



# Fatal Flaw Analysis Tech Memo

I-45N Planning & Environmental Linkages Study  
Beltway 8 North to Loop 336 South (Conroe)

January 2020

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## 1.0 Introduction

The Planning and Environmental Linkages (PEL) Study is a process used to identify and evaluate transportation issues, priorities, and environmental concerns related to proposed improvements.

A PEL effectively links planning and NEPA activities and can minimize duplication of effort, promote environmental stewardship, encourage meaningful and productive public engagement, and reduce delays in project implementation. Figure 1 provides more information on what a PEL Study provides and the benefits of a PEL Study.

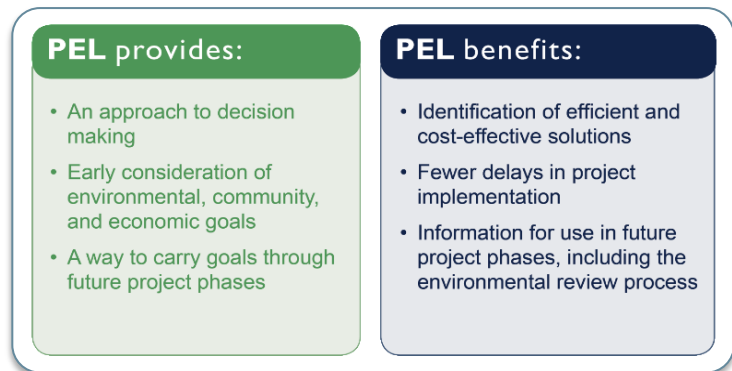


Figure 1. What is a PEL Study?

### 1.1 Project Background, Purpose, and Need

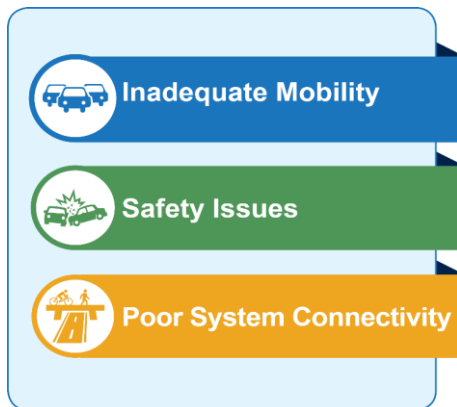


Figure 2. Corridor Needs

The Texas Department of Transportation (TxDOT) is conducting a PEL Study for the Interstate 45 North (I-45N) corridor from Beltway 8 North (Beltway 8N) to Loop 336 South (Loop 336S) in Conroe. The PEL Study will produce a planning document that evaluates the ability of improvement alternatives to effectively serve the region's increasing transportation needs. The goal will be accomplished by conducting analyses and planning activities with local and resource agencies, stakeholders, and the public.

The main purpose of this PEL Study is to ultimately identify feasible transportation alternatives which can best address the future transportation needs of the I-45N corridor. The top three needs that emerged from the evaluation of existing conditions and the engagement process with the public, stakeholders, and agencies are: inadequate mobility, safety issues, and poor system connectivity (Figure 2).

### 1.2 Study Area

As shown in Figure 3, the I-45N Study Area extends from Beltway 8N (the southern study limit) to Loop 336S (the northern study limit). It is 23.7 miles in length and traverses Harris and Montgomery Counties. The roadway corridor serves several municipalities including Houston, Spring, The Woodlands, Oak Ridge North, Shenandoah, and Conroe. I-45N is a major north-south commuter route, in addition to being a hurricane evacuation route and a significant freight corridor due to its connections to port intermodal facilities along the Gulf Coast. Given the multiple roles it plays in the Houston-area economy and transportation network, it is a facility of great importance to the region.



## 2.0 Alternative Screening Methodology

The alternative screening methodology utilized for the I-45N PEL incorporates a two-level screening process to reach a Recommended Alternative(s) from the initial Universe of Alternatives. Figure 4 provides an overview of the screening process and the analyses that will be used to evaluate alternatives at each level. This report will discuss the development of the Universe of Alternatives, the fatal flaw analysis, and identify the Reasonable Alternatives.

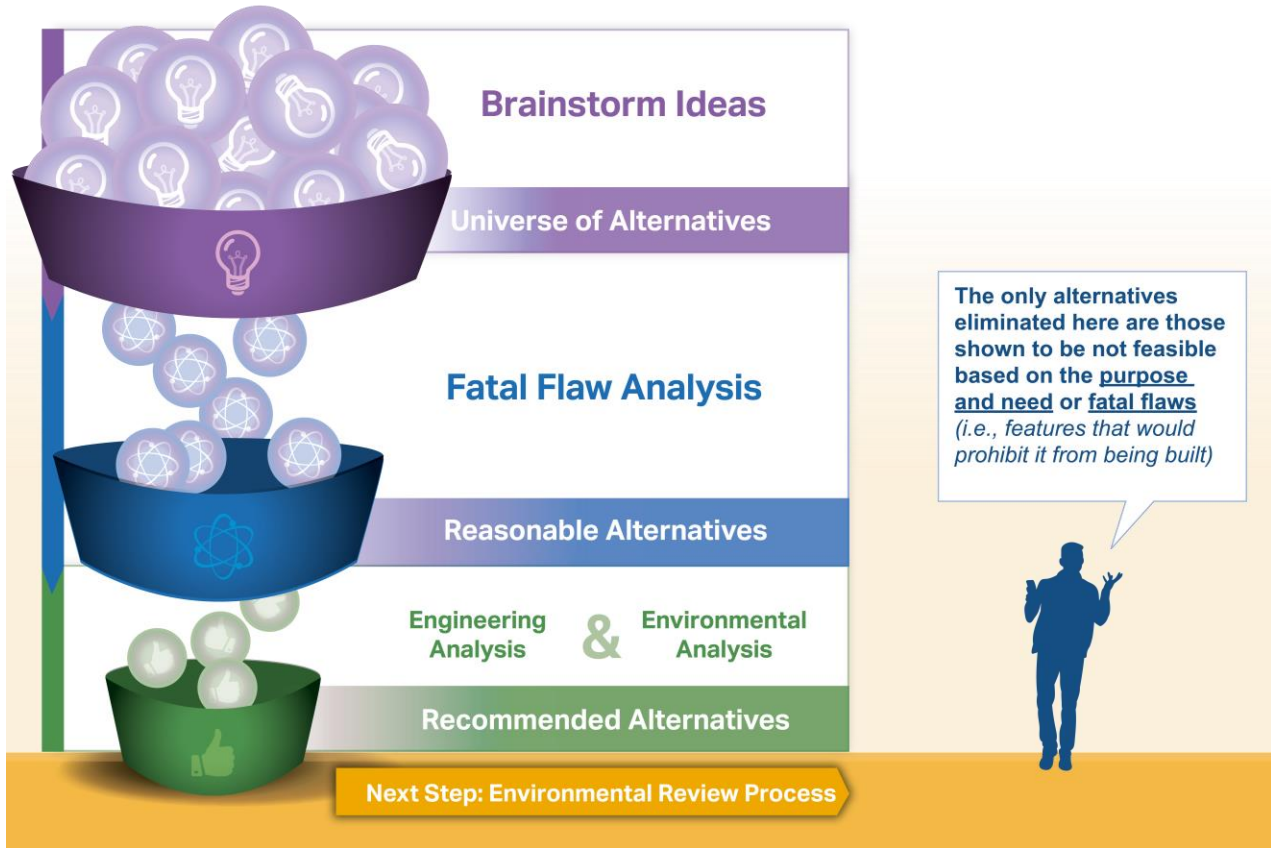


Figure 4. Alternative Screening Methodology

### 3.0 Development of Universe of Alternatives

The development of the Universe of Alternatives was the first step of the alternatives assessment and screening process. The Universe of Alternatives includes a wide array of ideas and suggestions for improvements to the I-45N Study Area. These ideas were gathered primarily from previous planning studies and through public, stakeholder, and agency input. The project team reviewed previously completed planning studies and guiding documents and pulled out recommendations that are relevant to the study area and scope. Ideas were also gathered during workshops and meetings with the groups identified in Figure 5.



Figure 5. Development of Improvement Ideas

The initial list of transportation improvement ideas was comprehensive and contained more than 150 ideas, which were then reviewed by the study team. Suggestions that were similar in nature were combined and those that were inconsistent with the findings from the existing conditions analysis, the identified corridor needs, or otherwise not feasible were eliminated.

The remaining improvement ideas were grouped into five general improvement categories: Parallel Routes, Add Lanes, Existing Corridor, High Capacity Transit, and Multimodal—described in further detail in Table 1. A description of each of the 20 separate Build alternatives is included in Table 2. The No-Build Alternative will be carried forward through the evaluation process as a baseline for comparison purposes. For this reason, it was included in the Universe of Alternatives but not evaluated in the fatal flaw analysis.

Table 1. Improvement Categories within the Universe of Alternatives

Category	Description
<b>Parallel Routes</b>	Improvements to roadways that are parallel to the I-45N corridor. The intent of these improvements is to provide traffic relief to the I-45N corridor by enabling parallel corridors to carry additional travel.
<b>Add Lanes</b>	Increasing the number of mainlanes along the existing I-45N corridor.
<b>Existing Corridor</b>	Transportation improvements within the existing corridor that do not include additional mainlanes along I-45N.
<b>High Capacity Transit</b>	Improvements to provide new or enhanced transit service along or parallel to the I-45N corridor. Transit alternatives include bus and rail and may operate in existing lanes or dedicated (i.e., separate) facilities.
<b>Multimodal</b>	Improvements to better accommodate and encourage multimodal trips, which are defined as trips using more than one travel mode (walking, biking, driving, or taking transit).

Table 2. Proposed Universe of Alternatives

Category	Alternative	Description
Parallel Routes	Improve Hardy Toll Road	Roadway capacity and safety improvements on the existing Hardy Toll Road to provide an alternate north-south travel option and reduce the demand placed on I-45N. Additional improvements may include ramp and connectivity improvements, or others as deemed feasible.
	Extend Hardy Toll Road North	Extension of existing Hardy Toll Road from SH 99 northward to Loop 336, providing an alternate north-south facility connecting northern suburbs (e.g., Conroe, The Woodlands) to Houston.
	Kuykendahl Improvements	Accommodate additional capacity on Kuykendahl Road to serve increasing demand and provide an alternate north-south route. Improvements may include additional lanes, intersection improvements, transit operations, multimodal facilities, and other improvements as deemed feasible.
Add Lanes	Within Existing Pavement (Restriping)	Re-striping of existing pavement to increase capacity without increasing the amount of pavement and/or re-purpose existing lane usage.
	At-Grade (New Pavement)	Construct additional at-grade lanes to add capacity to I-45N. New lane types could include general purpose, express, high-occupancy vehicle (HOV), managed, truck, etc.
	Elevated (New Pavement)	Construct new elevated lanes along I-45N to expand capacity and improve mobility. New lane types could include general purpose, express, high-occupancy vehicle (HOV), managed, etc.

Category	Alternative	Description
Existing Corridor	Use Technology (TSM / TDM / ITS)	Use technology to increase the efficiency of the transportation system. Transportation System Management (TSM) implements tools and technology to increase the efficiency of the transportation system. This can include installing improved signal and communication equipment, work zone management, and communicating real-time traffic information. Transportation Demand Management (TDM) includes strategies to manage travel demand such as implementing and encouraging flexible work hours, telecommuting, and ridesharing. Intelligent Transportation System (ITS) uses smart technology to manage congestion and traffic flow. This can include the use of dynamic message signs, dynamic route planning, and information sharing systems for weather, accident, and emergency conditions.
	Rehabilitation	Rehabilitate the pavement and infrastructure along the existing I-45N corridor.
	Interchanges / Ramps / Direct Connectors	Construct new interchanges, ramps, or direct connectors. Reconfigure existing interchanges and improve connectivity within the roadway network.
	Improve East-West Connections	Improve existing east-west arterials that connect to I-45N, which could include construction of additional lanes, improved traffic signalization, improved safety features, and pavement rehabilitation.
	Add New East-West Connections	Construct new east-west local arterials that intersect with I-45N to enhance community connectivity on both sides of I-45N.
	Collector-Distributor Systems	Construct new collector-distributor systems between mainlanes and frontage roads near interchanges to improve traffic flow and access. Improve safety by reducing freeway merging and lane changes.
	Frontage Road Improvements / Access Management / Ramps	Implement frontage road and ramp improvements along the corridor to improve traffic flow and safety, and to reduce travel delays.

Category	Alternative	Description
High Capacity Transit	Expand Bus Routes / Transit Services	Expand the existing bus service area to better serve the I-45N Study Area. Increase the frequency of service to shorten wait times, reduce operational delays, and improve on-time performance.
	Light Rail	Extend the existing downtown light rail network northward to serve the I-45N Study Area. Light rail is a transit system that operates low speed trains along exclusive right-of-way in high-density urban environments.
	Commuter Rail	Construct commuter rail between Houston and suburban cities in the I-45N Study Area to provide congestion relief during peak commuting hours. Commuter rail is a passenger rail service that primarily provides rush-hour service between a city center and suburbs. Trains typically travel at speeds of 30 mph or higher and operate along exclusive right-of-way or co-exist along an existing freight rail corridor.
	High Speed Rail	Construct high-speed rail connecting Houston to other major cities to provide regional high-speed transportation connections. Trains would provide express service and operate at speeds around 150 miles per hour (mph).
Multimodal	Microtransit	Implement microtransit in communities along I-45N to provide first- and last-mile service to complement other transportation modes and facilities such as Park & Rides and bus facilities. Microtransit is an app-based on-demand transit service that offers flexible routing and scheduling of low-capacity vehicles.
	Pedestrian / Bicycle Improvements	Improve bicycle and pedestrian infrastructure along I-45N frontage roads and east-west crossings to encourage walking and biking trips. Improvements could include sidewalks, multi-use paths, ramps compliant with Americans with Disabilities Act (ADA), refuge islands, bicycle signals, etc.
	Park & Ride Improvements / Multimodal Hub	Build or improve Park & Rides and multimodal hubs to better support transit use, serve trips linking different modes, and help reduce single occupancy vehicle trips.

## 4.0 Fatal Flaw Analysis

The fatal flaw analysis (Figure 6) evaluates the Universe of Alternatives at a high level to ensure that the alternatives meet the study purpose and need—i.e., whether they can be expected to improve **connectivity**, **safety**, and **mobility** in the Study Area. Alternatives that have a negative rating for any of the three factors in the purpose and need category will not move forward in the subsequent screening process.

Next, the alternatives that pass the purpose and need step, or Gate 1, will be assessed in terms of six other factors (Gate 2):

1. Consistency with regional plans
2. Environmental and social effects
3. Right-of-way required
4. Ability to support future technology
5. Support in previous studies
6. Public acceptance

Alternatives with an overall positive rating for these factors will move forward for additional analysis.



Figure 6. Fatal Flaw Screening

## 5.0 Fatal Flaw Screening Criteria

Fatal flaw screening criteria are summarized in Figure 7 below. A high-level assessment was conducted for the Universe of Alternatives to determine whether each alternative is likely to have a positive, neutral, or negative impact on each screening criteria. Further detail about each criterion are provided in this session.

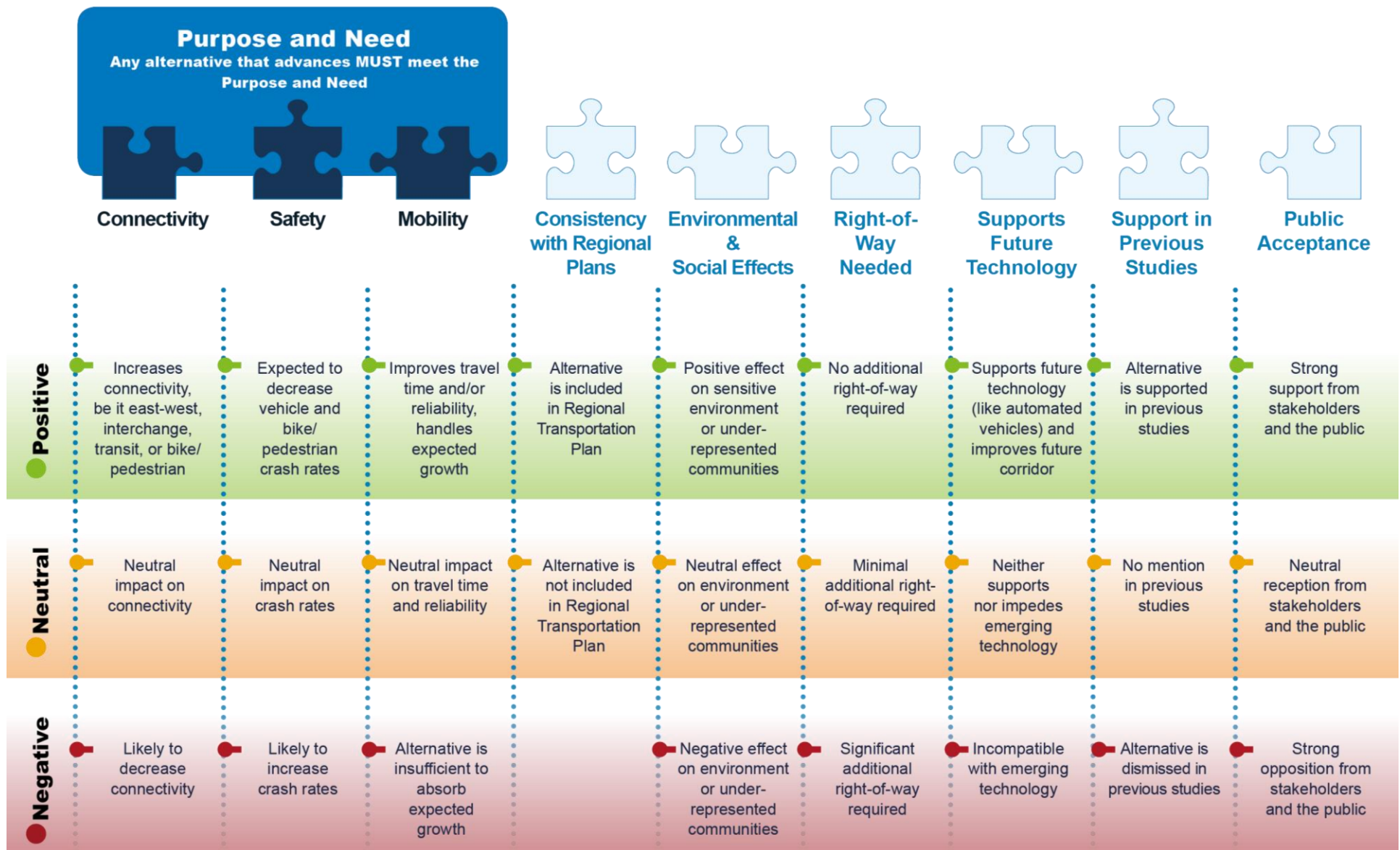


Figure 7. Fatal Flaw Screening Criteria

## **5.1 Purpose and Need**

### **5.1.1 Connectivity**

Alternatives that improve the ease of travel across and within the I-45N study area were rated positive. These alternatives address existing transportation network gaps for all transportation modes by improving network completeness, network density, route directness, access to destinations, or network quality. Conversely, alternatives that were deemed to result in reduced connectivity compared to existing conditions were rated negative. Alternatives that had little or no discernable connectivity impacts were rated neutral.

### **5.1.2 Safety**

Alternatives that are expected to improve safety for all transportation modes through reduced crash rates and crash severity were rated positive. Those that could be expected to increase crash rates and crash severity were rated negative. Alternatives with little or no discernible safety impacts were rated neutral.

### **5.1.3 Mobility**

Alternatives that are expected to increase travel speeds, reduce travel time, and improve travel time reliability were rated as positive. Alternatives that will be inadequate in accommodating future traffic were rated as negative. Alternatives that are expected to neither improve nor reduce mobility were rated neutral.

## **5.2 Consistency with Regional Plans**

Each alternative was evaluated for consistency with H-GAC 2045 Regional Transportation Plan (RTP). Alternatives that are included in the 2045 RTP were rated positive. Alternatives that are not consistent with improvements/recommendations included in the 2045 RTP were rated neutral. This criterion does not include a negative rating.

## **5.3 Environmental and Socioeconomic Impacts**

Alternatives that are expected to protect, restore, and enhance the environment, with positive benefits for sensitive environments and Environmental Justice (EJ) communities were rated positive. Conversely, alternatives that negatively impact the environment and EJ communities were rated negative. Alternatives that have no discernible positive or negative impact were rated neutral.

## **5.4 Right-of-Way Needed**

Acquisition of right-of-way (ROW) for projects typically has negative impacts for cost and the environment. Alternatives requiring significant additional ROW for implementation were therefore rated negative, whereas those not requiring additional ROW were rated positive. Alternatives that required negligible acquisition of ROW were rated as neutral. For the purposes of this high-level fatal flaw analysis, negligible or “little” ROW refers to what may be required for localized improvements. For instance, small areas of ROW may be required for the construction of a new entrance ramp or exit ramp.

## **5.5 Support for Future Technologies**

Alternatives were evaluated for compatibility with future and emerging technologies such as connected vehicles, connected infrastructure, and autonomous vehicles, among others. Alternatives that are expected to support future and emerging technologies were rated positive. Alternatives that are incompatible with future technologies were rated negative. Alternatives that are not expected to support or impede future technologies were rated neutral.

## **5.6 Support in Previous Studies**

In addition to the criterion of compatibility with the H-GAC 2045 RTP, alternatives were also evaluated with respect to previously completed studies. These include previous studies or planning processes conducted by TxDOT, counties, cities, and other public agencies. Alternatives that were supported or recommended in previous studies were rated as positive since they demonstrate awareness and potential acceptance of the alternatives by the public, stakeholders, and agencies. Alternatives that were dismissed in a previous study were rated as negative. Alternatives not mentioned in a previous study were rated neutral.

## **5.7 Public Acceptance**

Coordination with key stakeholders, agencies, and members of the general public is a critical component of the current PEL Study as well as the subsequent NEPA processes. The Universe of Alternatives was presented to the public during a series of public meetings held in October 2019. Members of the public were provided the opportunity to indicate their preferences during the public meeting as well as through an online survey.

### **5.7.1 Stakeholder Input**

Stakeholders were asked to provide input on the Universe of Alternatives during a meeting held on September 27, 2019. A paper survey was provided asking each stakeholder to review the Universe of Alternatives and indicate if he or she supports, opposes, or remains neutral to each. Twenty-one surveys were completed by the stakeholders. Most of the input received was in support of the proposed alternatives.

### **5.7.2 Online Survey**

The online survey solicited public feedback on a variety of topics, including their preferences for the proposed improvements. The online survey was accessible from the project website and was available from September 25, 2019 through November 1, 2019. The online survey was available to everyone and 640 participants took the survey. Survey participants were asked to rate each alternative from 1 star (least preferred) to 5 stars (most preferred). For the online survey:

- 1 or 2 stars - negative
- 3 stars - neutral
- 4 or 5 stars - positive

### 5.7.3 Public Meeting

As part of the public meeting input, each participant had three stickers of each color to rate the alternatives on the interactive board. Ratings were based on color:

- Green - positive
- Yellow - neutral
- Red - negative

The input from the stakeholder meeting survey, public meeting interactive boards, and online survey were compiled to determine the overall public acceptance rating for each alternative. A summary of the input and ratings is included in Appendix A.

## 6.0 Fatal Flaw Screening Results

This section provides the evaluation results from the fatal flaw screening process and summarizes the rationale for either eliminating an alternative from further study or for carrying it forward to the next phase of alternative development and evaluation.

### 6.1 Gate 1: Purpose and Need

The purpose and need consists of three screening criteria: connectivity, safety, and mobility. It is important that an alternative meets the purpose and need of the PEL Study. If any alternative received a negative rating in any of these screening criteria, it was eliminated from further consideration.

Four alternatives were eliminated from further consideration because they received a negative rating for one or more of the screening criteria. Table 3 shows the ratings for these four alternatives.

Table 3: Alternatives Eliminated from Further Study

Alternative	Purpose and Need		
	Connectivity	Safety	Mobility
Rehabilitation	●	●	●
Light Rail	●	●	●
Commuter Rail	●	●	●
High Speed Rail	●	●	●

● = Negative     
 ● = Neutral     
 ● = Positive

Rehabilitation would not address any of the connectivity or mobility needs within the I-45N Study Area. Although this alternative is eliminated from further study, TxDOT will continue to perform maintenance activities along I-45N in order to maintain the freeway facility in the State of Good Repair.

Light rail would connect dense urban areas such as Downtown Houston, Midtown, and the Texas Medical Center. The Study Area does not have the population and employment density to support a new light rail facility. As a result, this alternative would not improve mobility in the I-45N Study Area.

While commuter rail offers high mobility between a fixed set of origins and destinations along a rail line, it is limited in terms of hours of operation and ability to facilitate cross-suburb travel in a polycentric metropolitan area like Houston (i.e., a metro area in which employees make their daily commutes to dispersed employment centers, rather than traveling to a single central business district). This makes it unsuited to meet the connectivity needs of the Study Area.

High speed rail is not planned near the Study Area and would not improve connectivity in the I-45N Study Area.

The remaining 16 build alternatives passed Gate 1: Purpose and Need and were evaluated further in Gate 2.

## **6.2 Gate 2: Remaining Screening Criteria**

In Gate 2, the 16 remaining build alternatives were evaluated against six screening criteria:

- Consistency with regional plans
- Environmental and social effects
- Right-of-way required
- Ability to support future technology
- Support in previous studies
- Public acceptance

A rating of positive, neutral, and negative were assigned to each screening criteria. A summary of the ratings is shown in Figure 8. Rationale for each alternative screening are summarized in Appendix B.

To determine if an alternative passed the fatal flaw screen, the number of positive ratings was compared to the number of negative ratings for the six Gate 2 screening criteria. If the number of positive ratings equaled or outweighed the number of negative ratings, the alternative will be carried forward for further evaluation.

One alternative evaluated in Gate 2 failed the fatal flaw screen. The remaining 15 build alternatives passed the fatal flaw screen. In total, 16 alternatives, consisting of the no-build alternative and 15 build alternatives, will be carried forward as the Reasonable Alternatives and will be evaluated in further detail.

● Negative ● Neutral ● Positive






Category	Alternative	Purpose and Need				Gate 1: Purpose and Need	Consistency with Regional Plans	Environmental and Social Effect	Right-of-Way Needed	Supports Future Technology	Previous Studies	Public Acceptance	Gate 2: Reasonable Alternative
		Connectivity	Safety	Mobility									
<b>No Build</b>	Keep as is					NO RATINGS							
 <b>Parallel Routes</b>	Improve Hardy Toll Road	●	●	●	YES	●	●	●	●	●	●	YES	
	Extend Hardy Toll Road North	●	●	●	YES	●	●	●	●	●	●	NO	
	Kuykendahl Improvements	●	●	●	YES	●	●	●	●	●	●	YES	
 <b>Add Lanes</b>	Within Existing Pavement (Restriping)	●	●	●	YES	●	●	●	●	●	●	YES	
	At-Grade (New Pavement)	●	●	●	YES	●	●	●	●	●	●	YES	
	Elevated (New Pavement)	●	●	●	YES	●	●	●	●	●	●	YES	
 <b>Existing Corridor</b>	Use Technology (TSM / TDM / ITS)	●	●	●	YES	●	●	●	●	●	●	YES	
	Rehabilitation	●	●	●	NO								
	Interchanges / Ramps / Direct Connectors	●	●	●	YES	●	●	●	●	●	●	YES	
	Improve East-West Connections	●	●	●	YES	●	●	●	●	●	●	YES	
	Add New East-West Connections	●	●	●	YES	●	●	●	●	●	●	YES	
	Collector-Distributor Systems	●	●	●	YES	●	●	●	●	●	●	YES	
	Frontage Road / Access Management / Ramp Improvements	●	●	●	YES	●	●	●	●	●	●	YES	
 <b>High Capacity Transit</b>	Expand Bus Routes / Transit Services	●	●	●	YES	●	●	●	●	●	●	YES	
	Light Rail	●	●	●	NO								
	Commuter Rail	●	●	●	NO								
	High Speed Rail	●	●	●	NO								
 <b>Multi-Modal</b>	Microtransit	●	●	●	YES	●	●	●	●	●	●	YES	
	Pedestrian / Bicycle Improvements	●	●	●	YES	●	●	●	●	●	●	YES	
	Park & Ride Improvements / Multimodal Hub	●	●	●	YES	●	●	●	●	●	●	YES	

Figure 8. Preliminary Fatal Flaw Screening Result

### 6.3 Alternatives Carried Forward for Further Study

The 16 Reasonable Alternatives that passed the fatal flaw screening will advance to the second level of screening. Prior to completing the next evaluation, the Reasonable Alternatives were categorized into three alternative types: Primary Alternative, Supplemental Alternative, and Alternative by Others.

1. **Primary Alternatives** are the alternatives that can serve the corridor-wide purpose and need.
2. **Supplemental Alternatives** are the alternatives that only meet localized transportation needs and can supplement the proposed improvements in Primary Alternatives.
3. **Alternatives by Others** are the alternatives that are outside TxDOT jurisdiction.

First, each alternative was reviewed to determine if the alternative was within the jurisdiction of TxDOT. Various agencies are responsible for facilities within the study area. The agency with jurisdiction over a facility is responsible for funding of associated improvement projects. TxDOT can provide support for these improvements but does not have control over implementation. Some alternatives have a shared responsibility between multiple jurisdictions. If an alternative under jurisdiction by others crosses a TxDOT facility like I-45N, TxDOT can support that alternative by constructing the portion that is within TxDOT right-of way. Figure 9 illustrates these designations.

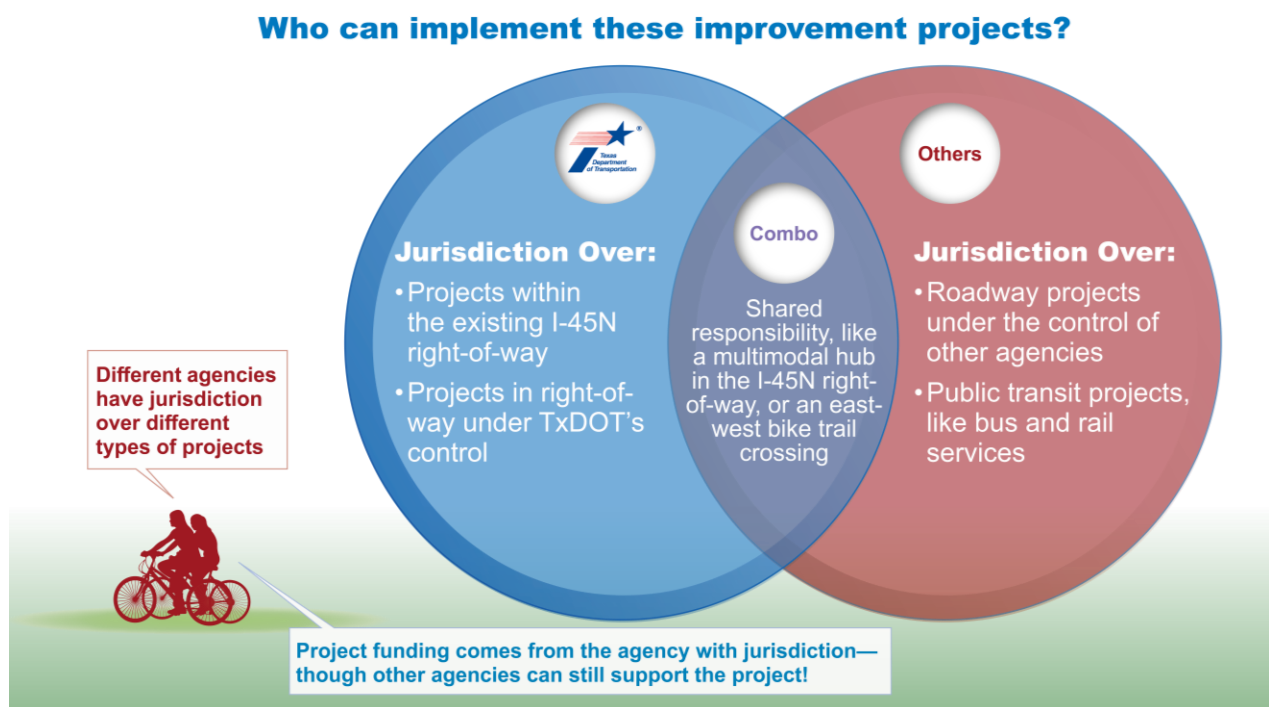


Figure 9: Alternative Jurisdiction

All alternatives outside of TxDOT jurisdiction were categorized as alternatives by others. The remaining alternatives were then reviewed to determine if they would address the purpose and need throughout the Study Area or only at spot locations. Corridor-wide alternatives were categorized as primary alternatives. The remaining alternatives were categorized as supplemental alternatives. Although the supplemental alternatives do not meet the needs throughout the Study Area, they are an important component to identifying a recommended alternative that addresses the needs of all users of the facility. Table 4 identifies the jurisdiction and type for each Reasonable Alternative.

Table 4. List of Reasonable Alternatives

Reasonable Alternatives	Jurisdiction	Alternative Type
No-Build	TxDOT	Primary
Improve Hardy Toll Road	Combo	Primary
Kuykendahl Improvements	Others	By Others
Add Lanes Within Existing Pavement (Restriping)	TxDOT	Primary
Add At-Grade Lanes (New Pavement)	TxDOT	Primary
Add Elevated Lanes (New Pavement)	TxDOT	Primary
Use Technology (TSM / TDM / ITS)	TxDOT	Supplemental
Interchanges / Ramps / Direct Connectors	TxDOT	Supplemental
Improve East-West Connections	TxDOT	Supplemental
Add New East-West Connections	Others	By Others
Collector-Distributor Systems	TxDOT	Supplemental
Frontage Road Improvements / Access Management / Ramps	TxDOT	Supplemental
Expand Bus Routes / Transit Services	Others	By Others
Microtransit	Others	By Others
Pedestrian / Bicycle Improvements	Combo	Supplemental
Park & Ride Improvements / Multimodal Hub	Combo	Supplemental

During the next alternative evaluation, the level of analysis will depend on the alternative type. Alternatives by others will be evaluated at the lowest level of detail. Supplemental alternatives will undergo a qualitative analysis. Primary alternatives will have both a qualitative and quantitative analysis completed.



# **Appendix A**

# **Public Input**

## Overall Public Input

Meeting	Vote	No-Build	Existing Corridor							Parallel Routes		
			Use Technology	Frontage Road Improvements	Rehabilitation	Improve East-West Connections	Add New East-West Connections	Collector-Distributor Systems	Interchanges/Ramps/ Direct Connectors	Improve Hardy Toll Road	Extend Hardy Toll Road North	Kuykendahl Improvements
Public Meeting	Support	1	6	12	4	4	7	1	12	9	13	7
	Neutral	0	2	1	1	3	3	6	3	4	6	7
	Oppose	15	1	1	1	0	0	0	1	1	2	0
Stakeholder Meeting	Support	-	11	20	7	19	12	8	18	17	13	11
	Neutral	-	7	1	11	1	9	13	3	4	7	9
	Oppose	-	3	0	3	1	0	0	0	0	1	1
Online Survey	Support	-	249	319	121	-	300	-	346	312	394	212
	Neutral	-	108	104	144	-	112	-	74	121	68	128
	Oppose	-	183	85	241	-	92	-	92	133	80	190
<b>Summary</b>	<b>Support</b>	<b>1</b>	<b>266</b>	<b>351</b>	<b>132</b>	<b>23</b>	<b>319</b>	<b>9</b>	<b>376</b>	<b>338</b>	<b>420</b>	<b>230</b>
	<b>Neutral</b>	<b>0</b>	<b>117</b>	<b>106</b>	<b>156</b>	<b>4</b>	<b>124</b>	<b>19</b>	<b>80</b>	<b>129</b>	<b>81</b>	<b>144</b>
	<b>Oppose</b>	<b>15</b>	<b>187</b>	<b>86</b>	<b>245</b>	<b>1</b>	<b>92</b>	<b>0</b>	<b>93</b>	<b>134</b>	<b>83</b>	<b>191</b>
<b>Overall Rating</b>		<b>-14</b>	<b>79</b>	<b>265</b>	<b>-113</b>	<b>22</b>	<b>227</b>	<b>9</b>	<b>283</b>	<b>204</b>	<b>337</b>	<b>39</b>

## Overall Public Input

Meeting	Vote	Added Capacity			High Capacity Transit				Multimodal		
		within Existing Pavement (restriping)	At-Grade (new pavement)	Elevated (new pavement)	Expand Bus Routes/ Transit Services	Commuter Rail	High Speed Rail	Light Rail	Microtransit	Pedestrian/ Bicycle Improvements	Park&Ride Improvements/ Multimodal Hub
Public Meeting	Support	2	21	19	1	4	10	5	3	4	1
	Neutral	7	2	1	7	9	2	6	3	9	3
	Oppose	11	2	3	8	8	10	12	11	9	1
Stakeholder Meeting	Support	11	14	12	11	12	11	8	7	11	10
	Neutral	5	6	9	7	5	5	9	9	4	9
	Oppose	5	1	0	3	4	5	4	5	6	2
Online Survey	Support	200	266	328	169	290	-	261	149	115	251
	Neutral	125	114	95	99	52	-	61	83	89	110
	Oppose	232	145	112	262	158	-	184	295	303	151
<b>Summary</b>	<b>Support</b>	<b>213</b>	<b>301</b>	<b>359</b>	<b>181</b>	<b>306</b>	<b>21</b>	<b>274</b>	<b>159</b>	<b>130</b>	<b>262</b>
	<b>Neutral</b>	<b>137</b>	<b>122</b>	<b>105</b>	<b>113</b>	<b>66</b>	<b>7</b>	<b>76</b>	<b>95</b>	<b>102</b>	<b>122</b>
	<b>Oppose</b>	<b>248</b>	<b>148</b>	<b>115</b>	<b>273</b>	<b>170</b>	<b>15</b>	<b>200</b>	<b>311</b>	<b>318</b>	<b>154</b>
<b>Overall Rating</b>		<b>-35</b>	<b>153</b>	<b>244</b>	<b>-92</b>	<b>136</b>	<b>6</b>	<b>74</b>	<b>-152</b>	<b>-188</b>	<b>108</b>

### Public Meeting Interactive Board Results

Meeting	Vote	No-Build	Existing Corridor						Parallel Routes			
			Use Technology	Frontage Road Improvements/ Access Management/ Ramps	Rehabilitation	Improve East-West Connections	Add New East-West Connections	Collector-Distributor Systems	Interchanges/Ramps/ Direct Connectors	Improve Hardy Toll Road	Extend Hardy Toll Road North	Kuykendahl Improvements
Harvest Time Church 10/12/2019	Support		2	1					4		3	2
	Neutral			1		1			1	2	2	
	Oppose	2										
Spring High School 10/15/2019	Support		2	2	3		1		2	5	3	2
	Neutral					1	2	2	2			3
	Oppose		1	1	1				1		1	
Oark Ridge HS 9th Grade Campus 10/16/2019	Support	1	2	9	1	4	6	1	6	4	7	3
	Neutral		2		1	1	1	4		2	4	4
	Oppose	13								1	1	
<b>Summary</b>	<b>Support</b>	<b>1</b>	<b>6</b>	<b>12</b>	<b>4</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>12</b>	<b>9</b>	<b>13</b>	<b>7</b>
	<b>Neutral</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>7</b>
	<b>Oppose</b>	<b>15</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>

### Public Meeting Interactive Board Results

Meeting	Vote	Added Capacity			High Capacity Transit				Multimodal		
		within Existing Pavement (restriping)	At-Grade (new pavement)	Elevated (new pavement)	Expand Bus Routes/ Transit Services	Commuter Rail	High Speed Rail	Light Rail	Microtransit	Pedestrian/Bicycl ye Improvements	Park&Ride Improvements/ Multimodal Hub
Harvest Time Church 10/12/2019	Support		4	4				1	1	1	1
	Neutral				1	1		1	1		1
	Oppose	1	1			1	2	1			
Spring High School 10/15/2019	Support		10	2		2	3	2	2	1	
	Neutral	4		1	3	1		2	1	8	1
	Oppose	4		2	3		3	1	3	2	1
Oark Ridge HS 9th Grade Campus 10/16/2019	Support	2	7	13	1	2	7	2		2	
	Neutral	3	2		3	7	2	3	1	1	1
	Oppose	6	1	1	5	7	5	10	8	7	
<b>Summary</b>	<b>Support</b>	<b>2</b>	<b>21</b>	<b>19</b>	<b>1</b>	<b>4</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>1</b>
	<b>Neutral</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>9</b>	<b>2</b>	<b>6</b>	<b>3</b>	<b>9</b>	<b>3</b>
	<b>Oppose</b>	<b>11</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>10</b>	<b>12</b>	<b>11</b>	<b>9</b>	<b>1</b>

# Online Survey Results

Rating	Existing Corridor					Parallel Routes		
	Use Technology	Improve Frontage Roads	Resurface Roadway	Add East-West Connections	Add Access to I-45	Improve Hardy Toll Road	Extend Hardy Toll Road	Improve Kuykendahl
5 stars	161	188	50	183	231	188	296	141
4 stars	88	131	71	117	115	124	98	71
3 stars	108	104	144	112	74	121	68	128
2 stars	87	52	98	46	40	55	36	65
1 star	96	33	143	46	52	78	44	125

**Total Ratings**

Support	249	319	121	300	346	312	394	212
Neutral	108	104	144	112	74	121	68	128
Oppose	183	85	241	92	92	133	80	190

Rating	Added Capacity			High Capacity Transit			Multimodal		
	Restripe New Lanes	Construct New Main Lanes	Construct Elevated Lanes	Expand Bus Routes	Construct Passenger Rail	Extend Light Rail	Provide Microtransit	Improve Bike/Ped	Improve Park Ride
5 stars	107	166	228	110	229	203	90	70	153
4 stars	93	100	100	59	61	58	59	45	98
3 stars	125	114	95	99	52	61	83	89	110
2 stars	87	58	34	85	50	57	86	86	51
1 star	145	87	78	177	108	127	209	217	100

**Total Ratings**




Support	200	266	328	169	290	261	149	115	251
Neutral	125	114	95	99	52	61	83	89	110
Oppose	232	145	112	262	158	184	295	303	151

# **Appendix B**










## **Fatal Flaw Screening**

### **Result Details**










### Fatal Flaw Evaluation Ratings

Symbol	Definition
	Positive
	Neutral
	Negative










### Parallel Routes: Improve Hardy Toll Road

Gate	Evaluation Criterion	Rating	Rationale
Gate 1	Connectivity		Connections to/from I-45N and Hardy Toll Road would be improved.
	Safety		Alternative would likely include safety improvements at the I-45N connections.
	Mobility		I-45N traffic would divert to Hardy Toll Road which improves I-45N mobility.
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes improvements from SH 99 to FM 1960.
	Environmental & Socio-Economic Effects		Potential for residential/commercial displacements which may negatively impact nearby EJ communities.
	ROW Needed		Additional ROW required
	Support for Future Technology		Ability to support future technologies is unknown
	Previous Studies		Improvements to the Hardy Toll Road are included in the 2019 H-GAC TIP.
	Public Acceptance		56% of public responses were in support of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			










### Parallel Routes: Extend Hardy Toll Road North

Gate	Evaluation Criterion	Rating	Rationale
Gate 1	Connectivity		Extending Hardy Toll Road would provide additional connections from northern communities to a high-speed north-south facility
	Safety		Alternative brings limited improvement in safety on I-45N
	Mobility		I-45N traffic would divert to Hardy Toll Road which improves I-45N mobility
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative potentially displaces communities and negatively impacts nearby EJ population
	ROW Needed		Significant additional ROW required
	Support for Future Technology		Ability to support future technologies is unknown
	Previous Studies		Alternative was not proposed or recommended in a previous study
	Public Acceptance		72% of public responses were in support of this alternative
<b>Gate 2: Fail – Alternative dropped from further consideration</b>			










### Parallel Routes: Kuykendahl Improvements

Gate	Evaluation Criterion	Rating	Rationale
Gate 1	Connectivity		Improvements to Kuykendahl will provide communities with connection to another north-south route for all modes of travel
	Safety		Alternative does not include improvements along I-45N, resulting in limited safety benefits
	Mobility		Alternative improves mobility by diverting traffic from I-45N
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes improvements from FM 1960 to Rankin Road.
	Environmental & Socio-Economic Effects		Alternative includes limited disruption to existing communities and environment
	ROW Needed		Alternative is anticipated to not require much additional ROW
	Support for Future Technology		Unknown if future technology will be incorporated
	Previous Studies		Alternative was proposed as a project in a presentation by the Woodlands Township titled Major Thoroughfare Access to SH 99.
	Public Acceptance		This alternative received almost equal amounts of positive and negative public support
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			










### Add Lanes: Within Existing Pavement (Restriping)

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative would not improve the existing connectivity along I-45N
	Safety		Alternative brings limited improvement in safety
	Mobility		Alternative creates additional lanes which increases capacity and reduces delay
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes restriping from Rayford Road and Spring Cypress Road.
	Environmental & Socio-Economic Effects		Alternative includes limited disruption on adjacent communities and environment
	ROW Needed		Alternative does not require additional ROW
	Support for Future Technology		Ability to support future technologies is unknown
	Previous Studies		Alternative was not proposed or recommended in a previous study
	Public Acceptance		42% of public responses were in opposition of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			










### Add Lanes: At-Grade (New Pavement)

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative would not improve the existing connectivity along I-45N
	Safety		Alternative brings additional capacity, reduced congestion, and improved safety
	Mobility		Alternative creates additional lanes which increases capacity and reduces delay
	<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>		
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative will impact businesses and properties adjacent to the existing corridor
	ROW Needed		Alternative will require additional ROW
	Support for Future Technology		Alternative will accommodate future technologies
	Previous Studies		Alternative was not proposed or recommended in a previous study
	Public Acceptance		53% of public responses were in support of this alternative
	<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>		




### Add Lanes: Elevated (New Pavement)

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative would not improve the existing connectivity along I-45N
	Safety		Alternative improves mobility and separates traffic, resulting in less conflict points and improved safety.
	Mobility		Alternative creates additional lanes which increases capacity and reduces delay
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative adds new pavement which may negatively impact adjacent communities and environment
	ROW Needed		Alternative will require limited additional ROW
	Support for Future Technology		Alternative will accommodate future technologies
	Previous Studies		Alternative was not proposed or recommended in a previous study.
	Public Acceptance		62% of public responses were in support of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			

### Existing Corridor: Use Technology (TSM / TDM / ITS)

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative does not directly address connectivity but does not hinder it either.
	Safety		Alternative provides improvements to mobility which are expected to yield safety benefits for the corridor.
	Mobility		Alternative improves mobility by better managing the transportation network and spreading out demand to reduce peak traffic.
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Improvements would be located within existing right-of-way and is not anticipated to have negative environment or socio-economic impacts.
	ROW Needed		Alternative does not require additional ROW.
	Support for Future Technology		Ability to support future technologies is unknown
	Previous Studies		Alternative was recommended in a Summary Report – Rank 61 – IH 45 (North Freeway) between Spring Cypress Rd/FM 2920 SL 8 North.
	Public Acceptance		Alternative received neutral response from the public
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			










### Existing Corridor: Rehabilitation

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative would not improve the existing connectivity along I-45N
	Safety		Alternative does not include improvements along I-45N, resulting in limited safety benefits
	Mobility		Alternative would not alleviate congestion along I-45N
<b>Gate 1: Fail – Alternative dropped from further consideration</b>			










### Existing Corridor: Interchanges / Ramps / Direct Connectors

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves access to and from I-45N.
	Safety		Alternative provides improvements to mobility which are expected to yield safety benefits for the corridor.
	Mobility		Improvements to connections to and from I-45N will improve travel speeds for road users.
	<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>		
Gate 2	Consistency with Regional Plans		The 2045 RTP includes direct connectors at SH 99, ramp modification between Rayford Road and Spring Cypress Road, and a SPUI at Woodlands Parkway.
	Environmental & Socio-Economic Effects		Little amounts of additional ROW may be required, accompanied by limited environment and socio-economic impacts.
	ROW Needed		Alternative may require acquisition of little amounts of additional ROW for improvements to I-45N connections
	Support for Future Technology		Alternative does not support or hinder future technologies.
	Previous Studies		Alternative is included a I-45N & FM 1488 traffic study.
	Public Acceptance		68% of public responses were in support of this alternative
	<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>		










### Existing Corridor: Improve East-West Connections

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves east/west connections in the corridor.
	Safety		Improvements to east-west connections would include safety improvements along the roadways and at intersections.
	Mobility		Alternative improves corridor mobility.
	<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>		
Gate 2	Consistency with Regional Plans		The 2045 RTP includes improvements to FM 2920, SH 242, FM 1488, and Loop 336.
	Environmental & Socio-Economic Effects		Alternative involves construction of additional lanes which are likely to have negative environmental, economic, and socio-economic impacts.
	ROW Needed		Alternative involves construction of additional lanes which will likely require acquisition of additional ROW.
	Support for Future Technology		Alternative does not support or hinder future technologies.
	Previous Studies		Improvements to east-west connections were included in the 2018 Houston Major Thoroughfare and Freeway Plan.
	Public Acceptance		82% of public responses were in support of this alternative
	<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>		










### Existing Corridor: Add New East-West Connections

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves east-west access in the corridor on surface street network.
	Safety		Additional east-west connections will increase conflict points which could negatively impacts.
	Mobility		New east-west connections would provide additional access and is anticipated to reduce local trips along I-45N.
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative involves construction of new roads which are likely to have negative economic and socio-economic impacts.
	ROW Needed		Additional ROW required
	Support for Future Technology		Alternative does not support or hinder future technologies.
	Previous Studies		Crighton, FM 1488, Shenandoah Park and Research Forest are included as planned east-west thoroughfares in the 2016 Montgomery County Thoroughfare Plan
	Public Acceptance		60% of public responses were in support of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			










### Existing Corridor: Collector-Distributor Systems

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves corridor connectivity.
	Safety		Alternative reduces merging and lane changes which are expected to yield safety benefits for the corridor.
	Mobility		Alternative is expected to improve traffic flow in the corridor and increase travel speeds.
	<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>		
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative may have a little environmental and socio-economic impact
	ROW Needed		Alternative may require a little additional ROW
	Support for Future Technology		Alternative does not support or hinder future technologies
	Previous Studies		Alternative was not proposed or recommended in a previous study.
	Public Acceptance		68% of public responses were neutral towards this alternative
	<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>		




### Existing Corridor: Frontage Road Improvements / Access Management / Ramps

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves corridor connectivity.
	Safety		Alternative improves mobility and is expected to yield safety benefits for the corridor.
	Mobility		Alternative is expected to improve traffic flow in the corridor and increase travel speeds.
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes frontage improvements near SH 242 and ramp modification near SH 99.
	Environmental & Socio-Economic Effects		Alternative not likely to have significant environmental and socio-economic impacts
	ROW Needed		A little additional ROW likely required
	Support for Future Technology		Alternative does not support or impede future technology
	Previous Studies		Alternative was not proposed or recommended in a previous study.
	Public Acceptance		68% of public responses were in support of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			




### High Capacity Transit: Expand Bus Routes / Transit Services

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves transportation connectivity for transit users in and across the corridor.
	Safety		Alternative improves mobility, resulting in safety benefits.
	Mobility		Improvements to transit service are expected to improve mobility for transit users and reduce vehicular traffic resulting in overall mobility improvements.
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes a new transit center near Six Pins Drive & Lake Robbins Drive.
	Environmental & Socio-Economic Effects		Alternative improves transit ridership and has positive socio-economic impacts; it also reduces vehicular traffic and has positive environmental impacts.
	ROW Needed		Alternative likely requires some ROW
	Support for Future Technology		Alternative does not support or impede future technology
	Previous Studies		Transit improvements are included in the Woodlands Township Transit Plan (2015).
	Public Acceptance		48% of public responses were in opposition of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			




### High Capacity Transit: Light Rail

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative is expected to have a limited improvement on connectivity
	Safety		Alternative does not include improvements along I-45N, resulting in limited safety benefits
	Mobility		Alternative is not anticipated to alleviate congestion along I-45N
<b>Gate 1: Fail – Alternative dropped from further consideration</b>			










### High Capacity Transit: Commuter Rail

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Commuter rail would serve inter-city trips and would not improve connectivity along I-45N
	Safety		Alternative does not include improvements along I-45N, resulting in limited safety benefits
	Mobility		Alternative would provide an alternate mode of transportation for local trips that currently use I-45N
<b>Gate 1: Fail – Alternative dropped from further consideration</b>			










### High Capacity Transit: High Speed Rail

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative would not improve connectivity because high speed rail would not be accessible from I-45N
	Safety		Alternative does not include improvements along I-45N, resulting in limited safety benefits
	Mobility		Alternative would provide an alternate mode of transportation for long distance trips that currently use I-45N
<b>Gate 1: Fail – Alternative dropped from further consideration</b>			










### Multi-Modal: Microtransit

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves connectivity for corridor transportation users.
	Safety		Alternative improves safety by encouraging more users to use transit.
	Mobility		Alternative improves first and last mile service to complement other transportation modes, but is not likely to yield significant overall I-45N mobility improvements.
	<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>		
Gate 2	Consistency with Regional Plans		Alternative was not mentioned in 2045 RTP
	Environmental & Socio-Economic Effects		Alternative complements environmentally friendly solutions such as Park & Ride facilities
	ROW Needed		Alternative does not require construction or additional ROW
	Support for Future Technology		Alternative is likely to support future technologies
	Previous Studies		Alternative was not proposed or recommended in a previous study.
	Public Acceptance		55% of public responses were in opposition of this alternative.
	<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>		

### Multi-Modal: Pedestrian / Bicycle Improvements

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative improves connectivity for bicycle and pedestrian transportation modes
	Safety		Alternative improves safety for bicyclists and pedestrians
	Mobility		Alternative improves mobility for bicycle and pedestrian transportation modes but has little impact on overall I-45N mobility
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes bicycle improvements along SH 75.
	Environmental & Socio-Economic Effects		Although alternative may require a little additional ROW, the environmental and socio-economic benefits of enhancements for pedestrian and bicycle transportation modes are more significant
	ROW Needed		Alternative may require a little additional ROW
	Support for Future Technology		Alternative not likely to include support for future technologies
	Previous Studies		A proposed trail crossing under I-45N is included in the Cypress Creek Hike & Bike Trail System.
	Public Acceptance		58% of public responses were in opposition of this alternative
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			

### Multi-Modal: Park & Ride Improvements / Multimodal Hub

Gate	EVALUATION CRITERION	RATING	RATIONALE
Gate 1	Connectivity		Alternative provides improvements for multimodal connectivity
	Safety		Alternative reduces corridor congestion and enhances safety
	Mobility		Alternative reduces vehicular traffic and improves overall I-45N mobility
<b>Gate 1: Pass – Alternative moves forward to Gate 2</b>			
Gate 2	Consistency with Regional Plans		The 2045 RTP includes a new park and ride near Springwoods Village Parkway.
	Environmental & Socio-Economic Effects		Alternative reduces vehicular traffic which has positive environmental impacts but may require property and may have socioeconomic impacts
	ROW Needed		Some additional ROW may be required
	Support for Future Technology		Alternative likely to include support for future technology
	Previous Studies		Improvements are included in the Woodlands Township Transit Plan.
	Public Acceptance		Alternative received neutral response from the public
<b>Gate 2: Pass – Carried forward as a Reasonable Alternative</b>			