TOOLE DESIGN

NHHIP FEIS REVIEW

December 3, 2020 | FINAL

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INTRODUCTION & EXECUTIVE SUMMARY

The Texas Department of Transportation (TxDOT) has been planning the I-45 North Houston Highway Improvement Project (NHHIP) for over 15 years. The preferred alternative covers from U.S. Highway 59 (US 59)/I-69 to Beltway 8 North, including modifications along US 59/I-69 between I-45 and Spur 527 in Harris County, Texas. The project is divided into three segments: Segment 1 is Beltway 8 North to I-610; Segment 2 is I-610 to I-10; and Segment 3 is the Downtown Loop System (I-45, I-10, and US 59/I-69). The project proposes to widen the highway by adding travel lanes and shoulders in each direction, reconstructing the main line and frontage roads, rerouting portions of the highway and reconstructing the interchange at I-45 and I-610 North. HOV lanes and transit access are proposed, however, operational funding for transit service is not included in the project. Bicycle and pedestrian features are also proposed along frontage roads and some cross streets. On September 25, 2020, the Texas Department of Transportation (TxDOT), as lead agency, issued the Final Environmental Impact Statement (FEIS) for the proposed NHHIP "proposed project" or "project." After comments are received and reviewed, a Record of Decision will be issued, potentially positioning the project to move forward with detailed design and utility work. The Record of Decision is one of the last milestones in the process, leading up to construction. Toole Design, under contract to Harris County, has reviewed the FEIS and prepared the following response to the FEIS. This response includes:

- A qualitative assessment of the impacts the project may have on the quality of life and economy of the affected areas;
- An identification of bias in language and/or technical analyses that disadvantages minority, low-income, and vulnerable populations;
- An identification of flaws in logic, methods, assumptions, and metrics; and
- Recommendations for alternatives to be considered.

The work in this response is primarily the work of Toole Design Group. However, Harris County and the county's consultant TEI have provided existing and/or supplemental analyses that are used in this response.

More detailed information on the preferred alternative as well as the FEIS can be accessed on the project's website, www.ih45northandmore.com.

The FEIS prepared by the lead agency (TxDOT) is meant to support the study's Need and Purpose, which is defined by TxDOT as:

Need	Purpose
Congestion	
The roadway facility does not provide adequate capacity for existing and future traffic demands, resulting in congestion, longer travel times, and reduced mobility.	Manage I-45 traffic congestion in the NHHIP area through added capacity, options for high-occupancy vehicle (HOV) lanes, and improved operations.
The average daily traffic volumes on I-45 in the areas from US 59/I-69 to I-10 and I-610 to Beltway 8 North are projected to increase by approximately 40 percent between 2015 and 2040 The average daily traffic volume on I-45 between I-10 and I-610 is projected to increase by approximately 15 percent during the same period. Congestion on I-45 currently ranges from "moderate" to "serious" conditions. Without improvements, I-45 will have "serious" to "severe" congestion by 2040, as measured by traffic volume capacity.	Improve mobility on I-45 between US 59/I-69 and Beltway 8 North by accommodating projected population growth and latent demand in the project area.
The reversible HOV lane on I-45 serves traffic in only one direction during the peak periods and is unused for large portions of the day. During peak hours, the HOV lane congestion is classified as "tolerable." Forecasts for commuter service indicate that even with parallel high-capacity transit in the corridor, managed lanes would be needed to support commuter traffic and express bus service.	Provide expanded transit and carpool opportunities with two-way, all-day service on MaX lanes, and access to METRO Park & Ride facilities.
Design Standards/Safety	
Portions of I-45 do not meet current roadway design standards, creating a traffic safety concern.	Bring I-45 up to current design standards with shoulders and auxiliary lanes to improve safety and operations.
Roadway design deficiencies also include inadequate storm water drainage in some locations. Intense rainfall causes high water levels and the I-45/I-10 underpass and on the outside lanes and frontage roads between Parker Road and Gulf Bank Road, I-45 would not operate effectively as an evacuation route with high water closures, especially during hurricane evacuations when high rainfall events are likely.	Eliminate areas of flooding on the I-45 mainlines.
All sections of I-45 show a considerably higher crash rate than the statewide crash rate.	Provide an improved facility with additional capacity and current design standards to reduce the crash rate.
Emergency Evacuation	
I-45 is a designated evacuation route in case of major storm, hurricane, or chemical spill. At its present capacity, evacuation effectiveness would be limited in the event of a hurricane or other regional emergency.	Expand capacity for emergency evacuations by providing proper design and flexible operations.

Source: Table ES-1 Summary of Need and Purpose, http://www.ih45northandmore.com/docs14/NHHIP_FEIS_Files/1_NHHIP_FEIS_2020_Volume%20I.pdf

This response is organized in chapters to address the issues identified in the Need and Purpose. A summary of the most consequential conclusions drawn as a result of this analysis are as follows:

Chapter 1: Ethics and Background

The lead agency's approach to this FEIS is based on the conventional transportation paradigm, which is based on values that prioritize automobile users and speed. The impacted communities of Harris County and the City of Houston favor policies and programs based on the traditional transportation paradigm, which prioritizes human-scaled infrastructure, multiple modes, access, proximity, and exchange. There is a direct conflict between the proposed project and the values and priorities of the impacted communities of Harris County and the City of Houston that will result in unnecessary negative impacts to residents, general dissatisfaction, and overall decline in public trust in the public agencies involved.

It is recommended that a supplemental EIS be prepared to address these deficiencies by developing a broader Need and Purpose statement that allows at least one new alternative to be developed that is based on the traditional values promoted by Harris County, City of Houston, and is reflective of the overwhelming majority of public comments received.

Consequential flaw: The Need and Purpose statement was crafted such that every reasonable alternative was either a highway alternative or a strawman alternative (i.e., doing nothing or a "transportation system management" project). In other words, a full spectrum of alternatives was not considered. The FEIS mentioned the "universe" of options several times to give the illusion of vastness. However, the options considered were actually very narrow in scope. The alternatives were effectively all highway projects. Even before the Need and Purpose statement was made, the title of the project gave away the predetermined and narrowly focused outcome of the FEIS. The title was the "North Houston Highway Improvement Project." A wider range of alternatives should have been evaluated as part of this process.

There is significant bias in terms and language used throughout the FEIS.

Chapter 2: Safety

Consequential flaw: The proposed project will not increase safety; it will reduce safety. Less congestion and increased speeds resulting from the proposed project, according to TxDOT's own data, will result in more injuries and more deaths. In other words, the proposed project will make I-45 more dangerous.

Chapter 3: Congestion & Mobility

Consequential flaw: Despite model projections that traffic volumes would increase 40% between 2015 and 2040, traffic volumes on I-45 in fact have been declining since 2008. The "need" to address traffic volumes – a primary purpose of the project – is not substantiated.

Chapter 4: Equity

The proposed project overwhelmingly negatively impacts Black and Hispanic or Latinx communities.

Consequential flaw: Independence Heights (located northwest of downtown Houston, just west of and adjacent to Segment 1 was listed in the National Register of Historic Places on June 4, 1997. Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 prohibits agencies, including the Texas Department of Transportation, from impacting historic properties, unless there is no feasible and prudent alternative. As demonstrated in Chapter 1 of this response, the universe of alternatives evaluated is not adequate, and additional alternatives, at least one of which should include no impacts to Independence Heights, should be duly evaluated.

Chapter 5: Evacuation

Emergency evacuation is cited as a primary need, justifying the NHHIP project. I-45 narrows to four lanes at about a third of the way along the route from Houston to Dallas; adding more lanes to the already widest parts of I-45 is not a credible strategy to help with evacuation. The bottleneck is well north of the study area which means that the widened section of the highway will only serve as additional storage space for motorists moving at a crawl on an access-limited highway.

Chapter 6: Flooding

It is feasible to mitigate the existing flooding issues without widening the highway. The justification for the highway project should be made on transportation grounds, not flooding grounds. Flooding should be decoupled from the proposed project and removed from the Need and Purpose statement.

CHAPTER 1
ETHICS AND BACKGROUND

Before reviewing the issues associated with the Need and Purpose as outlined above, it is helpful to put transportation planning into perspective in order to remind ourselves of our values and priorities. Values and priorities in the form of policies, programs, initiatives and adopted goals and objectives guide public agencies such as Harris County, City of Houston, TxDOT, and others in the expenditure of the limited public funds available. At its very essence the NHHIP is about identifying a problem, identifying and evaluating the merits of possible solutions, and selecting the best solution. The paragraphs that follow highlight a disconnect between the values and priorities promoted by Harris County, the City of Houston, and the overwhelming majority of comments received by the public, and those upon which the FEIS is based; bias on the part of the lead agency; and some clear fatal flaws.

RATIONALITY

In an FEIS, what is "reasonable", technically goes back to meeting the statement of the Need and Purpose but, ultimately, the statement of the Need and Purpose traces back to values. So, what is reasonable is based on values. To better understand the values employed in the FEIS, it helps to explain the two transportation paradigms, the "traditional paradigm" and the "conventional paradigm," each of which has its own underlying values.

The traditional paradigm came first, around the time people began living together in cities about 6,500 years ago. It revolves around the ideas of proximity, access, exchange, identity, network, block size, walkability, transit, convenience, connectedness, and human scale.

Like most cities that predate WWII, Houston evolved using traditional values from its beginnings in the 1830s until after WWII. After WWII, car-ownership grew in Houston and in 1951, Houston received its first highway, the Gulf Freeway (which became I-45 a decade later). For about 120 years, traditional values shaped the city and resulted in connected street networks, economic and social exchange born out of proximity, short trips, multi-modalism, trolley systems, walkability, etc.

Following WWII, the conventional paradigm dominated policies, programs and public initiatives. Conventional values revolve around the ideas of increasing motor vehicle speed, reducing motor vehicle congestion, and a dendritic hierarchy of streets. These values, which were untested at the time, were assumed to be capable of "improving" life in the city. Metrics were developed in accordance with conventional values such as levels-of-service for motorists, V/C ratios (i.e., motor vehicle volume divided by the motor vehicle-carrying capacity of the street), and travel time for motorists. The consequences of the conventional practices were mostly unknown immediately after WWII but we now recognize serious and very expensive problems emerged as a direct result of policies linked to

Traditional vs. Conventional Paradigm

The *Traditional Paradigm* is based on people and characterizes human settlements and cities before about 1940. Operational considerations and infrastructure design are made at the human scale and prioritize proximity, access, exchange, identity, network, block size, walkability, transit, convenience, and connectedness.

The *Conventional Paradigm* became prominent after 1940 and evaluated transportation system performance primarily on speed, and convenience/affordability of motor vehicle travel. Thus, automobile-oriented "improvements" became the default solutions to any inefficiencies.

the conventional paradigm (e.g., suburban sprawl, poor health outcomes, large death and injury tolls, inefficient consumption of land, large carbon footprints, and motor vehicle dependency, among others). Consistent with the conventional paradigm, the NHHIP FEIS assumes that widening I-45 will improve quality of life for area residents by addressing isolated flooding issues and facilitating longer-distance auto travel at higher speeds, however this is in direct conflict with the traditional values expressed and adopted by modern-day Harris County and the City of Houston, including:

- Taking a holistic approach to flood risk assessment and development of mitigation strategies, including making an independent review of emergency response systems and more stringent floodplain development standards as a condition associated with the $2.5 billion in County flood bond funding (Harris County)
- Providing coordinated, multimodal transportation and transit infrastructure to support needs of all communities, supported by the first-ever county-wide mobility needs assessment (Harris County)
- Making investments that reduce energy-use, are more climate-friendly, and better serve low-income and minority communities, such as ongoing transit operations, establishing an Economic Opportunity Department, and creating a commission to advise the county on how to protect and celebrate African American history and culture (Harris County)
- Committing to “Vision Zero” through an executive order with a goal to end traffic deaths and serious injuries caused by crashes (Harris County and City of Houston)
- Promoting walkability, affordability and equity through the Livable Places Action Committee (City of Houston)

This FEIS is steeped in conventional values. It assumes that connecting distant areas into cities and through cities, with high-speed highways, is inherently important and that the fabric of the city is relatively unimportant. The FEIS assumes that it is acceptable to damage the fabric of Harris County, and its low-income and communities of color, to widen this highway. In fact, the two most troubling assumptions in the FEIS are: i) building/widening highways in cities is still a good idea; and ii) damaging the city is acceptable if some form of mitigation is offered.

With the problems that highways in cities have caused over the last 70 years, the questions should be, “Should conventional values still dominate and prevail over traditional values? Is highway widening/building in Harris County still a good idea in general?” Society has witnessed the negative patterns with highway building. We have also witnessed what happens in similarly sized cities when other options, based on traditional values, are pursued (e.g., highway removals, 15-minute neighborhoods, coordinated land use and transportation planning, investment in regional transit networks, etc.): vibrant cities, thriving economies, and engaged communities.

VALUES

This project will damage predominantly Black, Latinx and low-income communities. Not one of the alternatives avoided significant negative impacts to these communities. In this way, it is implied that these impacts are unavoidable – a “given” – and are therefore reasonable. The FEIS suggests that minimizing damage and mitigating damage is what makes it reasonable. The proposed project is not a

given. There are other available options founded on traditional values and responsive to community needs.

To a great extent, the debate between supporters and opponents of a highway widening project boils down to a proxy fight over which of the two paradigms should prevail; the “traditional paradigm” or the “conventional paradigm.” If you believe that the conventional paradigm should prevail, then you will support the highway widening project. If you support traditional values, then you will oppose the highway widening project, at minimum, and you would support an option that was based on traditional values. Sadly, no option based in traditional values was developed or considered, so it could not be supported. The absence of even a single, well-conceived, traditional option, in the FEIS, is a fatal flaw of the FEIS. In other words, that this kind of option was not identified and considered is a significant mistake and causes the argument in favor of the project to be ineffective.

The variations of the conventional highway alternatives for the three segments do not pass the test of a spectrum of reasonable alternatives. It is not surprising, however, due to the overly narrow Need and Purpose statement. It is recommended that a supplemental EIS be prepared to address these deficiencies by developing a broader Need and Purpose statement that allows at least one new alternative to be developed that is based on the traditional values promoted by Harris County, City of Houston, and is reflective of the overwhelming majority of public comments received. That said, Chapters 1-5 in this report address the issues identified in the stated Need and Purpose.

BIASES IN LANGUAGE

One of the basic principles of propaganda is to appeal to people’s emotions. The choice of language can affect how an idea is perceived. There were a number of industries and businesses that stood to make money off a change in paradigm; they selected words that emotionally affect the public such that they would support policy, funding, and projects that aligned with their world view. In a 2009 article, the Vancouver Sun nicely summarized the group as,

“An alliance of automotive interests united to counteract the constraints on automobiles proposed by city councils, engineers, street railways and safety reformers. Made up of automobile clubs, dealerships and manufacturers, they were known as Motordom: a non-pejorative term for advocates of the Motor Age. And their singular accomplishment, as Norton describes it, was a revolutionary change in the perception of the street. Motordom successfully redefined the roadway as a place primarily for cars.”

In a nutshell, they wanted people and cities to rely on motor vehicles for profit and ideological reasons. Their terms are still widely used today, such as, “capacity, upgrade, improvement,” and so forth.

The January 2017 Edition of Institute of Transportation Engineers (ITE) Journal was called, “*New Ways of Thinking,*” and the article called, “*Removing Bias*,” states,

“Similarly, the conventional performance metrics used by transportation professionals are evolving. Rather than focusing almost exclusively on motor vehicle metrics, contemporary transportation planning and design are increasingly considering factors such as safety, equity, and the mobility of diverse populations. However, the continued use of biased language perpetuates these inherited biases,

sounds discordant to people who do not share those biases, and can lead to unclear meaning. Transportation professionals and the profession itself must be unbiased and avoid the appearance of bias. Reforming the language of our profession to make it more objective will allow us to communicate more clearly, make sound decisions, and serve the needs of a broad population."

The article went on to discuss common words and terms that are biased and offered objective substitutes. One of the common biased words was, "*improvement*," which was discussed at length. Candidate objective substitutes were: "*modification, project, or change*."

The bias of the NHHIP FEIS begins in earnest in its title and first sentence by using the words "improvement" and "improvements." Those words mean to increase value or make things better. For a public document that is supposed to be fair and objective, this immediate assertion that the project's results are inherently positive is presumptuous and misleading. After all, who can argue with an "improvement"? The remedy is to replace the biased language from the FEIS with objective/neutral language. For example, the title, "North Houston Highway Improvement Project," could be changed to the, "North Houston Highway Project," or the "North Houston Highway Modification Project" or something else that removes the value-laden word "improvement." The first sentence, "The Texas Department of Transportation (TxDOT), as the lead agency, is proposing improvements to..." could be changed to, "The Texas Department of Transportation (TxDOT), as the lead agency, is proposing a project that will..."

Using "improvement" devalues/minimizes other people's perspectives and values. One of the objectives of an environmental review is to determine if, indeed, the proposed project would have positive or negative effects. The FEIS should be objective. Thus, labelling the sum of the changes as, "improvements," in the title and first sentence and then throughout the document is dismissive of the values of others and is wrong and biased.

The Highway Capacity Manual, first published in 1965, stated in its foreword, "Knowledgeable professionals, acting in concert, have provided the value judgements needed to… and have established the common vocabulary…" They acknowledge "value judgments" and the intention to shape the "common vocabulary" which leads to the second principle of propaganda which is repetition. For example, if one were to continually call highway widenings, "improvements," then people might start to believe that "widenings" and "improvements" are synonyms and are inherently a good thing. Similarly, if the "capacity" of the street (a.k.a. roadway in the EIS) is continuously used to connote how many motor vehicles can cross a line in an hour or day, then people may begin to forget that streets and roads have the capacity to have many other roles.

It is recognized that the FEIS is focused primarily on highway building and that highways are primarily for motorists. However, for non-highway streets and corridors, the authors still used "capacity" in the same manner, connoting that moving motorists is the most important idea, regardless of street type. The continued repetition of the biased language, throughout the FEIS, was a choice because there are neutral and objective substitutes. The repetition of biased terms reinforces the implied presumption that these conventional values, from 1965, are universally shared. These values are not universally shared. The misleading framing of the situation through biased language, from the onset, needs to be challenged because it sets up a biased trajectory for the balance of the FEIS.

The FEIS is filled with biased words, assumptions, and inferences while it is supposed to be an objective document. One does not need to search much further to find more examples of bias because the balance of the first sentence is, "... create additional roadway capacity to manage congestion, enhance safety, and improve mobility and operational efficiency on..., including improvements along... in Harris County, Texas." The sentence is laden with biased terms and jargon that confirms the leaning if the FEIS towards conventional outcomes.

For brevity sake, we won't write about all the biases in the first sentence but the word, "efficiency," needs to be exposed. The aforementioned article in the ITE Journal said:

"Efficiency is generally a good thing because using less land, energy, or other resources to achieve the same end is usually positive. Over the past 50 years, widening highways in metro areas, in an attempt to speed up motorists, has led to sprawl, car-dependency, and more vehicle-miles-traveled, and it hasn't solved congestion. Yet it is common to hear, "We need to widen the highway to increase efficiency." Per capita gasoline consumption, in the United States, is the highest in the world at 1.16 gallons (4.39 liters) per day. More "efficient" is often a euphemism for faster. An objective translation would be "Let us widen the highway so motorists can drive faster."

Nobody can make a credible case that highway building in cities is about using less land, energy, and other resources, so greater efficiency is not achieved. The FEIS is using "operational efficiency" as a euphemism for "fast."

RANGE OF ALTERNATIVES

The Need and Purpose statement was crafted such that every reasonable alternative was highway alternative or a strawman alternative (i.e., doing nothing or a "transportation system management" project). In other words, a full spectrum of alternatives was not considered. The FEIS mentioned the "universe" of options several times to give the illusion of vastness. However, the opposite was the case. The alternatives were effectively all highway projects. Even before the Need and Purpose statement was made, the title of the project gave away the predetermined outcome. The title was the "North Houston Highway Improvement Project." The title literally connotes that the highway is intended to be "improved". By "improve," they mean adding more motor vehicle-carrying capacity, as they confirmed by their stated intent in the first sentence. The outcome of the FEIS was predetermined, starting with the title and first sentence. This project has a long history and there has been plenty of time to identify and then appropriately evaluate a wider range of alternatives, which was not done. The FEIS was written to ensure an overly narrow set of alternatives were considered, a fatal flaw for the FEIS.

The Council on Environmental Quality (CEQ) was established about 50 years ago to oversee the implementation of the National Environmental Policy Act (NEPA) and develops related policies and regulations. The CEQ regulations require an EIS to "rigorously explore and objectively evaluate all reasonable alternatives and devote substantial treatment to each alternative considered in detail so that reviewers may evaluate their comparative merits." [40 CFR 1502.14(b)]. There is multiple mention of the term "reasonable alternatives" in the report. The CEQ considers "Reasonable alternatives" those that are practical or feasible from the technical and economic standpoint and using common sense,

including those that require legislative changes. There are several reasonable alternatives that were dismissed or not considered:

1) Page 2-6, Line 16: A land use alternative would propose well-conceived changes to the mix, densities, and placement of various land uses to increase mobility by rewarding proximity, short trips, and active transportation (i.e., waking, cycling, and transit). However, land use alternatives were not evaluated as an option (or used in combination with transit or other relatively sustainable ideas as an option) because the City of Houston does not have zoning laws and this alternative would require coordination by multiple jurisdictions. Just because an alternative is hard or needs interjurisdictional coordination, does not mean that it is unreasonable.

2) A highway-to-boulevard alternative was not considered. Several cities domestically and abroad have removed highways. Every example was a success from many traditional perspectives.

3) Rebuilding the highway, in place, was not considered. This seems like an abundantly obvious alternative.

4) Previous transit proposals were considered but an independently generated transit option was not considered in the context of being a significant part of replacing I-45. A Transportation Demand Management (TDM) alternative was considered but was rejected because, on its own, it could not meet the Need and Purpose.

5) A multi-part alternative, with aspects of the first four ideas, would likely result in desirable outcomes, including fewer fatal collisions, a more effective strategy for emergency evaluation, less severe flooding, and dramatically fewer negative impacts to communities of color. However, a multi-part alternative was not considered. It seems that the FEIS was looking for a large silver-bullet sort of project and rejected multi-part alternatives due to their complexity. This is not surprising because modernist/conventional practices tend to reject complexity and prefer simplicity. However, built environments are complex systems. The best large cities in the world, with the best transportation safety records, tend to have fewer highways and more traditional approaches to transportation. They appear to have less congestion as well. Subjectively, their approaches to transportation appear measurably better than the conventional approach in the NHHIP. The FEIS should consider alternatives that have had tremendous success in real cities around the world.

ETHICAL CONSIDERATIONS

There is a difference between, “Doing things right,” versus “Doing the right things.” - TxDOT is undoubtedly very good at building highways in cities. However, the most dynamic and thriving cities in the world did not become that way by building prolific highway systems to and through their downtowns and then continually widening their highways to speed up motorists. In many places, the conventional transportation practices of state transportation agencies seem out of touch with contemporary needs ranging from dealing with climate change, to equity, to increasing public health, and to increasing safety (especially fatal crashes). Additional alternatives, reflective of the priorities, programs, and initiatives adopted by the local communities, should be identified and studied.

If the project is legal, then is it ethical? - The FEIS is trying to make the widening project seem justified, and therefore legal. However, under a little scrutiny, the proposed widening is not justified based on key issues cited in the Need and Purpose, namely safety, congestion relief and/or emergency evacuation. The modeling is questionable because it leans theoretical and is not reflective of what really happens in Houston. The project fails on multiple counts to satisfy federal environmental requirements, and negatively affects Harris County's most vulnerable populations.

If the process and project are normal or accepted practice, then are they ethical? - It may be normal for transportation agencies to use biased language to justify widening a highway based on misleading or false statements about safety, congestion, and emergency evacuation. It might be normal that every reasonable alternative was a highway widening alternative. It might be normal to think damaging minority communities is reasonable. However, the appearance of an ethical FEIS would be higher if all the above were not the case.

If the project is based on a past wrong, then is it ethical? - The construction of the previous stages of I-45 disproportionately damaged minority communities. That damage is indeed done. That, however, does not make the past stages of I-45 right and does not imply the past damage has to be perpetuated and permanent. Furthermore, that past damage does not justify additional damage by a wider highway. The cumulative effects are past and proposed projects are negative and large. The project ought to ameliorate the past wrongs, not exacerbate them.

Does the project hurt anyone or anything? - Yes, it does. In fact, there will likely be more injuries and deaths if the proposed project is built, than if it were not built. I-45 damages communities and it will do more damage if widened. I-45 pollutes and exacerbates automobile dependency, poor health outcomes, sprawl, and climate change and will worsen these outcomes if widened. From the perspective of doing harm, the proposed widening is unethical.

Does the preferred alternative advance equity and inclusion? - No. The widening itself disproportionately harms people of color and low-income communities. The motorists who will be doing the long commutes to and from the north will likely be wealthier and whiter than the communities through which they will drive. People who walk, cycle, and take transit will benefit less as a result of this project than those people who drive. The project does not include ongoing operational funding for transit, so it is uncertain whether there will be any benefit at all to transit riders. This project fails on equity.

Are the underlying values pro-city, pro-place, and/or pro-planet? - No, traditional values are pro-city, pro-place, and pro-planet. The conventional values employed for the proposed widening are not pro-city, pro-place, and/or pro-planet.

Is there a better way? – Yes. The highway arguably will make congestion and safety worse. It will exacerbate many problems. And the so-called benefits, based on the model, are exhausted in 2040. In the life of a city, 20 years is a short time. What happens then? More widenings? More damage to minority communities? More sprawl? A better way would ameliorate the problems by taking actions that are durable long after 2040. In sum, those actions would likely align with traditional values, the sorts of changes and actions that have stood the test of time, unlike conventional actions.

CHAPTER 2
SAFETY

HIGHWAY WIDENING AND SAFETY

The FEIS makes the claim that congestion is leading to safety issues on I-45. The link between congestion and safety was made, in Section 1.1.1 and 1.2.2, with statements like "*Heavily congested areas are generally where more crashes occur*" and "*Population and economic growth will increase system demand, increasing congestion and contributing to system deterioration, both of which are implicated in safety issues*." Immediately following these statements, crash statistics for fatal and severe injury crashes are cited which would lead people to believe that congestion is the cause for the severe injury crashes occurring within the study area.

The data does not support the FEIS' claims. TxDOT's own data says that motorists are 400% less safe when there are higher speeds and less congestion on I-45. During the least congested times of day, when speeds are the highest, injuries and fatalities are the highest.

SUPPORTING MATERIAL

EFFECTS OF NUMBER OF LANES ON SAFETY

Adding lanes will exacerbate safety issues along I-45; this is also supported by Crash Modification Factors (CMF) from FHWA's CMF Clearinghouse and the Highway Safety Manual (HSM). A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a widening or other change to the highway. The CMF for adding a lane in one direction is 1.11 (from 4-lanes to 5-lanes) and 1.07 (from 5-lanes to 6-lanes); this means that crashes are likely to increase by 11% when going from a 8-lane highway to a 10-lane highway and another 7% from 10 to 12 lanes.[1] It should be noted that this CMF is applicable to Urban Principal Arterials, Freeways and Expressways with Average Daily Traffic between 77,000 and 126,000 vehicles per day (in one direction) which is within the range of traffic volumes along I-45.

CRASH SEVERITY AS A METRIC

Crashes between 2015 and 2018 were extracted from TxDOT's Crash Reporting Information System (CRIS) and analyzed by time-of-day, frequency, and severity. For the purposes of this analysis only crashes coded on the freeway parts of I-45 were considered (not on the frontage roads). **Figure 1** shows the distribution of all crashes by time-of-day. As alluded to in the FEIS, **Figure 1** would suggest that a higher frequency of crashes do occur during typical peak periods, 6AM to 8AM and 4PM to 6PM, which can be explained through the idea of crash exposure. Exposure is a measure of the degree of opportunity for a crash to occur (i.e., more traffic correlates to increased exposure which translates into more opportunities for a crash to occur). So, the fact that there are more crashes during the times of higher traffic volumes (i.e. higher exposure) makes statistical sense.

However, the crash distribution of KSI (Killed or Seriously Injured) crashes in **Figure 2** shows that there are far fewer KSI crashes during the most congested periods of the day (i.e., in the a.m. and p.m. peak

[1] CMF Clearinghouse - http://www.cmfclearinghouse.org/detail.cfm?facid=9

periods) despite the increased exposure. If the FEIS' claims were true, that congestion results in more severe crashes, then that would be reflected in the data, comparing congested times and uncongested times on I-45. The overall crash rate, comparing the periods 4 a.m. to 6 a.m. (less congested) with 6 a.m. to 8 a.m. (more congested), was slightly higher from 4 a.m. to 6 a.m. but the KSI crash rate was 400% higher. Accounting for exposure, the probability of getting into a crash is about the same during peak and off-peak periods but the probability of being killed or injured is up to 400% higher during off-peak than in peak periods. The conclusion, based on TxDOT's own data, is that the FEIS' claim is false; the truth, according to the data, is that less congestion and increased speeds makes I-45 more dangerous.

Figure 1: Crash Distribution by Time of Day (All Crashes)

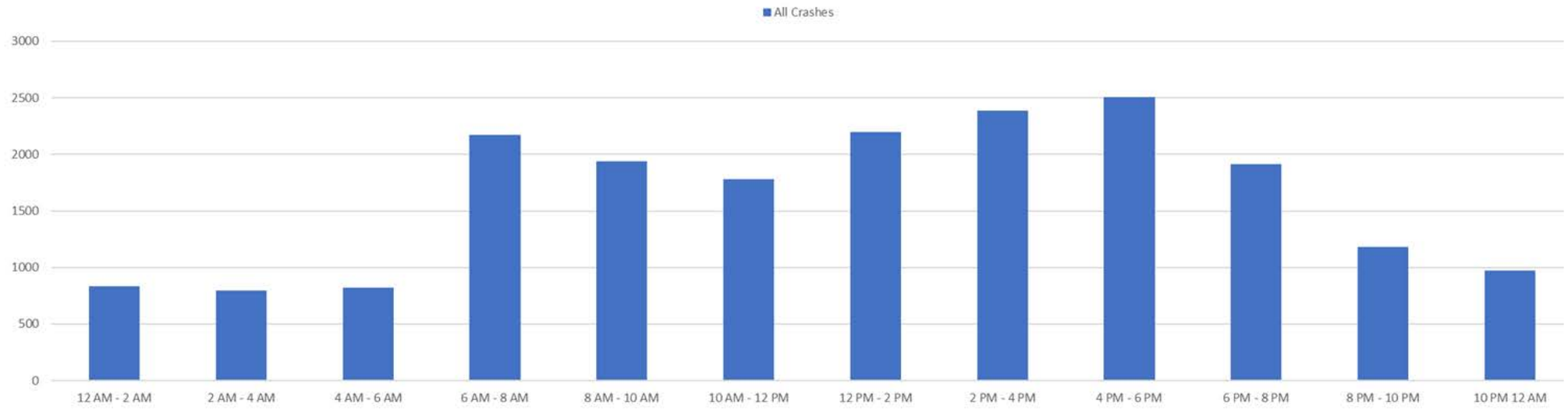
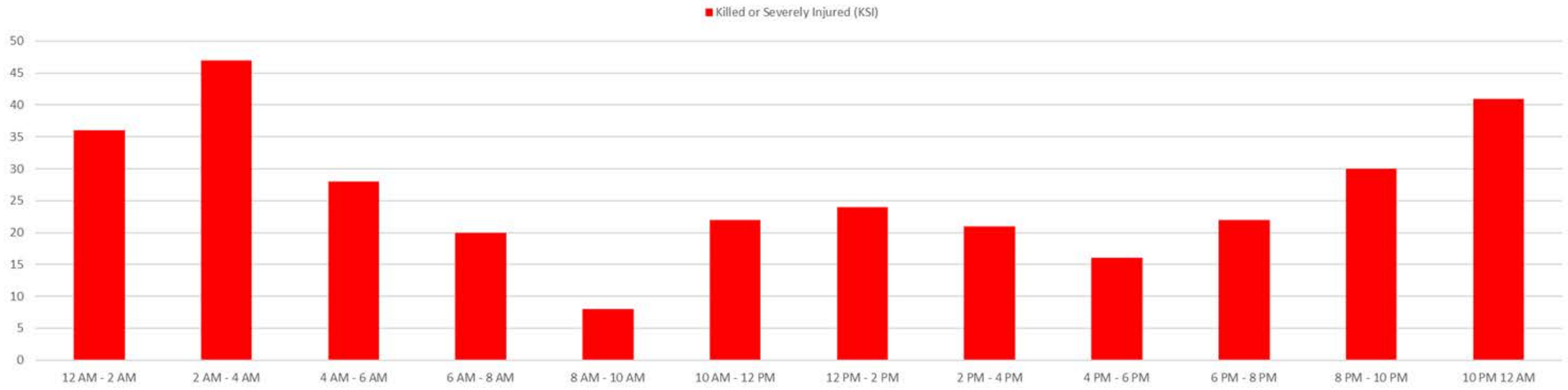


Figure 2:Crash Distribution by Time of Day (Fatal and Serious Injury Crashes)



DESIGN STANDARDS AND SAFETY

The "Need for Proposed Action" (Section 1.2) states that "*Portions of I-45 do not meet current roadway design standards, creating a safety concern*.". The FEIS' claim that substandard parts of the highway are contributing to the safety problem are not supported by the data. The FEIS' safety claims are misleading, misplaced, or wrong.

SUPPORTING MATERIAL

NOMINAL SAFETY VS SUBSTANTIVE SAFETY

A distinction should be made between "design standards" and "design elements" and how they affect safety: the former relates to Nominal Safety while the latter relates to Substantive Safety. Nominal safety is the evaluation of safety by whether a roadway (or its design element) meets minimum design standards or warrants. Substantive safety, however, defines safety in terms of historical (or expected) crash frequencies and crash severity. Design standards do not necessarily consider the context of the roadway (users, land use, local vision…) and do not necessarily account for the influence of design elements on safety performance. Design standards do not directly affect roadway safety, design elements do. For example, say the standards require 12-foot lanes and there are 11-foot lanes along a roadway. Though the 11-foot lanes would not be up to standards, they influence lower speed which drastically reduces the severity of a crash, thus making motorists safer. The distinction between nominal safety and substantive safety is also made in the American Association of State Highway and Transportation Officials (AASHTO) ***Policy on Geometric Design of Highways and Streets 2018*, 7th Edition**, which states that, "*The fact that new design values and concepts are presented herein does not imply that existing streets and highways are unsafe, nor does it mandate the initiation of improvement projects*." Furthermore, the TxDOT ***Roadway Design Manual***, (July 2020) agrees with AASHTO stating that, "*The fact that updated design values are presented in this document does not imply that existing facilities are unsafe. Nor should the publication of updated design guidelines mandate improvement projects*." So, while there is no opposition to bringing the road up to standards per se, the correlation being made between safety and design standards is misleading and makes the widening of I-45 seem like a safety imperative.

SPEED AND SAFETY

The FEIS states that a goal of this project to, "*move the maximum amount of people at maximum speed*." (Page 1-3, Line 22). This statement is problematic in that it advocates for higher speeds and increased exposure, both of which will reduce safety.

SUPPORTING MATERIAL

EFFECTS OF SPEED ON SAFETY

Exposure, Risk, and Probability of Injury are three aspects of crashes. Exposure measures the opportunity for a crash to occur. Risk measures the probability of a crash given a certain exposure. Probability of Injury measures the likelihood of getting injured in a crash. As motorists drive faster, their risk of crashing increases and the probability of an injury increases. Some of the factors involved include:

Cone of Vision - A driver's viewshed of decreases/narrows as speed increases.

Reaction Distance - The distance a vehicle travels, from the time a driver detects an emergency to the time the driver reacts, increases as speed increases.

Stopping Distance - The distance needed to stop, once the driver starts to brake, increases as speed increases.

Run off the road - As speed increases, there is an increased risk that an evasive steering maneuver will result in loss of control.

Crash Severity - As speed increases, kinetic energy and crash forces increase exponentially. At high speeds, the forces can exceed the vehicle's ability to protect the people involved, resulting in injuries or death.

The factors, above, were corroborated in a recent research paper by the Texas A&M Transportation Institute (TTI), called, "Road Safety Study During the Pandemic Shows Risk of Death or Injury Is Greater When Roads Are Clearer" [2]. They found that, during the pandemic with decreased traffic volumes, the numbers of single-vehicle crashes and multiple vehicle crashes dropped by 23 and 55 percent, respectively, but fatal crashes rose by 14 percent and 59 percent respectively. Because there was less exposure to risk, with fewer drivers on the road, the number of total crashes went down but the risk of a fatal crash was greater than normal. That was because speeds increased. In Houston, highway speeds during the peak periods increased from less than 45 miles per hour to 65 miles per hour (under the legal speed limit). The higher speeds resulted in reduced safety and more fatal crashes. The big take-away is that the data proves that increasing speeds on highways in Houston reduces safety and results in more people getting killed.

It should also be noted that TxDOT recently made a commitment to eliminate traffic fatalities on Texas roads by 2050 [3]; this is only 10 years after the life of the proposed widening. It should be noted that the City of Houston and Harris County also made similar commitments. Therefore, if the FEIS wants to increase safety along I-45 in accordance with TxDOT, the City of Houston and Harris County's policy direction, then it should focus on reducing speeds, not increasing speeds. Yet, the FEIS claims the widening is justified on safety grounds but the data shows it is not justified on safety grounds.

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[2] https://tti.tamu.edu/researcher/road-safety-study-during-the-pandemic-shows-risk-of-death-or-injury-is-greater-when-roads-are-clearer/

[3] https://www.txdot.gov/inside-txdot/media-center/statewide-news/012-2019.html

CHAPTER 3
CONGESTION, TRAFFIC DEMAND MODELING, AND MOBILITY

WIDENING AND CONGESTION

The "Need for Proposed Action," states that "*The average daily traffic volumes on I-45 in the areas from 8 US 59/I-69 to I-10 (Downtown area) and I-610 to Beltway 8 North are projected to increase up to approximately 40 percent between 2015 and 2040*."

Assumptions upon which the traffic model were based are not provided for review or scrutiny. Traffic volumes have in fact been trending downward on I-45 since 2008. The FEIS provided no evidence to support its claim of congestion and substantial increases in traffic volumes. Without credible evidence, the justification for the widening project is invalid.

SUPPORTING MATERIAL

CREDIBILITY OF THE TRAFFIC DEMAND MODEL

The recent I-10 widening project failed to deliver congestion relief until the design year. Since the widening, congestion got worse, making the model predictions wrong and the model, itself, not credible. I-10 is a relevant example because, like I-45, it is an interstate highway that leads downtown. It appears counter-intuitive that I-10 would get much more congested after widening. Most conventional traffic engineers would guess that the widening would reduce congestion for about 25 years, just like their model predicts. Based on the I-10 real-life experience, the model's predictions are not credible.

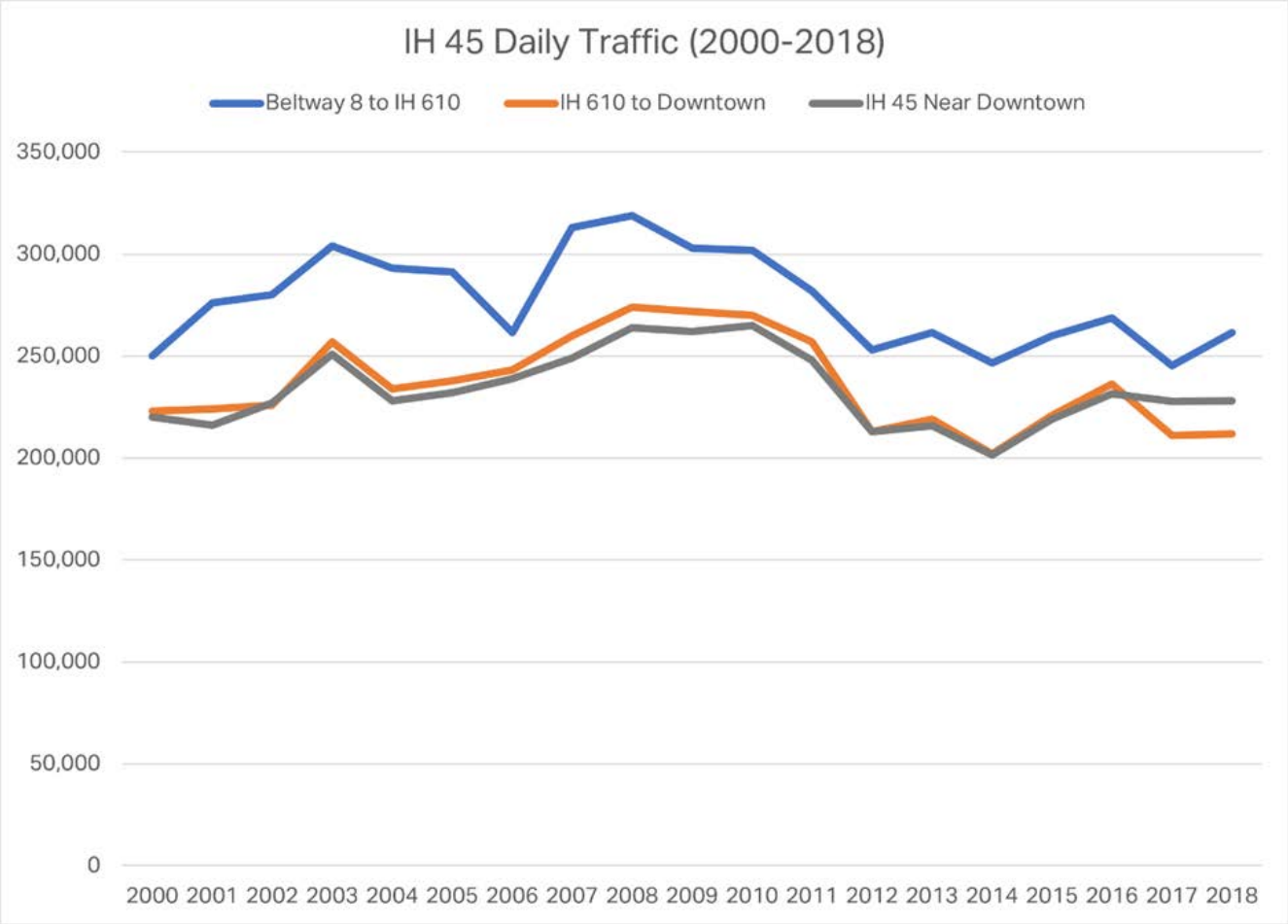
The FEIS for I-45 claims, that in 25 years (starting in 2015), the traffic volumes on I-45 would increase by 40%. Five years have passed already and there has been no increase. According to the FEIS, there should already be 10% more traffic. The model used to make this forecast is not credible and the FEIS's major justification in the purpose and need for the widening is invalid.

The model got it very wrong for I-10 and I-45. Is there any real data, from any highway that leads to downtown and has been widened in the last 20 to 25 years, where the model's predictions were correct? Based on the above, it is unlikely. If such supporting data did exist, then it was not provided in the FEIS.

HISTORICAL TRAFFIC VOLUMES

As shown in **Figure 3**, traffic volumes along I-45 have being trending downward since 2008. Over the entire 18 years of data, the compounded annual growth rates along I-45 between Beltway 8 and I-610, I-610 and Downtown, and I-45 and Downtown were 0.2%, -0.3% and 0.2%, respectively. In other words, the idea that the traffic volumes are going to grow by 40% in the next 20 years is not credible. The data says otherwise; the trend since 2008 is downward, not upward. There is no evidence-based justification for the FEIS' forecast.

Figure 3: Historical Traffic Volumes



Source TxDOT Statewide Planning Map Data

When the projected growth rates significantly differ from growth rates in recent years (i.e., since 2008), the FEIS should provide justification why future traffic volumes are expected to be significantly higher than actual trends on the highway. According to the *American Association of State Highway and Transportation Officials (AASHTO) Practitioner's Handbook #7, Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects*, "*if the Need and Purpose statement relies in part on future growth in population and employment, the purpose and need chapter should include data and analysis to demonstrate that the projected growth trends are reasonable and well-supported by evidence."*

The FEIS discussed such population and employment trends in the future but showed no evidence that these trends were any different than the trends since 2008, while the traffic volumes on I-45 were decreasing. The FEIS failed the test of "well-supported" evidence to show why their forecasts differ so much from the trends, based on real data, since 2008.

The traffic volumes have been steady or trending slightly downward since 2008. However, the traffic volumes could increase dramatically if a disruptive market force were to occur, like a huge increase in car-carrying capacity due to a highway widening project on I-45. That car-carrying capacity would

represent a free resource or subsidy to northern property owners and sprawl developers in the form of a "development road." With the wider highway in place, the land use would likely respond. This proposed expenditure of billions of taxpayer dollars will essentially profit northern property owners and speculators and subsidize sprawl developers to house whiter and wealthier people and worsen the environment, while harming communities of color. The FEIS states that the project will harm minority communities, but it neglects to note the beneficiaries of the highway-induced wealth transfer. The FEIS language minimizes the harsh reality under a veil of increased "mobility." This predictable pattern of negative environmental outcomes should have been covered openly in the FEIS.

Furthermore, the existing highway (i.e., the do-nothing option) cannot carry 40% more traffic as predicted by the model. So, if the highway were never widened, then the 40% increase could never happen. So, to induce the traffic volumes to grow by 40%, the widening would have to occur. The 40% growth in traffic is the justification for widening the highway, but the 40% increase is impossible without the widening. In other words, the widening cannot be justified unless the widening occurs. This is a self-fulfilling prophecy and a flawed justification in the FEIS. Unfortunately, the FEIS was deficient by not providing enough detail about the modelling to assess its rigor.

MOBILITY

This limited and conventional perspective on mobility is a flaw in the FEIS. In other words, the FEIS ignores the traditional ways of increasing mobility for all populations.

SUPPORTING MATERIAL

DEFINITION OF MOBILITY

The "Need for Proposed Action," states, "*The I-45 roadway facility in the study area does not provide adequate capacity for existing and future traffic demands, resulting in congestion, longer travel times, and reduced mobility.*"

The FEIS throws around the word "mobility" as if speeding up motorists and carrying motorists in greater numbers were synonymous with "mobility." The FEIS uses the nice word "mobility" to sell people on the highway widening because most people support the idea of increasing mobility. It sounds like good public policy. In fact, Increasing the populations' mobility is good public policy but that is not synonymous with motorists driving faster, farther, and in greater numbers which is the strong implication in the FEIS.

"Mobility" is the populations' capabilities and strategies to move in order to access what they need to live. Notice that "populations'" is plural. There are many populations in the Houston area: children, elderly, people with disabilities, different income levels, millennials, pedestrians, cyclists, transit users, students, etc. All these populations have varying mobility needs. Their capabilities have to do with their: i) physical ability to walk, cycle, drive, etc.; and ii) the mode choices that they can afford and access privately or publicly. Strategies have to do with the populations' adaptations to changes to its built environment (i.e., changes infrastructure, barriers, air quality, services, comfort, land use patterns, costs, etc.)

Highway widenings affect different populations differently and they affect the built environment and land use patterns. With highway widenings, the area becomes more car dependent and barriers increase due to wider roads. As land uses disperse over greater distances due to the highway's rewarding longer trips (i.e., sprawl), the mobility of the non-motorist populations diminishes relative to that of the motorists and in real terms. Consequently, highway building in cities rewards longer and faster travel by car, but it does not generally increase mobility. Patterns from I-375 in Detroit, the Scajaquada Highway in Buffalo, I-345 in Dallas, I-980 in Oakland and other places are similar to what is happening in Houston, as is covered in more detail in the next chapter on equity, that highway widenings benefit wealthier and whiter people living on the edge and reduce the mobility of less affluent populations and people of color who live in relatively urban neighborhoods. So, the Need and Purpose statement's sweeping generalizations about mobility is an indication of the systemic racism that is built into highway projects.

Movement in cities and metro areas is purposeful. Mobility is about populations moving in order to access what they need (e.g., entertainment, work, education, cultural experiences, exercise, food, etc.) Typically, only about 20% of trips in cities have to do with going to work. About 80% have to do with everything else - accessing food, school, religious institutions, entertainment, medical care, and so forth. By focusing on mobility, holistically, it is feasible to increase mobility while reducing traffic volumes, even with growing populations and growing economies. For example, cities can increase mobility by mixing and/or densifying land uses; this brings trip ends closer together and makes multimodal travel more feasible. This project will likely do the opposite by eliminating many businesses in communities along the corridor.

The FEIS' idea about "improving mobility" is conventionally oriented towards increasing levels-of-service for motorists, reducing "delays" for motorists, and other euphemisms for increasing speeds. The FEIS is primarily interested in speeding up motorists (or at least attempting to speed them up) and is less interested in the breadth of mobility that can be provided through traditional means.

The FEIS' ideas on "managing congestion" and "improving mobility" do not align with contemporary mobility needs and societal needs.

The FEIS should provide specific supporting data for the need to widen/add motor vehicle-carrying capacity. It does not. In several sections, the FEIS clearly states it wants to "*create additional roadway capacity to manage congestion*." In other words, authors of the FEIS think they can build their way out of motor vehicle congestion with highway widenings. Houston has over two million people, Harris County has more than four million people, and the metropolitan area has about seven million people. Yet there is not one example of a single city/county/metro area, anywhere in the world, that is home to millions of people that has built its way out of motor vehicle congestion via highway widenings.

Furthermore, these conventional transportation theories might "work" in theoretical traffic demand forecast models for 20 to 25-year horizons but where is the data that shows these strategies work in real life? If this theory, as outlined in this FEIS, really worked, then the majority of the highways built or widened in the Houston area, leading to downtown, since 1995, should still be working fine. However, that is not the case. Setting aside the lack of data to prove that it is feasible to widen one's way out of congestion, is it even a good idea to speed up motor vehicle traffic? Do high speeds help cities, counties, and metro areas? Is it good for safety, land use patterns, carbon footprints, public health,

taxation, equity…? If you were to ask an average motorist, "Would you like to be able to drive to work faster, rather than slower?" they would likely reply, "Yes." If you asked about getting to the grocery store, the kids' school, or their church, you'd likely get the same answer. Most motorists, acting rationally and in their own self-interest, want to drive from A to B faster, rather than slower. So, by extension, then it would logical and make good public policy for all motorists to be able to drive more quickly all over the city, county, and metro area.

The big question for this FEIS is "does our individual desire to drive faster scale up to good public policy, socially, economically, and environmentally"? Contrary to the inferences in the FEIS, the answer is actually, "No." It's analogous to fishing in the ocean, logging in the forests, and paying taxes. In these cases, what is rational and in one's self-interest, multiplied by everyone doing the same thing, results in exploitation or damage to the whole. It is the proverbial "tragedy of the commons." Acting rationally and in one's self-interest, a fisherperson would prefer to catch and sell more fish; a logger would prefer to cut and sell more timber; and a taxpayer would prefer to pay zero taxes. However, if everyone were to do the same thing, then fish would go extinct, the forests would disappear, and there would be ineffective governance. The same applies to the FEIS's goal of increasing speeds for motorists over longer distances in cities. It is not good public policy.

Though perhaps individually appealing, the idea, scaled up, results in substantial social disruption, costs, and environmental damage, not to mention negative health consequences, equity issues, disadvantaging transit, promoting sprawl, and more. That is the underlying problem with the values regarding highway building in Houston.

EVALUATION CRITERIA AND METRICS

The transportation evaluation criteria, within the FEIS are too narrow: four out of six operational criteria in the FEIS are about increasing speeds for motorists. The key operational evaluation criterion for the "Traffic/Mobility Improvements" and for evaluating the "reasonable" alternatives were:

- Reduction of systemwide delay (for motorists);
- Increase in systemwide travel speed (for motorists);
- V/C ratios (motor vehicle volume divided by the motor vehicle-carrying capacity of the street); and
- (Motor) Vehicle hours travelled.

The other two screening criteria under "traffic" were "travel demand" and "managed lane utilization." With all the criteria being about motor vehicles, the preoccupation of increasing speeds for motorists is clear.

The first criterion, in the bulleted list, is about reducing "delays" for motorists, which is another way of saying increasing speeds for motorists. The second criterion about increasing systemwide travel speeds for motorists is obviously about increasing speeds for motorists. The third criterion is about V/C ratios which relates to reducing motor vehicle congestion (i.e. increasing speeds for motorists). The fourth criterion is about reducing motor vehicle hours travelled which is also about increasing speeds for motorists. In sum, four out of six operational criteria are about increasing speeds for motorists. When closely examined the proposed project is mostly about speeding up motorists.

Over time, an increasing number of transportation agencies have come to adopt a broader more sustainable set of metrics for evaluating transportation needs, seeking to capture all populations' mobility needs rather than simply speeding up motorists. The "Need for and Purpose of Proposed Action" section suggests that the widening project is needed to address motor vehicle congestion. While level of service is an effective operational metric for timing traffic signals and the like, it is not a good metric for transportation planning involving I-45. There is ample historical evidence (e.g. I-10) to suggest that LOS-thinking leads to highway widenings which only deliver temporary reductions in motor vehicle congestion. The widenings result in medium and long-term negative outcomes including increased motor vehicle volumes, additional motor vehicle dependence, increased congestion, and lower quality of life.

Consideration should be given to criteria such as increasing modal splits for active transportation, shortening average trips lengths, and lowering vehicle-miles-traveled. Vehicle Miles Traveled (VMT) reduction ought to be the primary metric of FEISs moving forward, followed by mode split, and average trip length. The FEIS predicts an increase in VMT. That is the wrong direction, not desirable, and should be an indicator of failed transportation and land use planning, which is a joint responsibility. The County and City ought to be able to grow their populations and economies and increase their quality of life while reducing VMT. The key is reducing the mode split by motor vehicle, shortening average trips lengths (for all modes), and using transit for long haul trips.

DESIGN YEAR

The 20- to 25-year planning horizon is unreasonably short. The I-45 project will likely fail by 2040 and the problem will be congestion, again, but in 2040 it will involve more lanes of congestion and be more expensive to address at that time.

SUPPORTING MATERIAL

The usual reason for choosing 20 to 25 years is the limitation of the model. There is no debate that the model has limitations. We've already shown that, even within five years, it lacks credibility. The idea is that the changes in land use, behavior, technology, etc. are not reasonably predictable after 20 to 25 years. The benefit to highway builders of only looking out 20 to 25 years is that the results appear plausible, vision is optional, and responsibility for the long-term outcomes (i.e., beyond 20 to 25 years) is not required. One generation is about 20 to 25 years; it is a short time period in the life of a city. Houston is almost 200 years old and the city will most likely exist in another 100 or 200 years. So, what if the projected forecasts for I-45 were for 100 or 200 years? Based on the FEIS' trends, the highway widening would likely involve adding 20 to 60 additional lanes. Obviously, that would be unrealistic (even if an agreement was made to stage the additional lanes in 20-year increments). This is the trajectory for consideration. It is ridiculous when extrapolated into the future but sounds plausible in the shorter timeframe.

The 20-year highway building patterns suit the sprawl developers, land speculators, highway builders, and car industry's business models who will lobby and push for more of the same because it is profitable. Furthermore, for most agencies, the short-term traffic model is their oracle and the 20 to 25-

year conventional practices are easier to perpetuate than reform. Thinking 100 to 200 years out requires thoughtful and integrated transportation and land use planning. The pro-highway system is resilient to such reform, from its language, to the funding, to the dispersed organization, to the way the FEISs have been performed. Everything is incremental, no change is big enough to require a system change. Nobody is really in charge of the whole system, no one agency is leading the needed system-wide reforms, so why bother? In reality, we all know why we should bother but, in the context of an FEIS, it is typically easier to punt the problem to the next generation. In other words, this FEIS, and everyone else who supports these short-term transportation and land use planning horizons (i.e., 20 to 25 years), is pushing the tough transportation and land use planning decisions onto the next generation. TxDOT, Harris County, the City of Houston, and most informed people, already know the truth: what is going on now and what has been going on for years is unsustainable. The City and County are trying to change but the values and direction of the FEIS is lagging. Despite that knowledge, not enough has been done to change the trajectory, and here we are, via this FEIS, facing another 20-year increment of the highway widening trajectory, along with the usual pro-highway rhetoric. Hopefully, this time, Harris County, the City of Houston, and others will prevail.

The pre-WWII decades and centuries of observing planning relationships and patterns are accessible for anyone who is willing to see them.

- Cities and streets have been around for about 6,500 years
- Wooden-rail transit came about 400 years ago
- Bicycles have been used for about 200 years
- Iron-rail transit and trains arrived about 170 years ago
- Cars have been around for about 120 years
- Modernist/conventional transportation practice and highways have only been around for about 70 years.

There are enough cities in North America and around the world that we can observe and contrast the outcomes of conventional strategies and traditional strategies. The patterns are clear. It is feasible and desirable to plan well beyond 20 to 25 years. The idea of the I-45 widening being a good for a 20 to 25 year-period is a failed idea. The thinking is short-sighted and long-term outcomes are bad, and, consequently, the 20 to 25 planning horizon is unreasonably short.

A transportation project that cost billions of dollars ought to have value after 20 to 25 years; and should not exacerbate the problems that the transportation project was supposed to address. The design year of 2040 is unreasonably soon. Large, expensive, infrastructure projects ought to be based on a 100 to 200-year vision, not a 20-year shelf life. The TxDOT, Harris County, Houston, and others should develop a plan that aligns resources and projects in the pursuit of a long-term vision, such that the place gets better with each change. A “vision” is a public consensus about what the place ought to be like in 100 to 200 years.

CHAPTER 4
EQUITY

INEQUITABLE IMPACTS

The FEIS and its alternatives seem to favor white communities while disproportionately impacting communities of color. In areas with more white residents, the freeway is likely to be depressed, narrowed, or removed; parks are also more likely to be proposed. In areas with more Black and Hispanic or Latinx residents, the freeway is likely to be widened and residential and commercial properties are more likely to be taken for the freeway project or otherwise negatively impacted.

Alternatives that avoid negative impacts to Black and Latinx communities and result in desired outcomes, including fewer fatal collisions, a more effective strategy for emergency evaluation, less severe flooding should be considered and fully evaluated.

SUPPORTING MATERIAL

DISPROPORTIONATE IMPACTS ON COMMUNITIES OF COLOR

The proposed mitigation strategy seems to be based primarily on an evaluation of financial impacts but not on social, cultural, family, or historic impacts. The impacts of the NHHIP will displace single family homes, multi-family homes, businesses, schools, and places of worship in historic and culturally significant African American communities. Significant freeway widening is proposed adjacent to the historically Black (but gentrifying) neighborhood of Third Ward but while the proposed right-of-way impacts seem minimal, significant damage was already caused by the original freeway project which are intensified by the impacts from the NHHIP.

This project almost exclusively negatively impacts Black and Hispanic or Latinx communities. Proposed mitigation strategies such as freeway removals, depressed freeway segments and freeway caps are being proposed near predominantly white (or gentrifying) communities including Midtown/Montrose, Woodland Heights and East Downtown. In Segment 1, the freeway will be widened and/or elevated; this is the longest segment in the project and the negative impacts are nearly exclusively to Black and Latinx communities. In Segment 2, negative impacts are nearly exclusive to Latinx communities; whereas in locations where there are more white residents, a park (freeway cap) or freeway removal is proposed. In Segment 3, Black and Latinx communities will be negatively impacted, while the white and/or less populated area is mitigated with the depression of the freeway below grade and the construction of a park. (See **Figure 4**). While the intent of this project may not be to purposely disadvantage people and communities of color, the overwhelming fact is that it does.

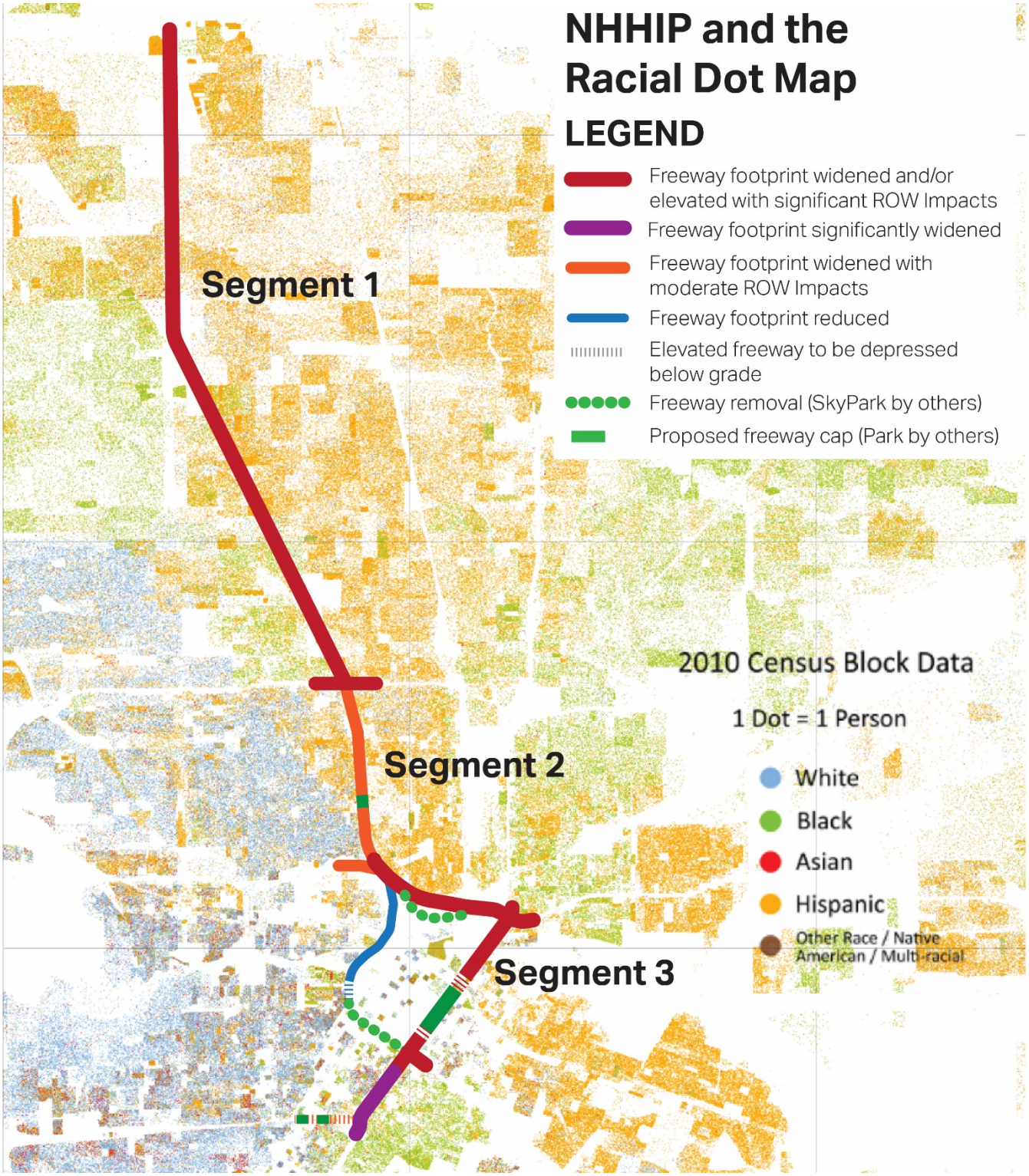
SYSTEMIC/STRUCTURAL RACISM

The Aspen Institute defines Structural Racism as “A system in which public policies, institutional practices, cultural representations, and other norms work in various, often reinforcing ways to perpetuate racial group inequity. It identifies dimensions of our history and culture that have allowed privileges associated with “whiteness” and disadvantages associated with “color” to endure and adapt over time.” Deep racial and ethnic inequities exist in the City of Houston and in Harris County today and these inequities will be reinforced and continued with the construction of this project. Housing and commercial property values adjacent (and near adjacent) to the freeway will likely decline, limiting

family wealth generated through long-term property ownership, and growth of generational wealth enjoyed by other communities.

It should also be noted that Independence Heights (located northwest of downtown Houston, just west of and adjacent to Segment 1) was listed in the National Register of Historic Places on June 4, 1997. Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 prohibits agencies, including the Texas Department of Transportation, from impacting historic properties, unless there is no feasible and prudent alternative to the use, and the action includes all possible planning to minimize harm to the property. There are feasible alternatives. This is a fatal flaw of the proposed project.

Figure 4: NHHIP Impacts and Racial Dot Map



CHAPTER 5
EVACUATION

EFFECTIVENESS OF THE NHHIP EMERGENCY EVACUATION PLAN

Emergency Evacuation is cited in the FEIS as being a motive for widening the highway. I-45 narrows to four lanes at about a third of the way along the route from Houston to Dallas; adding more lanes to the already widest parts of I-45 is not a credible strategy to help with evacuation. The bottleneck is well north of the study area which means that the widened section of the highway will only serve as additional storage space for motorists moving at a crawl on an access-limited highway.

SUPPORTING MATERIAL

BOTTLENECK NORTH OF THE STUDY AREA

Section 1.2.3 of the FEIS states “Another safety issue for the Houston region is emergency evacuation. I-45 is identified by H-GAC as an emergency evacuation route for the Houston-Galveston region in the event of a major storm, hurricane, or chemical spill. During Hurricane Rita in 2005, approximately 2.5 million people attempted to evacuate the region, resulting in stopped traffic for miles on major arterial freeways, where it took up to nine hours to travel a distance of 10 to 20 miles. A similar situation also occurred during the evacuation for Hurricane Ike in 2008 and it was determined that there was a need to improve this evacuation route.”

The FEIS attempts to make the case that the project is justified for evacuation purposes. Sentence 1 identified I-45 is an evacuation route. Sentence 2 and 3 contains some general statistics about the failure of the region’s highways to evacuate people in 2005 and 2008. If the FEIS’ statistics are true, then some motorists may have been travelling at an average of 1.7 MPH i.e. [(10 miles +20 miles)/2) / 9 hours]. For purposes of comparison, a pedestrian walking at 3 mph, could walk that distance in almost half the time. Not surprisingly, sentence 4 states that the evacuation route needed to be “improved”.

It is understood that the evacuation route may need “improvements” but nowhere does the FEIS show any data, analysis, or other information that proves that the proposed widening will help during an evacuation.

It can be argued that an evacuation route is only as effective as its part with the least motor vehicle capacity. With the assumption that, during an evacuation, motorists will evacuate to the north from Houston-Galveston towards Dallas or places beyond. I-45 is already eight or more lanes up to and past Beltway 8. However, north of Huntsville, I-45 is four lanes (i.e., two lanes northbound and two lanes southbound); it should also be noted that Huntsville is not even a third of the way to Dallas. Therefore, it can be argued that the bottleneck is not at the existing 8-lane section but at the 4-lane section (north of Huntsville). In addition, the 4 northbound lanes (between downtown and Beltway 8) are not the only lanes feeding traffic to the north; there are approximately 40 lanes of northbound on-ramps, leading onto I-45 between I-610 and Huntsville. If the southbound lanes and ramps are reversed to flow northbound (which is typical during an emergency evacuation), then there will be roughly 40 additional on-ramps delivering traffic northbound. In sum, there would be 80 on-ramps in addition to the existing 8

lanes of mainline traffic, all leading into four lanes. It seems obvious that the bottleneck during evacuation operations is not within the study area so adding more lanes to the already widest part of the highway (south of Beltline 8) is not a credible strategy as suggested by the FEIS. On the face of it, billions of dollars will be spent on this widening project but will do nothing to help with evacuation. Considering how badly the interstates performed in the past, perhaps the wisdom of the evacuation strategy should be revisited.

CHAPTER 6
FLOODING

DECOUPLING FLOODING MITIGATION AND HIGHWAY WIDENING

Much of Houston and Harris County suffers from flooding. Flooding can be addressed in a number of ways, many of which have been specifically identified in association with the 2018 bond program and based on scientific environmental analysis at the watershed level. Harris County does not generally experience isolated or infrequent flooding, rather flooding is a systemic problem that is likely to become more destructive and expensive as a result of more severe weather, storm events, and global warming. The proposed highway widening project will not solve Harris County's flooding problem and, like squeezing a balloon, isolated improvements are likely to result in higher waters elsewhere. Flooding should be addressed at the watershed level, consistent with the County's adopted strategy. Flooding mitigation should be decoupled from the proposed project and removed from the Need and Purpose statement.

SUPPORTING MATERIAL

It is feasible to mitigate the existing flooding issues without widening the highway. The justification for the highway project should be made on transportation grounds, not flooding grounds. The flooding issues should be addressed otherwise, and separate from, consideration for this project.

It can also be argued that the proposed highway widening will increase the quantity of storm water runoff by increasing the area of impervious surfaces and thus, require a larger mitigation effort. The FEIS indicates the ability to mitigate the existing impervious surface area and the additional impervious surface area that will be caused by the proposed widening project. In other words, the problem of impervious area is being increased and, consequently, will required a larger mitigation effort. When instead, the impervious area should be reduced as to not rely on such large mitigation efforts.

CHAPTER 7
CONCLUSIONS

The rationalizations for the FEIS' preferred highway widening project involve six main ideas: i) congestion; ii) safety; iii) evacuation; iv) flooding; v) equity; and vi) the breadth of options considered. It is the job of the FEIS to prove that the widening is the best option, from a range of options, using credible data, not presumptions.

Congestion: The data, from TxDOT, shows that traffic volumes on I-45 have been dropping since 2008. The FEIS projected that, starting back in 2015, the traffic volumes would rise 40% by 2040. That projection is not credible. The data from the first five years of that projection shows traffic volumes going down. The assumptions and modeling in the FEIS simply got it wrong. The FEIS failed to prove, with data, that the traffic volumes will rise at all, let alone by 40%. The congestion-based justification for the highway widening is invalid.

Safety: The FEIS states that the widening will increase travel speeds on I-45 and increase safety. The data from TxDOT itself, from other highways in Texas, and from published risk factors show that, with increased speeds and more lanes, the safety will decrease on I-45. The FEIS' claims directly conflict with the safety data and facts. The FEIS claims that addressing "substandard" design characteristics of the highway will increase safety but has no data to substantiate the claim. Federal and TxDOT guidance states that "substandard" design characteristics are insufficient justification for a project without supportive data. The FEIS indicates that congestion contributes to the safety problems. However, the data shows safety rates being either better or unchanged during the congested periods of the day. The safety-based justification for the highway widening is invalid.

Evacuation: The FEIS described the severe queuing problems during previous evacuations in 2005 and 2008. The FEIS states that the widening is needed to help with evacuations but provides no explanation or data supporting how the widening would help. The bottleneck is not even in the study area. Adding lanes to the widest part of the highway does nothing to the bottleneck which are the six and four-lane parts of I-45 to the north. The evacuation-based justification for the highway widening is invalid.

Flooding: The FEIS suggests that the flooding problems should be addressed. However, solving flooding problems is not justification for widening a highway, especially when that widening increases the impervious surface area. The flooding-based justification for the highway widening is invalid.

Equity: Helping to increase the mobility of communities of color and low income would be a praiseworthy pursuit of TXDOT and other public agencies, especially when previous highway projects damaged those communities and altered land use patterns, exacerbating their mobility challenges. Advancing equity was not a goal of the FEIS. In fact, every option that the FEIS considered "reasonable" inflicted more damage on communities of color and low-income communities, in a disproportionately high manner with less mitigation, compared to whiter and wealthier communities. Any equity-based justification or rationalization for the highway widening is invalid.

Breadth: The FEIS was supposed to look at all the options and, based on an objective and data-driven analysis, pick the best one. This project is about "Transportation," not "Highway Building." However, the highway bias began in the title of the FEIS, permeated the Need and Purpose statement, dominated the criteria, was reflected in biased language, and effectively monopolized the options considered. The FEIS's outcome was predetermined to be a bigger highway. Entire categories of options were not considered. The few non-highway ideas were strawman options. They did not stand

a chance and were dismissed. Any justification for accepting the FEIS as being either complete or objective is invalid.

The supporting data is not in the FEIS and what was provided was insufficient or incorrect. The highway widening was probably not the best option. We don't know definitively what the best option would be because all the options that were considered reasonable were highway widening options. However, the patterns from world class cities/regions (i.e., high quality of life, equitable, healthy, viable mode choices, attractive…) don't support such a proliferation of highways and widening projects that we see in Houston. Specifically, under some scrutiny, the FEIS' narrowly focused, pro-speed, and pro-highway widening justifications did not stand up well; they were found to be flawed or invalid. The FEIS should be rejected and replaced with a process and FEIS that is objective, inclusive, contextual, and advances options that can be justified with real data.

The data presented in the FEIS does not support moving forward with the NHHIP.

For a more productive use of public funds and an outcome more satisfactory to residents and businesses, TxDOT, Harris County, the City of Houston, and potentially others ought to collaborate on a shared set of values, develop a vision, establish roles, determine context zones and associated planning and design principles. The shared vision could be used as a foundation for land use planning, transportation planning, and other important regional infrastructure decisions. Collaborative leadership on behalf of TxDOT, Harris County, and the City of Houston will position the region to address the monumental challenges of economic resilience in a dramatically changing world, climate change and adaptation, public health, equity, disaster preparedness, and mobility for all.