existing footprint along the west and south sides of Downtown Houston. The elevated portion of I-45 west and south of Downtown would be reconstructed. The proposed typical section of the widened I-45 would include 10 elevated general purpose lanes; however, the lane configuration would be altered to have six northbound lanes and four southbound lanes. The I-45 MaX lanes proposed in Segments 1 and 2 would terminate in the Downtown area in Segment 3. The I-45 MaX lanes would be parallel to I-10 in the vicinity of the I-45/I-10 interchange and would terminate/begin at Milam Street/Travis Street, respectively. I-10 along the north side of Downtown, between

I-45 and US 59/I-69, would be slightly realigned to accommodate four elevated I-10 express lanes (two lanes in each direction) on this segment of I-10. The I-10 express lanes would generally be parallel to I-10, and located on the north side of White Oak Bayou. West of the I-45/I-10 interchange, the I-10 express lanes would connect to the existing I-10 HOV lanes. US 59/I-69 along the east side of Downtown would generally remain in its current configuration. Alternative 10 would require new right-of-way along I-45 from I-10 to Houston Avenue and from Brazos Street to US 59/I-69. Alternative 10 would require approximately 76 acres of new right-of-way. The length of this alternative, including interchange improvements, would be approximately 4.4 miles.

***1.2.3.2 Segment 3, Alternative 11: Realign I-45 along I-10 and US 59/I-69 (Proposed Recommended)***

Alternative 11 would reroute I-45 to be coincident with US 59/I-69 on the east side of Downtown Houston. The existing elevated I-45 roadway along the west and south sides of Downtown would be removed and relocated to be parallel to I-10 on the north side of Downtown and parallel to US 59/I-69 on the east side of Downtown. Access to the west side of Downtown would be provided via “Downtown Connectors,” which would provide access to and from various Downtown streets. To improve safety and traffic flow in the north and east portions of the proposed project area, both I-10 and US 59/I-69 would be realigned to eliminate the current roadway curvature. I-45 and US 59/I-69 would be depressed along a portion of the alignment east of Downtown. South of the George R. Brown Convention Center, I-45 would begin to elevate to the interchange of I-45 and US 59/I-69 southeast of Downtown, while US 59/I-69 would remain depressed as it continues southwest toward Spur 527. The four proposed I-45 MaX lanes in Segments 1 and 2 would terminate/begin in Segment 3 at Milam Street/Travis Street, respectively. I-10 express lanes (two lanes in each direction) would be located generally in the center of the general purpose lanes within the proposed coincidental alignment of I-10 and I-45 on the north side of Downtown. The I-10 express lanes would vary between being elevated and at-grade. Approximately 190 feet of new right-of-way to the east of the existing US 59/I-69 along the east side of Downtown would be required to accommodate the proposed realigned I-45. The existing Hamilton Street would be realigned to be adjacent to US 59/I-69 to serve as the southbound frontage road, and the existing St. Emanuel Street would serve as the northbound frontage road. Alternative 11 would require approximately 160 acres of new right-of-way, the majority of which would be for the I-10 and US 59/I-69 realignments, and to construct the proposed I-45 lanes adjacent to US 59/I-69 along the east side of Downtown. The length of this alternative, including roadway realignments and interchange improvements, would be approximately 12.0 miles.

This alternative provides an opportunity to include a structural “cap” over the proposed depressed lanes of I-45 and US 59/I-69 from approximately Commerce Street to Lamar Street. This area could be used as open space. The open space option is conceptual only

and would be separate from TxDOT's roadway project. Any open space project would require development and funding by parties other than TxDOT.

***1.2.3.3 Segment 3, Alternative 12: Realign Northbound I-45 along US 59/I-69 and I-10***

Alternative 12 would reroute northbound I-45 to be coincident with US 59/I-69 on the east side of Downtown Houston. An elevated structure would be constructed to accommodate four I-45 northbound general purpose lanes that would be located east of the existing US 59/I-69 general purpose lanes. Northbound I-45 traffic would continue on elevated lanes constructed between the I-10 general purpose lanes, then would move northward into Segment 2. Southbound I-45 traffic at the I-45/I-10 interchange northwest of Downtown would be directed onto one-way general purpose lanes along the west and south sides of Downtown, following the existing Pierce Elevated footprint. The four proposed I-45 MaX lanes in Segments 1 and 2 would terminate/begin in Segment 3 at Milam Street/Travis Street, respectively. I-10 express lanes (two lanes in each direction) are proposed to be located along the portion of the existing I-10 north of Downtown between the interchanges of I-10 and I-45, and I-10 and US 59/I-69. Near the US 59/I-69 interchange, the I-10 express lanes would be located at-grade in the center of the general purpose lanes, then would shift to become elevated and generally parallel to I-10, but located on the north side of White Oak Bayou. West of the I-45/I-10 interchange, the I-10 express lanes would connect to the existing I-10 HOV lanes. US 59/I-69 along the east side of Downtown would generally remain in its current configuration, with the I-45 one-way northbound lanes being immediately adjacent to this segment of US 59/I-69. Alternative 12 would require approximately 109 acres of new right-of-way. The length of this alternative, including interchange improvements, would be approximately 9.8 miles.

## 2 METHODOLOGY

Highways and major transit facilities can affect the visual and aesthetic character of surrounding landscapes and the perceptions of the individuals who live within and visit these environments. The Federal Highway Administration (FHWA) guidance, *Visual Impact Assessments for Highway Projects* (FHWA 2015), provides a framework for evaluating impacts to visual and aesthetic resources for vehicular highway projects. Following the guidance established by the FHWA, the existing visual character and quality and the existing viewer exposures and sensitivity in the proposed project area are described in Section 2. The analysis of potential resource change and viewer response, and an evaluation of the visual impact of the project Build Alternatives and the No Build Alternative are included in Section 3. The National Cooperative Highway Research Program (NCHRP) issued a report entitled *Evaluation of Methodologies for Visual Impact Assessment* in 2013 (Churchward et al. 2013). The methodology for the analysis follows FHWA guidance, supplemented by the best practices identified in the NCHRP study, where applicable.

FHWA guidance defines key terms used in a visual impact analysis for aesthetics and scenic resources. These guidelines were considered in defining the visual character or quality of a landscape unit (see definition below) and objectively evaluating whether the proposed project would have a substantial adverse impact on a scenic vista or substantially degrade the existing visual character or quality of a landscape unit. The definitions for key terms used throughout this analysis are as follows:

- **Aesthetics**—perception of natural beauty in a landscape.
- **Area of Visual Effect (AVE)**—the area in which views of the proposed project would be visible as influenced by the presence or absence of intervening topography, vegetation and structures.
- **Key viewpoint (KVP)**—a location from which a viewer can see either iconic or representative landscapes.
- **Landscape unit (LU)**—defined areas within the AVE that have similar visual features and homogeneous visual character. The LU is the spatial unit used for assessing visual impacts.
- **Viewer group**—groups of viewers as defined below:
  - Neighbors—viewers who occupy or would occupy land adjacent or visible to the proposed project corridor. Neighbors are further defined by their land use. Viewer groups consisting of neighbors can be residential, retail, commercial, industrial, agricultural, recreational or civic in nature. The land use definition is used to distinguish among neighbors' use of property. For instance, an agricultural neighbor typically occupies the same view much longer than recreational neighbors who may only occupy the view for a short period of time.

- Travelers–viewers who would use the proposed transportation system. Travelers are further defined by the purpose of their travel or by their mode of travel. The purpose of travel includes commuting, hauling, touring or exercising travelers. Travel mode is classified as motorists, bicyclists, or pedestrians.
- **Viewer sensitivity**–the degree to which viewers are sensitive to changes in the visual character of visual resources. Viewer sensitivity is assessed on a scale of low, moderate and high. Viewer sensitivity is the consequence of two factors, viewer exposure and viewer awareness. Sensitivity to views varies among viewer types, which would, therefore, affect the significance of the impact. A definition for viewer exposure and viewer awareness follows:
  - **Viewer exposure**–a measure of the proximity, extent and duration of a viewer to a visual resource. Proximity is the distance between the viewer and the visual resource being viewed. Extent is the number of people viewing the visual resource. Duration is the length of time the visual resource is viewed.
  - **Viewer awareness**–a measure of attention (level of observation based on routine and familiarity), focus (level of concentration) and protection (legal and social constraints on the use of visual resources).
- **Viewshed**–all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail). There are three types of viewsheds:
  - **Static viewsheds** are what neighbors adjacent to the Build Alternative would see from a stationary location.
  - **Dynamic viewsheds** are what travelers see as they move through the landscape
  - **Restricted viewsheds** are where views are limited by land cover or atmospheric conditions, such as cloud cover, fog or precipitation.
- **Visual character**–the description of the visible attributes of a scene or object. This description is an impartial narrative of the components of the landscape and defined by the relationship between the natural environment and built environment.
- **Visual quality**–viewers’ perception of visual resources that compose the visual character of a particular scene. Neighbors and travelers may evaluate the visual quality of specific visual resources differently based on the factors of natural harmony, cultural order, vividness, and coherence, as defined below:
  - **Natural harmony**–what a viewer perceives about the natural environment, labelling the environment as being either harmonious or inharmonious
  - **Cultural order**–how viewers perceive the organization of the cultural visual environment or the man-made built environment, including buildings, transportation facilities, structures or historical artifacts, labeling the built environment as orderly or disorderly.

- **Vividness**–the degree of memorable, dramatic or distinctive components of the landscape. Vividness is an overall aggregation of topography, vegetation, water features and cultural elements created by people.
- **Project coherence**–the viewer’s perception about how constructed facilities associated with the Build Alternatives would fit into the existing environment.
- **Visual Resources**–components of the natural, cultural or project environments that are capable of being seen. Brief definitions for the three subcomponents of visual resources are as follows:
  - **Natural visual resources**–the land, water, vegetation, and animals which compose the natural environment. Although natural visual resources may have been altered or imported by people, resources which are primarily geological or biological in origin are considered natural. A grassy pasture with rolling terrain, scattered trees and grazing cows, for example, is a natural visual resource, even though it is a landscape created by people.
  - **Cultural visual resources**–the man-made built environment, which is composed of the buildings, structures and artifacts of a particular area
  - **Project visual resources**–the geometrics, structures and fixtures which compose the proposed project’s environment. This includes any constructed facility, feature or fixture along the proposed project corridor, as well as a constructed facility, feature or fixture at station areas.

### 3 EXISTING CONDITIONS

The existing visual character and quality and existing viewer exposures and sensitivity are described in this section. This analysis provides the basis to which the proposed project is compared to in order to determine whether any visual impacts would occur.

The proposed project area for the visual and aesthetic impact assessment was divided into three landscape units with similar visual characteristics. The landscape units are the three project segments. Each landscape unit is made up of visual resources, such as a site, object or landscape feature that contributes to the composition of the landscape unit. Given the size of the project area, there are some units with predominant characteristics that may contain small areas that differ from the overall character of the landscape unit.

Developing the existing conditions for visual and aesthetic resources requires two phases. The first phase documents the visual character of the landscape units and assigns a visual quality grade. This phase also describes key visual resources. The second phase determines who has views of the proposed project and establishes the viewer sensitivity of the viewer groups.

Using professional judgement, each visual quality factor (natural harmony, cultural order and vividness) and the overall visual quality were assigned one of five categories: low, moderately low, moderate, moderately high and high.

- Low refers to areas lacking valued or having degraded visual resources with no aesthetically pleasing composition. An example would be a disjointed, abandoned industrial area adjacent to a heavily trafficked highway.
- Moderately low refers to areas containing some visual resources, but lacking a coherent and aesthetically pleasing composition. An example would be poorly maintained commercial or industrial area adjacent to a new community center or well-maintained neighborhood.
- Moderate refers to areas primarily of visual resources combined in an aesthetically pleasing composition with low levels of disruptive visual detractors. An example would be a cohesive, well-maintained development or maintained park adjacent to a well-maintained commercial or industrial area.
- Moderately high refers to areas of visual resources combined in an aesthetically pleasing composition, expressing a sense of place and lacking prominent disruptive visual detractors. An example would be a planned development that includes open space and trails, or well-maintained parks and open spaces with memorable vistas.
- High refers to areas comprising visual resources free of disruptive visual detractors and with a strong sense of place. An example would be federally protected, undeveloped land with unique, scenic vistas.

Next, the primary views of each landscape unit were identified through field observations and aerial mapping. The sensitivity of the primary viewers or viewer groups within each landscape unit was determined by viewer type (neighbor or traveler) and their exposure (frequency and duration) to potential views and the visual resources in each landscape unit.

### 3.1 VISUAL CHARACTER AND QUALITY

#### 3.1.1 Segment 1: I-45 from Beltway 8 to I-610

The physical geography of Segment 1 is generally characterized as flat terrain. This landscape unit is mostly developed and is primarily comprised of commercial and industrial development along the frontage roads of I-45 and residential areas generally located behind the commercial developments. A few residential areas face both sides of I-45 between Parker Road and I-610. Industrial and public/institutional land uses are also located along the frontage roads and throughout the entire Segment 1 study area. The I-45 corridor consists of eight lanes of general traffic, four lanes of frontage roads, and one reversible HOV lane. The interstate corridor is mostly at-grade and elevated over major intersecting roads.

The natural environment of Segment 1 is flat grassland mixed with pockets of dense forested areas. Two creeks, Halls Bayou and White Oak Bayou, are located in this landscape unit. The areas around these creeks have moderate to moderately low natural harmony for recreational and residential viewer groups. Residential areas include many trees which provide a higher sense of natural harmony for residential and recreational users by restricting views of the I-45 corridor and adjacent developments. Therefore, the natural harmony of this area is moderate.

The cultural order of this landscape unit ranges from low to moderate. Areas with a lower sense of cultural order are mostly located closer to I-45 and adjacent to a combination of many land uses which appear to have little organization. Some of the residential and recreational areas in this landscape unit are well-maintained and have a sense of cultural order. The vividness of this landscape unit is low. There are few memorable, dramatic or distinctive visual resources. Table 3-1 describes the visual quality of this landscape unit.

**Table 3-1: Visual Quality Assessment Landscape Unit #1**

Landscape Unit	Vividness	Natural Harmony	Cultural Order	Visual Quality
1	Low	Moderate	Moderately low	Moderately low

### **3.1.2 Segment 2: I-45 from I-610 to I-10**

Similar to Segment 1, the physical geography of Segment 2 is generally characterized as flat terrain. This landscape unit is mostly developed and is primarily comprised of residential development. A small amount of commercial and industrial development is concentrated along the frontage roads of I-45. Little White Oak Bayou runs generally parallel to the I-45 corridor, which has historically limited development adjacent to I-45 in this area. Montie Beach Park and Woodland Park are located on west side of I-45, and Moody Park is located on the east side of I-45. The Historic Hollywood and Holy Cross Catholic cemeteries are located between I-45 and the Little White Oak Bayou. The I-45 corridor consists of eight lanes of general traffic, six lanes of frontage roads, and one reversible HOV lane. The interstate corridor is mostly at-grade and elevated over major intersecting roads. There is also a 0.5-mile section of the corridor where the general lanes of traffic are below grade near Moody Park and the cemeteries.

The natural environment of this landscape unit is flat grassland mixed with dense forested areas. In the residential areas, there are many trees which provide interest for residential and recreational users. The natural harmony of this landscape unit is moderate because Little White Oak Bayou has limited development and is organized in an aesthetically pleasing composition with low levels of disruptive visual detractors.

The cultural order of this landscape unit ranges from low to moderate. Areas with a lower sense of cultural order are mostly located closer to I-45 and adjacent to a combination of many land uses that appear to have little organization. Most of the residential neighborhoods and recreational areas in this landscape unit are well-maintained and have a sense of cultural order. The vividness of this landscape unit is moderately low. The areas containing Moody Park, Little White Oak Bayou, and the historic cemeteries provide a distinct viewshed within this landscape unit. Table 3-2 describes the visual quality of this landscape unit.

**Table 3-2: Visual Quality Assessment Landscape Unit #2**

<b>Landscape Unit</b>	<b>Vividness</b>	<b>Natural Harmony</b>	<b>Cultural Order</b>	<b>Visual Quality</b>
2	Moderately low	Moderate	Moderately low	Moderate

### **3.1.3 Segment 3: Downtown Loop System**

Similar to the other segments, the physical geography of Segment 3 is generally characterized flat terrain; however, this segment includes Downtown Houston which is the central business district with several tall buildings. This landscape unit is densely developed and is comprised of commercial and multiple purpose land uses concentrated in central Downtown with residential areas located primarily outside of the Downtown Loop. More undevelopable land, including storm water detention areas, drainage channels, bayous, and waterbodies, occur in this landscape unit in comparison to the other segments.

The natural environment of this landscape unit is flat urban land with several urban park areas and a bayou running east and west through the north part of Downtown. Within the residential areas out of the Downtown loop, there are many trees which provide interest for residential and recreational users. The natural harmony of this area is moderate due to the presence of many natural areas and urban parks such as Buffalo Bayou, White Oak Parkway, Freed Art and Nature Park, Hogg Park, and Stude Park located north of I-10 along White Oak Bayou.

The cultural order of this landscape unit ranges from low to moderate. Areas with a lower sense of cultural order, mostly located east of Downtown, are adjacent to a combination of many land uses which appear to have little organization. This area is typically comprised of industrial uses or vacant properties. These areas are experiencing some revitalization as new developments continue to appear. Most of the residential neighborhoods outside of the Downtown loop in this landscape unit are well-maintained and have a sense of cultural order. These neighborhoods are among some of the original and most historic communities in Houston, dating back to the mid-1800s.

The vividness of this landscape unit is moderate. Downtown Houston has a unique a distinct viewshed and strong sense of place. Additionally, southbound travelers on I-45 have a view of The American Statesmanship Park, which contains four large statues of important political figures. Table 3-3 describes the visual quality of this landscape unit.

**Table 3-3: Visual Quality Assessment Landscape Unit #3**

Landscape Unit	Vividness	Natural Harmony	Cultural Order	Visual Quality
3	Moderately high	Moderate	Moderate	Moderate

### 3.2 VIEWER EXPOSURE AND SENSITIVITY

#### 3.2.1 Segment 1: I-45 from Beltway 8 to I-610

The primary viewers in this landscape unit are residents and travelers along I-45. A smaller group of viewers consists of workers in commercial or industrial areas and recreational viewers located in neighborhoods, parks, trails, or open spaces located within the landscape unit. Travelers along I-45 comprise a large number of viewers in this landscape unit; however, their exposure to the proposed project area is typically short due to the speed of their travel. Additionally, the focus of travelers is not on the transportation corridor, but rather on the vehicles ahead and around the traveler. Therefore, the sensitivity of travelers is low.

Exposure of the proposed project changes on residents and recreational viewers is dependent on their location. Those closest to the I-45 corridor will have more exposure. The viewshed for many residents does not include the I-45 corridor as views of the infrastructure may be restricted by commercial developments, trees, billboards along the interstate

right-of-way, and the roofs of houses. Additionally, most viewers may not pay full attention to the I-45 corridor because the presence of the transportation infrastructure has become integrated into their routine. Therefore, the sensitivity of the residential viewer ranges from low to moderate depending on the location of the viewer.

While most of the employment areas are located adjacent to the I-45 corridor, most workers' attention is likely focused inside their buildings and not on the I-45 corridor. Therefore, workers in the landscape unit have moderately low viewer sensitivity.

The viewer sensitivity in this landscape unit ranges from low to moderate, but is typically low.

### ***3.2.2 Segment 2: I-45 from I-610 to I-10***

Travelers along I-45 comprise a large number of viewers in this landscape unit; however, their exposure to the proposed project area is typically short due to the speed of their travel. Additionally, the focus of travelers is not on the transportation corridor, but rather on the vehicles ahead and around the traveler. Therefore, the sensitivity of travelers is low.

Residents and recreational users closest to the I-45 corridor will have more exposure. The viewshed for many residents does not include the I-45 corridor as views of the infrastructure may be restricted by trees, billboards along the interstate right-of-way, and the roofs of houses. Additionally, most viewers do not pay full attention to the I-45 corridor because the presence of the transportation infrastructure has become integrated into their routine. Therefore, the sensitivity of the residential viewer ranges from low to moderate depending on the location of the viewer.

While most of the employment opportunities are located adjacent to the I-45 corridor, workers' attention is likely focused inside their buildings and not on the I-45 corridor. Therefore, workers in the landscape unit have moderately low viewer sensitivity.

The viewer sensitivity in this landscape unit ranges from low to moderate, but is typically low.

### ***3.2.3 Segment 3: Downtown Loop System***

A large number of viewers come from the thousands of travelers along I-45, I-10, and US 59/I-69; however, their exposure to the proposed project area is typically short due to the speed of their travel. Additionally, the focus of travelers is not on the transportation corridor, but rather on the vehicles ahead and around the traveler. Although some parts of the interstate corridors in this landscape unit are elevated and offer more expansive viewsheds, the sensitivity of travelers is low.

Viewer groups, especially workers, in Downtown are typically not focused on one particular location if they have a view of the surrounding environment from their office or home. Although many workers, residents, and recreational viewers may have elevated views from several of the tall buildings in Downtown, these viewer groups turn their attention to particular activities rather than focus on the transportation infrastructure. Therefore, the duration of the view would be low to moderately low.

The viewshed for many residents does not include interstate corridors, as views of the infrastructure may be restricted by other buildings, trees, and other transportation infrastructure. Additionally, most viewers do not pay full attention to the infrastructure corridors because the presence of the transportation infrastructure has become integrated into their routine. Therefore, the sensitivity of the residential viewer ranges from low to moderate depending on the location of the viewer.

The viewer sensitivity in this landscape unit ranges from low to moderate, but is typically moderate due the high number of people viewing the proposed project.

## 4 IMPACTS OF THE BUILD ALTERNATIVES

The second phase of the assessment evaluates the Build Alternatives' impacts on visual quality and included the following processes. Visual impacts were evaluated based on professional judgment and simulated views to predict viewer groups' perceptions of the change to the environment. Next, the extent of any potential impact is determined based on the following three criteria:

- **Compatibility of the impact**—the perceived ability of the Build Alternatives to blend in with the existing visual and aesthetic environment.
- **Viewer Sensitivity of the impact**—the degrees to which viewer groups are exposed to and are aware of the changes to the environment as a result of the proposed project. Viewer sensitivity of the impact is rated as low, moderate and high. This criterion is determined in the Existing Conditions section.
  - **Low sensitivity** may exist when there are few viewers who experience a defined view, when potential views of the project are screened or filtered by intervening terrain, structures or landscaping, or where viewers are not particularly concerned about the quality of views due to their activity type, such as a commuter on the highway.
  - **Moderate sensitivity** may occur where views of a project are distant enough that the project does not dominate the view or where viewer activity is not focused on visual quality and expectations are moderate, such as office workers, field laborers or an organized sporting event.
  - **High sensitivity** occurs where a project is highly prominent, open to view, and seen by relatively high numbers of viewers and where viewer concern and expectations of visual quality is also high, as in a rural park where scenery is a primary focus, or in a residential neighborhood.
- **Degree of impact**—the result of combining the compatibility of the impact with the viewer sensitivity of the impact. The degree of impact is beneficial, neutral or adverse. Beneficial impacts improve the experience for the viewer and may enhance visual resources or create improved views of those resources. Impacts which adversely impact visual quality degrade the quality of the visual resources, obstruct sensitive views or change desired views.

Neutral impacts occur when the existing visual quality is not perceived to be enhanced or degraded. These impacts could result in a change to the existing visual quality; however, viewer sensitivities are low to moderate, and the proposed project would be compatible with the existing environment. Therefore, neutral impacts occur in an environment where sensitivities are below moderate, which result in most viewers not perceiving visual enhancements or degradation.

#### 4.1 SEGMENT 1: I-45 FROM BELTWAY 8 TO I-610

This section describes visual impacts as a result of the three proposed Alternatives for Segment 1.

##### 4.1.1 Alternative 4 (Proposed Recommended)

This alternative would take property primarily on the west side of I-45, and small portions on the east side of I-45 at major intersections and between Crosstimbers Street and I-610. No parks, open spaces, cemeteries, or community and neighborhood centers would be impacted by this Alternative. Although some residential viewers closest to the proposed project would experience degradation in visual quality, the majority of residential and recreational viewers would not have a prominent view of the proposed project area. In specific views with high pedestrian activity, no significant visual resources, including community facilities and parks, would experience degradation in visual quality.

Manmade commercial developments concentrated around the I-45 corridor dominate the landscape and are visible to all viewer groups. Electrical utility infrastructure and tall billboards may restrict views of I-45 in some areas. Residential and recreational viewers' view may be restricted by trees and the roofs of homes. Due to the flat land, viewer groups located more than 0.25 miles from the proposed project area may not see the I-45 corridor. Although there are many viewers of the proposed project, their sensitivity is low because viewer groups may have become comfortable with the view of the I-45 corridor. No changes to the existing visual quality are anticipated, as shown in Table 4-1.

The proposed project would add two additional frontage lanes and four MaX lanes. The corridor in this landscape unit would have eight lanes of general traffic (four in each direction), four MaX lanes (two in each direction), and six frontage lanes (three in each direction), as shown in Figure 4-1. The proposed project would remain at-grade similar to the existing conditions. The form and materials of the Alternative would remain compatible with the existing environment.

The proposed project is compatible with the environment and does not degrade visual quality. Therefore, visual impacts would be neutral as proposed by this alternative.

Table 4-1: Visual Impact Summary Segment 1 Alternative 4

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
1	Moderately low	Moderately low	Low	Yes

Figure 4-1: Simulated view of Segment 1: Beltway 8 to I-610



Source: TxDOT

#### 4.1.2 Alternative 5

This Alternative would take property primarily on the east side of I-45, and small portions on the west side of I-45 at major intersections. One key visual resource would be impacted by this project. This Alternative would require right-of way that would displace the Aldine Ninth Grade School and the press box at Aldine Senior High School's Smith Stadium. Due to the location of this Alternative, the visual quality for the viewers at this school campus would be degraded. No parks, open space, cemetery, or community or neighborhood centers would be impacted by this alternative.

Additionally, some residential viewers closest to the proposed project would experience a degradation in visual quality, the majority of residential and recreational viewers would not have a prominent view of the proposed project area. Manmade commercial developments concentrated around the I-45 corridor dominate the landscape and are visible to all viewer groups. Tall billboards may restrict views of I-45. While the pedestrian activity may be high in some residential areas, most residential and recreational viewers' view may be restricted by trees and the roofs of homes. Due to the flat land, viewer groups located more than 0.25 miles from the proposed project area may not see the I-45 corridor. Although there are many viewers of the proposed project, their sensitivity is low because viewer groups have become

comfortable with the view of the I-45 corridor. No changes to the existing visual quality for this landscape unit are anticipated, as shown in Table 4-2.

**Table 4-2: Visual Impact Summary Segment 1 Alternative 5**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
2	Moderately low	Moderately low	Low	Yes

This Alternative would add two additional frontage lanes and four MaX lanes. The proposed project corridor in this landscape unit would have eight lanes of general traffic (four in each direction), four MaX lanes (two in each direction), and six frontage lanes (three in each direction), as shown in Figure 4-1. The proposed project would remain at-grade similar to the existing conditions. The form and materials of the Alternative would remain compatible with the existing environment.

This Alternative is compatible with the existing environment and does not degrade the visual quality of the area. Therefore, visual impacts would be neutral as proposed by this alternative. Some visual quality degradation at specific sites, such as the Aldine Senior High School and Aldine Ninth Grade School campuses, would be mitigated as described in Section 4.

#### **4.1.3 Alternative 7**

This Alternative would take property on both sides of I-45, and small portions on the west side of I-45 at major intersections. One key visual resource would be impacted by this project. This Alternative would require right-of-way that would displace some parking near the Aldine Ninth Grade School and Aldine Senior High School's Smith Stadium. Due to the location of this Alternative, the visual quality for the viewers at these school campuses would be degraded. No parks, open space, cemetery, or community or neighborhood center would be impacted by this alternative.

Additionally, some residential viewers closest to the proposed project would experience a degradation in visual quality, and the majority of residential and recreational viewers would not have a prominent view of the proposed project area.

Manmade commercial developments concentrated around the I-45 corridor dominate the landscape and are visible to all viewer groups. Billboards rise high and may restrict views of I-45. While the pedestrian activity may be high in some residential areas, most residential and recreational viewers' view may be restricted by trees and the roofs of homes. Due to the flat land, viewer groups located more than 0.25 miles from the proposed project area may not see the I-45 corridor. Although there are many viewers of the proposed project, their sensitivity is low because viewer groups have become comfortable with the view of the I-45 corridor. No changes to the existing visual quality for this landscape unit are anticipated, as shown in Table 4-3.

This Alternative would add two additional frontage lanes and four MaX lanes. The corridor in this landscape unit would have eight lanes of general traffic (four in each direction) at-grade, four elevated MaX lanes (two lanes in each direction) on a single structure in the median of the roadway, and six frontage lanes (three lanes in each direction) at-grade, as shown in Figure 4-1. The form and materials of the Alternative would remain compatible with the existing environment.

This Alternative is compatible with the environment and does not degrade visual quality. Therefore, visual impacts would be neutral as proposed by this alternative. Some visual quality degradation at specific sites, such as the Aldine Senior High School and Aldine Ninth Grade School campuses, would be mitigated as described in Section 5.

**Table 4-3: Visual Impact Summary Segment 1 Alternative 7**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
2	Moderately low	Moderately low	Low	Yes

## 4.2 SEGMENT 2: I-45 FROM I-610 TO I-10

This section describes visual impacts as a result of the three proposed Alternatives for Segment 2.

### 4.2.1 Alternative 10 (Proposed Recommended)

This Alternative would take property on both sides of I-45, and small portions on the west side of I-45 at major intersections. No parks, open space, cemetery, or community or neighborhood center would be impacted by this alternative.

Although some residential viewers in well-established neighborhoods closest to the proposed project would experience a degradation in visual quality, the majority of residential and recreational viewers would not have a prominent view of the proposed project area; however, some residential viewers adjacent to the depressed section of this Alternative would experience visual quality improvements if the open space structural “cap” over the proposed depressed lanes of I-45 and US 59/I-69 from approximately Commerce Street to Lamar Street was built to cover the below-grade lanes of traffic and link the frontage roads. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space project would require development and funding by parties other than TxDOT.

While the pedestrian activity may be high in some residential areas, most residential and recreational viewers’ view may be restricted by trees and the roofs of homes, or commercial developments and overhead electrical utility lines. Due to the flat land and a depressed segment, viewer groups located more than 0.25 miles away from the proposed project area, or not immediately adjacent, may not see the I-45 corridor. Although there are many viewers of the proposed project, their sensitivity is low because viewer groups have become

comfortable with the view of the I-45 corridor. No changes to the existing visual quality for this landscape unit are anticipated, as shown in Table 4-4.

**Table 4-4: Visual Impact Summary Segment 2 Alternative 10**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
2	Moderately low	Moderately low	Low	Yes

This Alternative would add four MaX lanes and would reduce the amount of frontage roads from six lanes to four lanes (two in each direction). The corridor in this landscape unit would continue to have eight lanes of general traffic (four in each direction). The proposed project would remain at-grade, and depressed for a segment less than one-half mile, similar to the existing conditions, as shown in Figure 4-2. This configuration provides an opportunity to include an open space structural “cap” over the proposed depressed lanes of I-45 and US 59/I-69 from approximately Commerce Street to Lamar Street that could enhance community cohesion and visual quality, as shown in Figure 4-3. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space project would require development and funding by parties other than TxDOT. The I-45 and I-610 frontage roads would continue through the I-45/I-610 interchange and would introduce new transportation infrastructure to the environment; however, this Alternative does not introduce new elevated structures that would create physical barriers for viewer groups, as shown in Figure 4-4. Therefore, the form and materials of the proposed project would remain compatible with the existing environment.

This Alternative is compatible with the environment and does not degrade visual quality. Therefore, visual impacts would be neutral as proposed by this alternative.

Figure 4-2 : Simulated View of Segment 2: Alternative 10



Source: TxDOT

**Figure 4-3: Simulated View of Segment 2 Alternative 10 Potential Open Space Structural “Cap”**



Source: HNTB

Note: The open space structural “cap” option is conceptual only and would be separate from TxDOT’s roadway project. Any open space project would require development and funding by parties other than TxDOT.

**Figure 4-4: Segment 2 and Segment 3 Connection Looking Southeast**



Source: HNTB

#### 4.2.2 Alternative 11

This Alternative would take property on both sides of I-45, and small portions on the west side of I-45 at major intersections. This Alternative would require less than one acre of land from Woodland Park; however, no visual degradation would occur as the view of the proposed project would not impact recreational viewers. Additionally, the park is surrounded by trees which limit the existing view of the interstate. Some residential viewers in the well-established neighborhoods located closest to the proposed project would experience a degradation in visual quality. These residential viewers adjacent to this Alternative's proposed right-of-way would experience increased visual quality degradation as a result of the new elevated structure throughout the length of the corridor.

While the pedestrian activity may be high in some residential areas, most residential and recreational viewers' view may be restricted by trees and the roofs of homes, or commercial developments and overhead electrical utility lines. Due to the flat land and a depressed segment, viewer groups located more than 0.25 miles from the proposed project, or not immediately adjacent, may not see the I-45 corridor. Although there are many viewers of the proposed project, their sensitivity is low because viewer groups have likely become comfortable with the view of the I-45 corridor. No changes to the existing visual quality for this landscape unit are anticipated, as shown in Table 4-5.

Table 4-5: Visual Impact Summary Segment 2 Alternative 11

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
2	Moderately low	Moderately low	Low	Yes

This Alternative would add 4 MaX lanes and would reduce the amount of frontage roads from six lanes to four lanes (two in each direction). The corridor in this landscape unit would continue to have eight lanes of general traffic (four in each direction). The general lanes and frontage lanes would remain similar to the existing conditions; however, the MaX lanes would be elevated created a new potential physical barrier for viewer groups, as shown in Figure 4-5. Additionally, the I-45 and I-610 frontage roads would continue through the I-45/I-610 interchange and would introduce new transportation infrastructure to the environment. The materials of the proposed project would remain compatible with the existing environment. Although the introduction of a new elevated structure for the length of the segment may slightly degrade visual quality as a result of more visible traffic; the structure would be similar height to the cantilevered frontage lanes.

This Alternative is compatible with the environment and does not degrade visual quality. Therefore, visual impacts would be neutral as proposed by this alternative.

Figure 4-5: Simulated View of Segment 2 Alternative 11



Source: TxDOT

### 4.2.3 Alternative 12

This Alternative would take property on both sides of I-45, and small portions on the west side of I-45 at major intersections. This Alternative would require less than one acre of land from Woodland Park; however, no visual degradation would occur as the view of the proposed project would not impact recreational viewers.

Although some residential viewers in the neighborhoods located closest to the proposed project would experience a degradation in visual quality, the majority of residential and recreational viewers would not have a prominent view of the proposed project area. The elevated lanes would be relatively at the same height as the cantilevered frontage road lanes and would not significantly affect the existing visual conditions.

While the pedestrian activity may be high in some residential areas, most residential and recreational viewers' view may be restricted by trees and the roofs of homes, or commercial developments and overhead electrical utility lines. Due to the flat land and a depressed segment, viewer groups located more than 0.25 miles from the proposed project, or not immediately adjacent, may not see the I-45 corridor. Although there are many viewers of the

proposed project, their sensitivity is low because viewer groups have become comfortable with the view of the I-45 corridor. No changes to the existing visual quality for this landscape unit are anticipated, as shown in Table 4-6.

**Table 4-6: Visual Impact Summary Segment 2 Alternative 12**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
2	Moderately low	Moderately low	Low	Yes

This Alternative would add four MaX lanes and would reduce the amount of frontage roads from six lanes to four lanes (two in each direction). The corridor in this landscape unit would continue to have eight lanes of general traffic (four in each direction). The general lanes and frontage lanes would remain similar to the existing conditions; however, the MaX lanes would be stacked, as shown in Figure 4-6. Two southbound lanes would be elevated above two at-grade northbound lanes. The elevated structure would create a new potential physical barrier for viewer groups. Additionally, the I-45 and I-610 frontage roads would continue through the I-45/I-610 interchange and would introduce new transportation infrastructure to the environment. The form and materials of the proposed project would remain compatible with the existing environment. The elevated structure would be similar height to the cantilevered frontage lanes.

This Alternative is compatible with the environment and does not degrade visual quality. Therefore, visual impacts would be neutral as proposed by this alternative.

Figure 4-6: Simulated View of Segment 2 Alternative 12



Source: TxDOT

### 4.3 SEGMENT 3: DOWNTOWN LOOP SYSTEM

This section describes the visual impacts as a result of the three proposed alternatives for Segment 3. This segment is different than the previous segments because it includes two additional interstate highways, I-10 and US 59/I-69, three interchanges in the Downtown loop, I-45 and I-10, I-10 and US 59/I-69, and I-45 and US 59/I-69, and one interchange south of the Downtown loop, US 59/I-69 and SH 288.

#### 4.3.1 Alternative 10

This Alternative would include improvements to existing facilities for the three highway systems. The Pierce Elevated would continue to provide service along the west and south border of Downtown, I-10 would serve the north border, and US 59/I-69 would serve the east border. New right-of-way required for this Alternative is less than the other two alternatives and would be taken from undevelopable or transportation/utility land uses.

This Alternative would add four MaX lanes to the I-45 corridor and would terminate, or begin, at Milam Street/Travis Street in Downtown Houston. Pierce Elevated would be reconstructed and widened to include 10 lanes of travel, as shown in Figure 4-7. The corridor would continue to be elevated similar to existing conditions. I-10 would be slightly realigned to include 4 elevated MaX lanes which would operate generally parallel to the I-10 general lanes north of White Oak Bayou, as shown in Figure 4-7. US 59/I-69 would generally remain the same as the existing conditions. The form and materials of the proposed project would remain compatible with the existing environment.

Figure 4-7: Simulated View of Segment 3 Alternative 10



Source: TxDOT

Although some residential viewers in well-established neighborhoods closest to the proposed project would experience a degradation in visual quality, the majority of residential and recreational viewers would not have a prominent view of the proposed project area; however, some residential viewers adjacent to this Alternative would experience increased visual quality degradation as a result of the newly widened elevated I-45 structure on the west side of downtown and the I-10 elevated structure on the north side of downtown.

This Alternative would also require approximately three acres from Freed Art and Nature Park, Hogg Park, Linear Park, and Sam Houston Park. Right-of-way requirements would also acquire land from pathways which currently connect neighborhoods. The Alternative would also temporarily impact hike and bike trails along White Oak Bayou and Buffalo Bayou. Additionally, a portion of the University of Houston Downtown Student Life Center building to the south of I-10 is in the proposed right-of-way. As a result of these proposed acquisitions, as well as the increased physical barriers from new or widened elevated structures, the visual impact would be adverse and would reduce the visual quality to moderately low, as shown in Table 4-7.

Although this Alternative’s materials would be compatible with the environment, the form of the proposed elevated structures would degrade visual quality due to viewer sensitivity. Therefore, visual impacts would be adverse as proposed by this alternative. Adverse visual impacts would be mitigated as described in Section 5.

**Table 4-7: Visual Impact Summary Segment 3 Alternative 10**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
3	Moderate	Moderately low	Moderate	Yes

**4.3.2 Alternative 11 (Proposed Recommended)**

This Alternative would realign I-45 along I-10 to the north of downtown and then turn south along US 59/I-69 to the east of Downtown. The land requirements for this Alternative is greater than the other two alternatives and would be taken primarily from the north side of I-10 and east side of US 59/I-69 in order to realign these highways and to construct the I-45 corridor and MaX lanes for each of the three interstate systems.

Under this Alternative, the Pierce Elevated segment of I-45 along a portion of the west side of Downtown would be removed and replaced with “Downtown Connectors”, as shown in Figure 4-8. The Pierce Elevated on the side south of Downtown would be removed, eliminating the visual barrier between Downtown and Midtown communities, illustrated in Figure 4-9. To the north of Downtown, the proposed elevated lanes along the realignment of I-10 would increase the visual barrier between Near Northside and Downtown neighborhoods (shown in Figure 4-8), disconnecting Near Northside and the future Hardy Yards development from Houston’s central business district. The US 59/I-69 corridor would be depressed from Commerce Street to Spur 527. This alternative provides an opportunity to include a structural “cap” over the proposed depressed lanes of I-45 and US 59/I-69 from approximately Commerce Street to Lamar Street. This area could be used as open space, creating opportunities to enhance the visual quality of the landscape unit through development, as shown in Figure 4-10. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space project would require

development and funding by parties other than TxDOT. The form and materials of the proposed project would remain compatible with the existing environment.

Figure 4-8 : Simulated View of Segment 3 Alternative 11



Source: TxDOT

**Figure 4-9: Simulated View of Segment 3 Alternative 11-  
Downtown Connectors Replacing Pierce Elevated**



Source: HNTB

**Figure 4-10: Simulated View of Segment 3 Alternative 11-  
Potential Open Space Structural “Cap” Over I-45 and US 59/I-69 Corridor**



Source: HNTB

Note: The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space would require development and funding by parties other than TxDOT.

The University of Houston Downtown would have improved views because the existing elevated highways would be realigned north of the campus; however, some residential viewers closest to the proposed project, along I-10 north of Downtown, would experience a degradation in visual quality due to the new elevated structures. The remaining residential and recreational viewers would have improved views as many elevated structures would be replaced with at-grade or depressed transportation facilities. Additionally, this Alternative would also require the least amount of land from park areas, including Freed Art and Nature Park. The Alternative would also temporarily impact hike and bike trails along White Oak Bayou and Buffalo Bayou during construction; however, impacts would not degrade the visual quality for viewer groups.

Although this Alternative would degrade the visual quality for viewer groups north of Downtown, the majority of viewer groups would have improved views as a result of the proposed project, as shown in Table 4-8. Therefore, visual impacts would be beneficial as proposed by this alternative.

**Table 4-8: Visual Impact Summary Segment 3 Alternative 11**

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
3	Moderate	Moderately high	Moderate	Yes

### **4.3.3 Alternative 12**

This Alternative would realign I-45 into a one-way loop around Downtown Houston. The land requirements for this Alternative would be taken primarily from the north side of I-10 and east side of US 59/I-69.

Under this Alternative, I-45 northbound travel lanes would be coincident with US 59/I-69 beginning at the interchange of I-45 and US 59/I-69 southeast of downtown. These four travel lanes would be elevated and located east of the existing US 59/I-69 general purpose lanes, as shown in Figure 4-12. US 59/I-69 would generally remain in its current configuration. Northbound I-45 travel lanes would continue to operate on elevated structures between I-10 general purpose lanes until it merges with Segment 2 and turns north. At the I-45/I-10 interchange northwest of Downtown, southbound I-45 travel lanes would be directed onto one-way general purpose lanes along the west and south sides of downtown following the existing Pierce Elevated corridor, as shown in Figure 4-11. The four MaX lanes would begin, or terminate, at Milam Street and Travis Street and would be elevated generally following the I-10 general purpose lanes, as shown in Figure 4-11. The form and materials of the Alternative would remain compatible with the existing environment.

Figure 4-11: Simulated View of Segment 3 Alternative 12



Source: TxDOT



Table 4-9: Visual Impact Summary Segment 3 Alternative 12

LU #	Visual Quality - No Build	Visual Quality - Build Alternatives	Existing Viewer Sensitivity	Project Compatibility
3	Moderate	Moderately low	Moderate	Yes

#### 4.4 SUMMARY OF VISUAL IMPACTS

##### 4.4.1 Segment 1: All Alternatives

All Alternatives within this Segment would have neutral visual impacts. While some specific sites within this landscape unit would have reduced visual quality, the viewer groups have low viewer sensitivity and would not be impacted by the proposed project. Alternative 4 would have the least visual impact of the three alternatives for Segment 1 since I-45 would remain at grade and similar to existing conditions. Alternative 5 would impact the view for the most number of community facilities, residences, and businesses. Alternative 7 would impact fewer community facilities and residences than Alternative 4 and Alternative 5; however, Alternative 7 would also introduce new elevated structures for the MaX lanes.

##### 4.4.2 Segment 2: All Alternatives

All Alternatives within this Segment would have neutral visual impacts. While some specific sites within this landscape unit would have reduced visual quality, the viewer groups have low viewer sensitivity and would not be impacted by the proposed project. Alternative 10 would have the least visual impact of the three alternatives for Segment 2. Although Alternative 10 would impact more residences and businesses, the design of the travel lanes would remain similar to the existing conditions. Additionally, the configuration of Alternative 10 provides an opportunity to include a structural “cap” over a portion of the depressed lanes of I-45 from north of Cottage Street to south of N. Main Street. This area could be used as open space. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space would require development and funding by parties other than TxDOT. Alternatives 11 and 12 would introduce new elevated lanes which would create additional visual barriers; the elevated lanes for Alternative 11 would be higher than for Alternative 12. The design of these alternatives would not accommodate the option for a structural “cap” over a portion of the depressed lanes of I-45.

##### 4.4.3 Segment 3: All Alternatives

Alternative 10 would degrade visual quality as a result of the elevated I-10 express lanes on the north side of Downtown Houston adjacent to the Near Northside neighborhood and the future Hardy Yards development. Alternative 10 would also result in the widening of the Pierce Elevated which would create a greater visual barrier between Downtown and Midtown. Alternative 12 would degrade visual quality through the addition of elevated lanes on the east side of US 59/I-69, which would widen the visual barrier between central Downtown and east Downtown. Alternative 12 would also include additional elevated lanes

on the north side of Downtown Houston adjacent to the Near Northside neighborhood and the future Hardy Yards development, which would impact the visual quality. Although Alternative 12 would impact the most residences and businesses, Alternative 11 would provide the most beneficial visual impacts. The removal of Pierce Elevated would improve the visual quality on the west and south side of Downtown, and depressing the I-45 and US 59/I-69 corridor would improve the visual quality on the east side of Downtown. Alternative 11 provides an opportunity to include a structural “cap” over the proposed depressed lanes of I-45 and US 59/I-69 from approximately Commerce Street to Lamar Street. This area could be used as open space. The open space option is conceptual only and would be separate from TxDOT’s roadway project. Any open space project would require development and funding by parties other than TxDOT. Additionally, the realignment of I-45 to parallel I-10 on the north side of Downtown would remove the existing elevated highway between the University of Houston Downtown’s business school and main building, enhancing the visual quality of the campus.

#### ***4.4.4 Impacts of the No Build Alternative***

The No Build Alternative would not change the existing visual and aesthetic qualities in the landscape units. The I-45 corridor would continue to be a local visual landmark and serve as the primary transportation corridor in the area.

## 5 MITIGATION VISUAL AND AESTHETIC QUALITIES

In developing the Build Alternatives, opportunities to collocate transportation and utility corridors were identified to maximize compatibility with existing aesthetic views. During the Alternatives Analysis, displacements were documented and evaluated to determine the degree of impact to all land uses. Roadway and structural design was developed to be compatible with the surrounding natural and cultural environment in order to minimize visual impacts.

Where practicable, mitigation to improve the visual and aesthetic qualities of the project area would include the following features:

- Landscape plantings and re-vegetation per TxDOT's Green Ribbon Landscape Improvement Program, which allocates funds for trees and plants within roadway right-of-way
- Promoting roadside native wildflower planting programs
- Noise barriers
- Providing adequate signage and easy access to roadway facilities
- Treatment of the side surfaces and columns of the project using façade materials of varying texture, color, etc.

Landscaping would include regionally native plants for landscaping and implementing design and construction practices that minimize adverse effects on the natural habitat. To the extent possible, the proposed project would be designed to create an aesthetically and visually pleasing experience for both roadway users and roadway viewers.

All lighting would be in accordance with the Texas Health and Safety Code Title 5 §425.002 regarding light pollution. To the extent possible, outdoor lighting fixtures would only be installed and operated if the purpose of the lighting cannot be achieved by the installation of reflective road markers, lines, warning, or informational signs, or other effective passive methods.

Additionally, full consideration would be given to energy conservation, reduction of glare, minimizing light pollution, and preserving the natural light environment. An example of commonly used lighting meeting these considerations is the use of high-pressure sodium lamps equipped with glare shields.

## 6 REFERENCES

Federal Highway Administration (FHWA) 2015. Guidelines for the Visual Impact Assessment of Highway Projects. January 2015

Churchward, Craig; Palmer, James F.; Nassauer, Joan Iverson; and Swanwick, Carys Anne. 2013. Evaluation of Methodologies for Visual Impact Assessments. National Cooperative Highway Research Program Report 741. Transportation Research Board. Washington, D.C. 2013.

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