

# Harris County Freight Study

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# Agenda

- Introduction
- Harris County Multimodal Freight Network
- Commodity Flow, Supply Chains, and Economic Impact Analysis
- Truck Origin-Destination Analysis
- Multimodal Freight Network Needs and Challenges
- Project and Policy Recommendations



# Introduction

Freight tonnage **980**  
is expected to million tons  
grow

**719**  
million tons



2022

2050

**\$372.1B**  
63% of  
Total GDP



# Study Purpose & Goals

**Purpose:** to remain economically competitive by investing in infrastructure and developing policies for a resilient, safe, and efficient movement of goods

## Goals

- Improve freight mobility, efficiency, and resiliency to make the **network more reliable and dependable**
- Strengthen **economic** vitality and competitiveness
- Improve **safety**
- Reduce **environmental and social** impacts
- Enhance **equity**



# Steering Committee & Stakeholders

## Steering Committee

- Commissioner Precincts
- Judge's Office
- Office of the County Engineer (OCE)

## Public Stakeholders

- TxDOT
- H-GAC
- City of Houston
- Port Houston
- Houston Airport System

## Private Stakeholders

- Texas Trucking Association & Economic Alliance Houston Port Region, Railroads
- Trucking & Shipping Companies
- Petrochemical, Food & Beverage
- Transport & Logistics, Construction
- Commercial & Industrial Real Estate



# Previous Studies

- **Existing Harris County Truck Route Plan (2016)**
- **Recent Freight Plans in Texas**
  - Texas Rail Plan (Dec 2019)
  - H-GAC Ports Area Mobility Study (Jan 2020)
  - TxDOT Houston District Truck Mobility Study (Nov 2020)
  - Houston-Beaumont Region Freight Rail Study (Sep 2021)
  - TxDOT Houston District Regional Express Access Lanes Plan (Jan 2023)
  - Texas Freight Mobility Plan (Mar 2023)
  - H-GAC Regional Goods Movement Plan (Aug 2023)
  - City of Houston Truck Route Plan (Nov 2023)



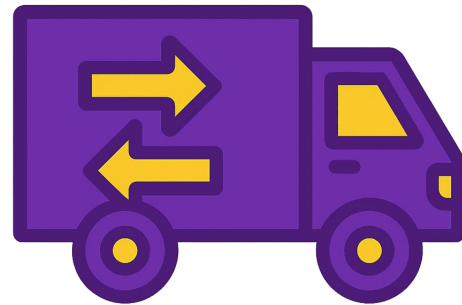
# Study Methodology & Data

## Existing Freight Mobility



FHWA  
TxDOT  
H-GAC

## Commodity Flow and O-D Analysis



Transearch  
Carload Waybill  
Sample  
ATRI

## Identify Freight Needs



Stakeholder data:  
Safety  
Infrastructure  
Mobility

## Recommendations



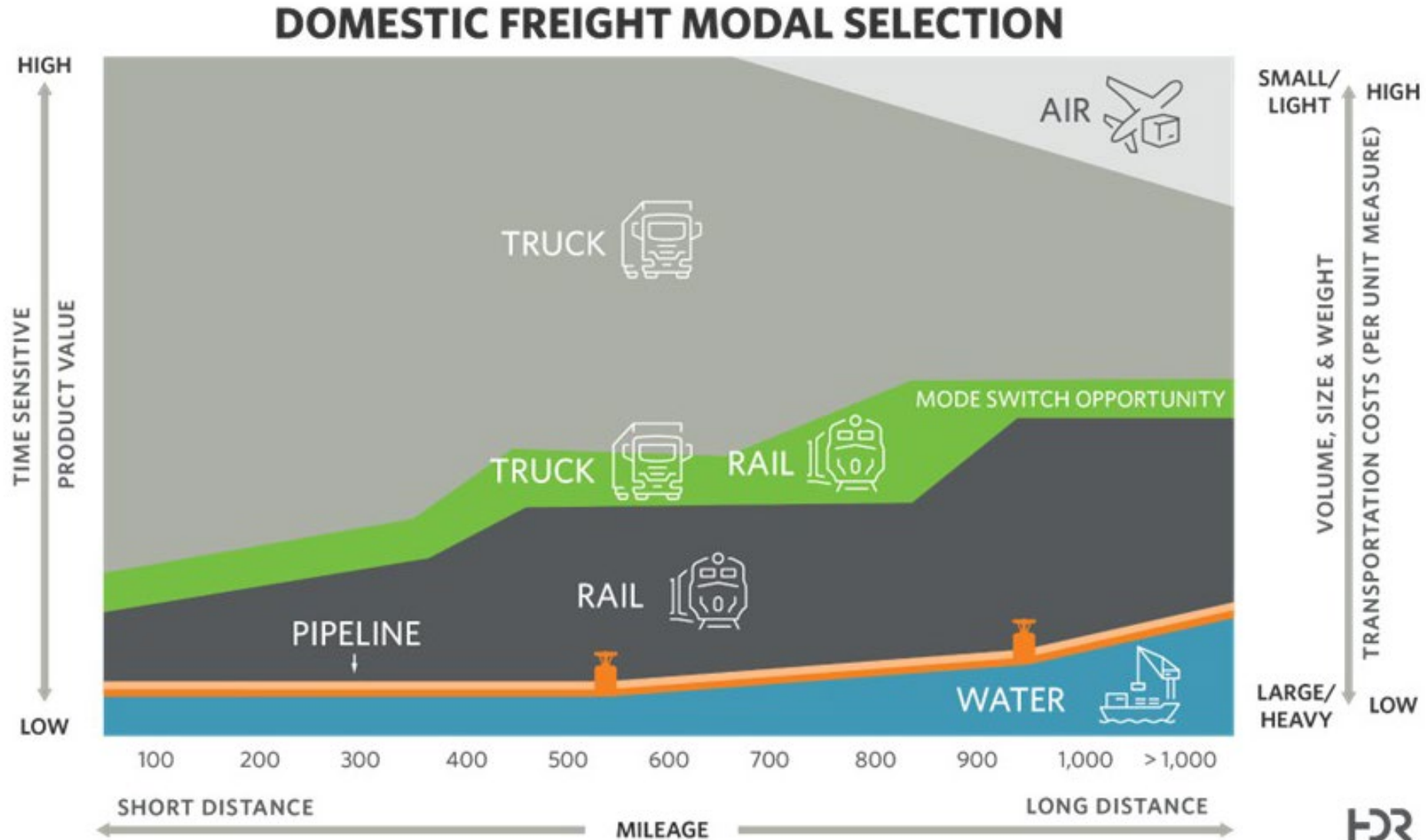
Freight  
Programs  
Actions



# Harris County Multimodal Freight Network



# Multimodal Freight Movement Overview



Source: K.J. Bucklew - October 2021



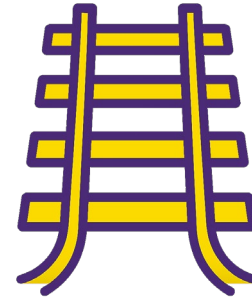
# County Freight Network Components



Three Airports



Port Houston  
Houston Ship  
Channel



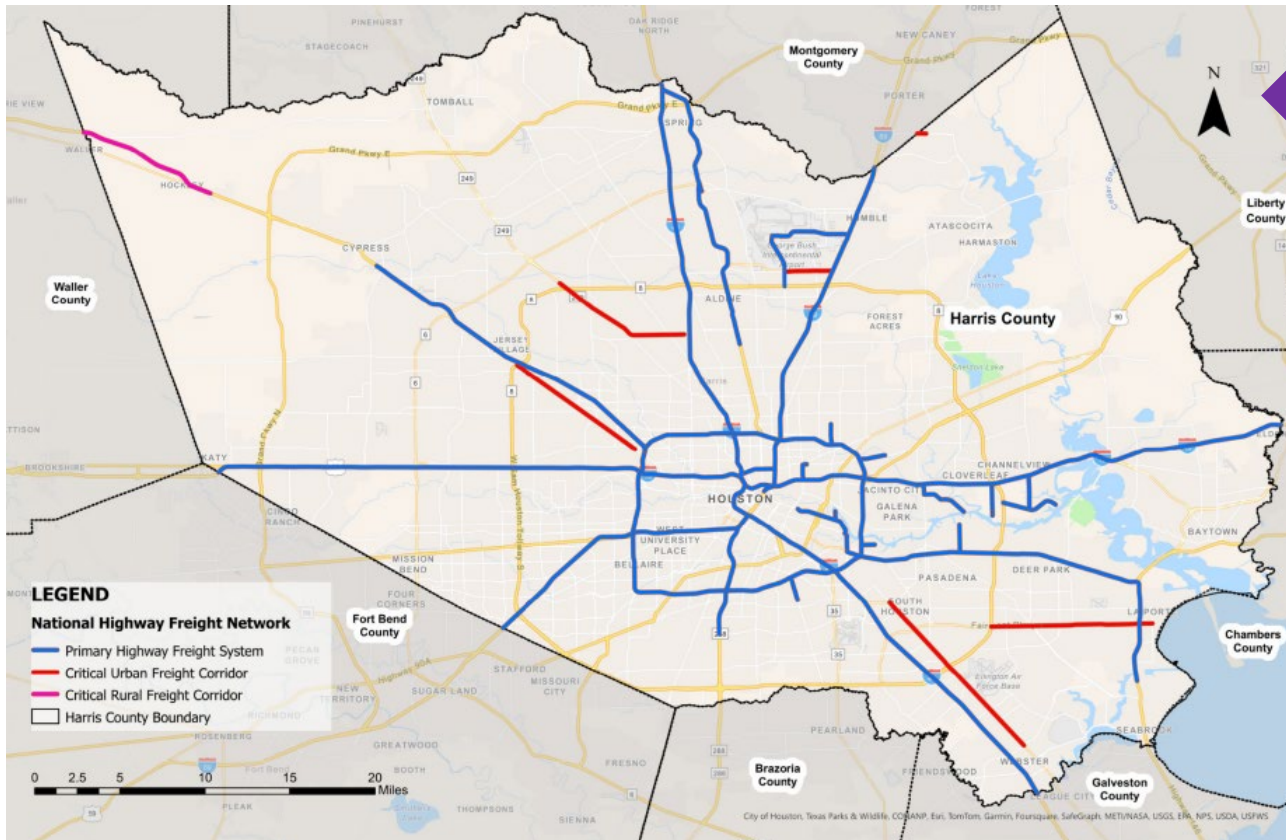
800 Miles Railway  
400 Freight  
Terminals  
660 Public At-  
Grade crossings



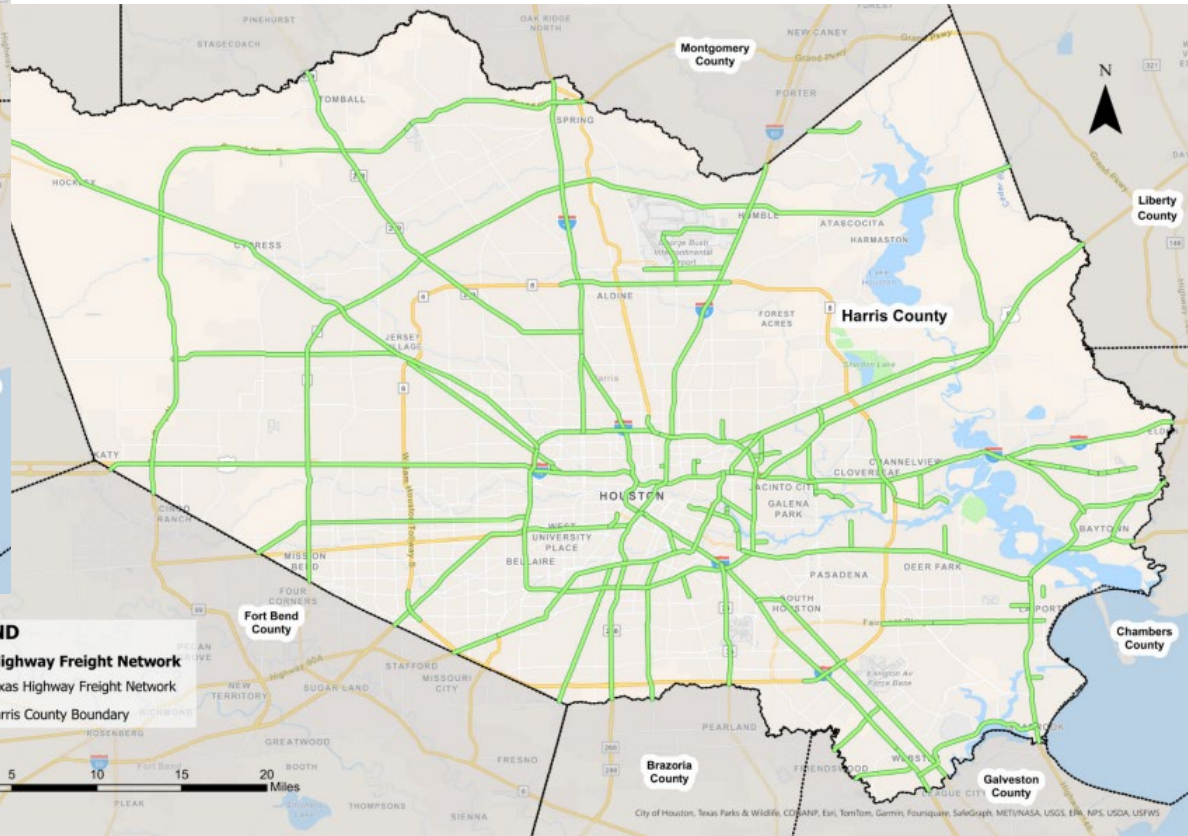
7055 miles  
Pipelines



# ...and Roadway Freight Network

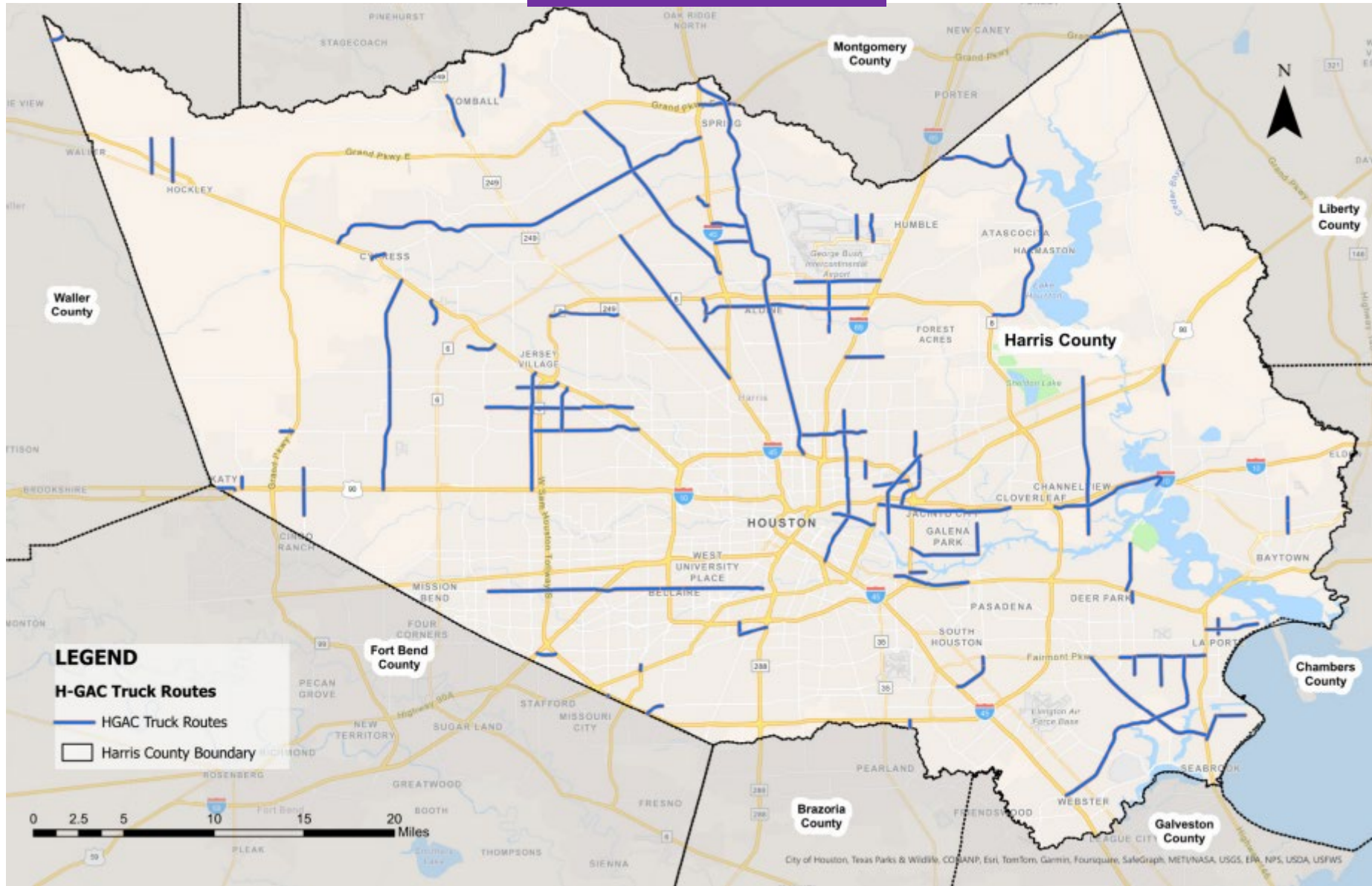


National Highway Freight Network



Texas Highway Freight Network

# H-GAC Truck Routes



# Commodity Flow & Economic Analysis



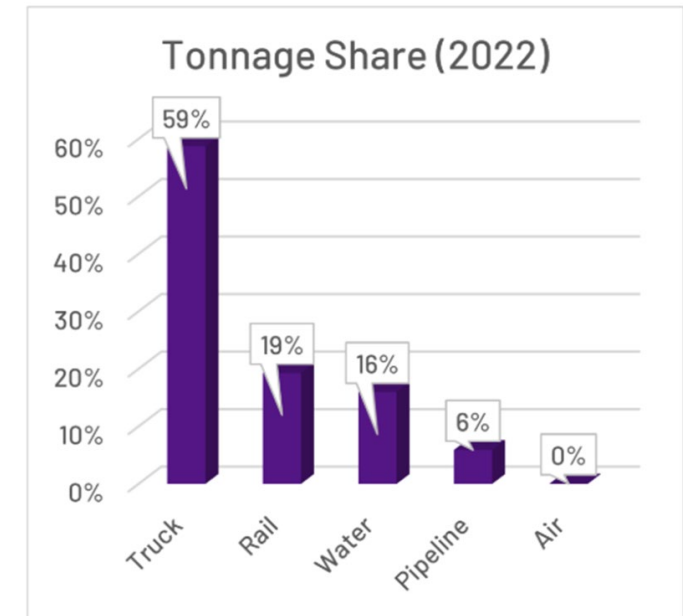
# Commodity Flow Analysis

## • Transearch Data

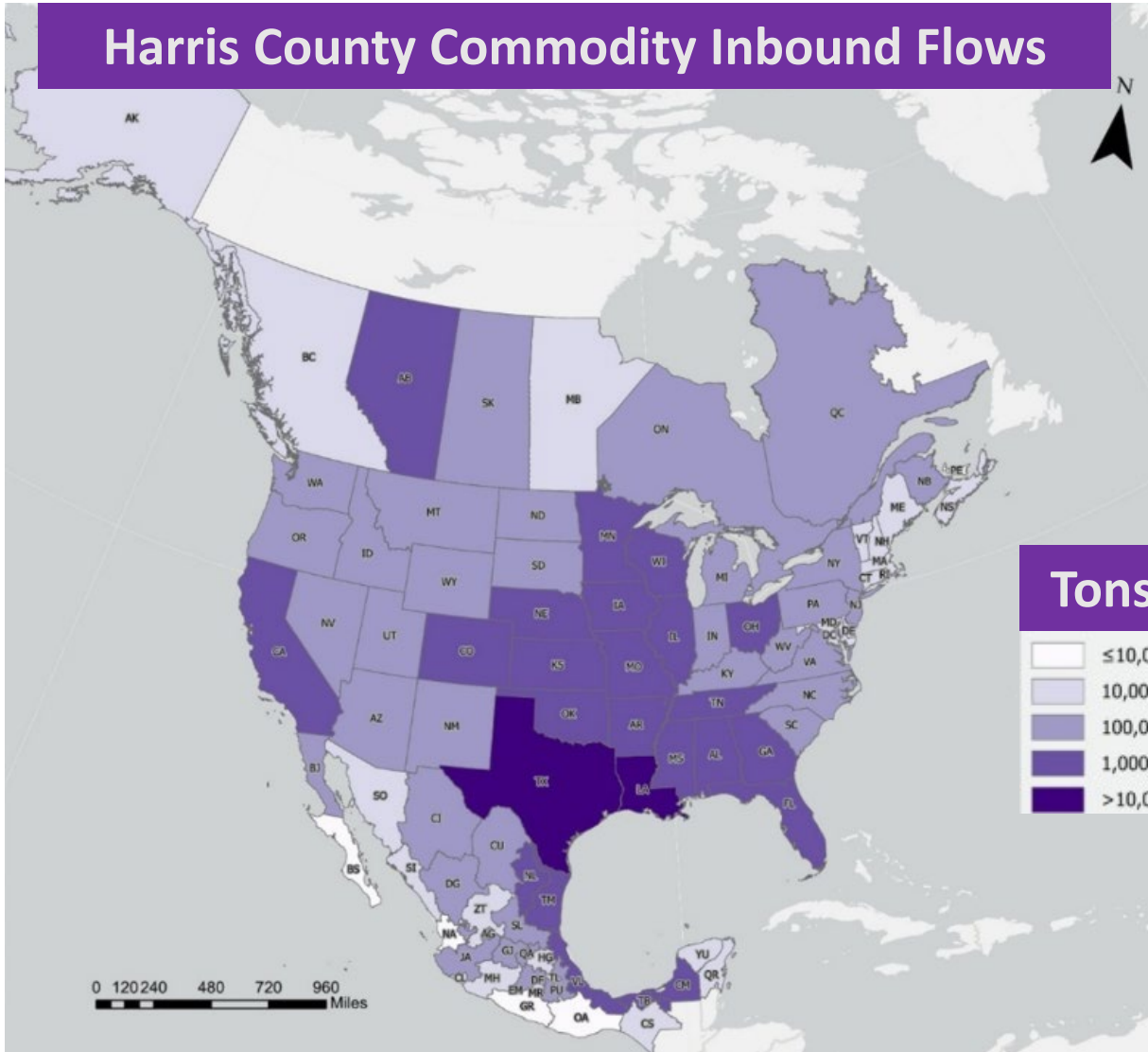
- From 2022, forecast year 2030, 2035, and 2050
- County-to-county modal freight movement

## • Analysis Results

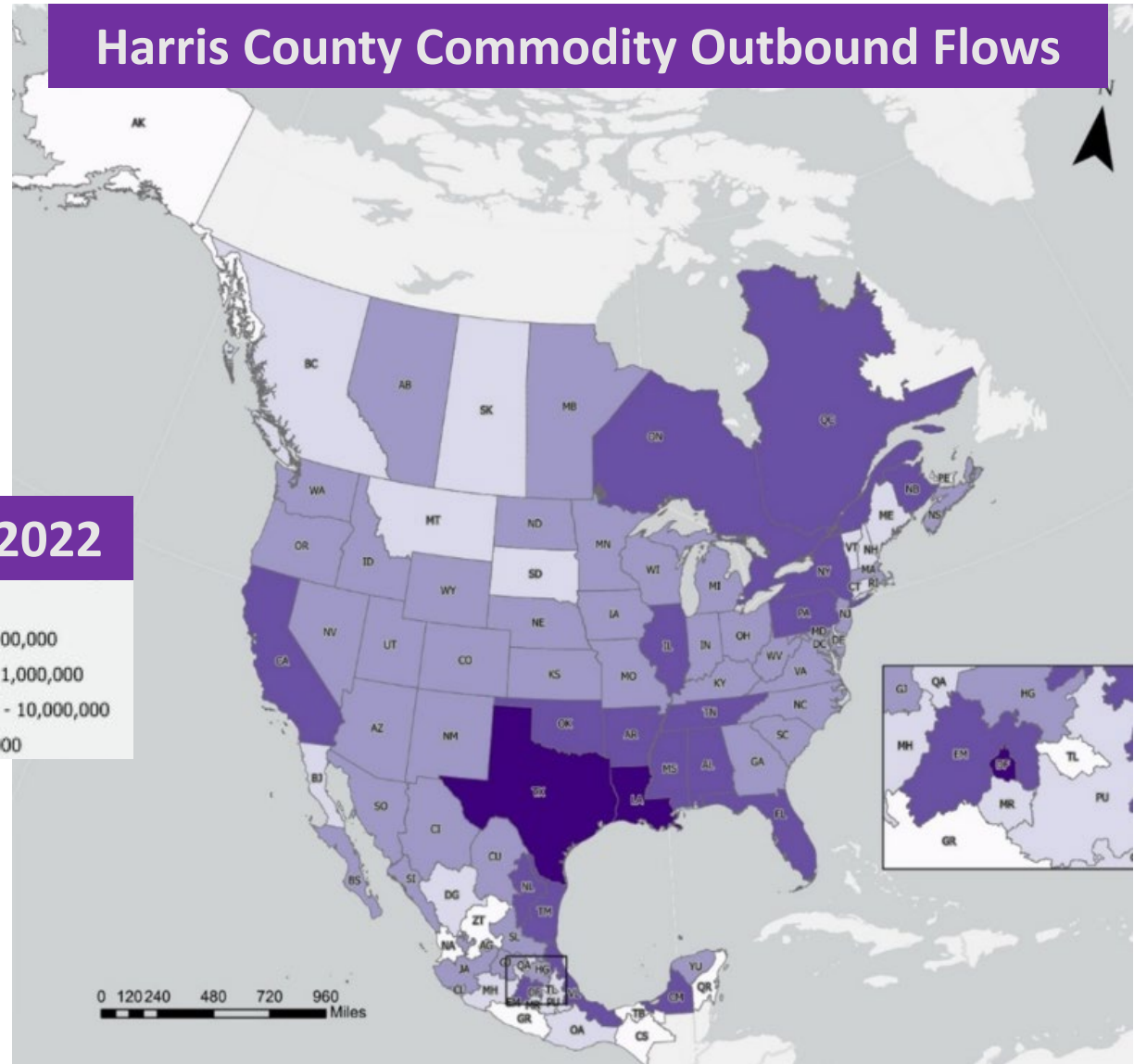
- 719M tons freight valued \$970B moved
- About 60% freight are transported via trucks
- Petroleum and chemical products are top commodities
- With 1% growth rate on freight tonnage, truck trip would increase > 50% in 2050



# Harris County Commodity Inbound Flows



# Harris County Commodity Outbound Flows



# Economic Impact Analysis Results

- Harris County Freight Industry Total Contribution**

Employment	Total Labor Income	Value Added: Contribution to Harris County GDP
1,755,150 Jobs	\$195.6 Billion	\$372.1 Billion

- Value-Added Impact of Freight Industry**

Economic Indicators	Value-Added	% Contribution
Direct	\$291.7 Billion	78%
Indirect	\$41.7 Billion	11%
Induced	\$38.7 Billion	10%
<b>Total</b>	<b>\$372.1 Billion</b>	<b>100%</b>

**63% of Total GDP \$586.4 Billion**



# Truck Origin-Destination Analysis



# Truck Origin-Destination Data & Analysis

- **American Transportation Research Institute (ATRI)**

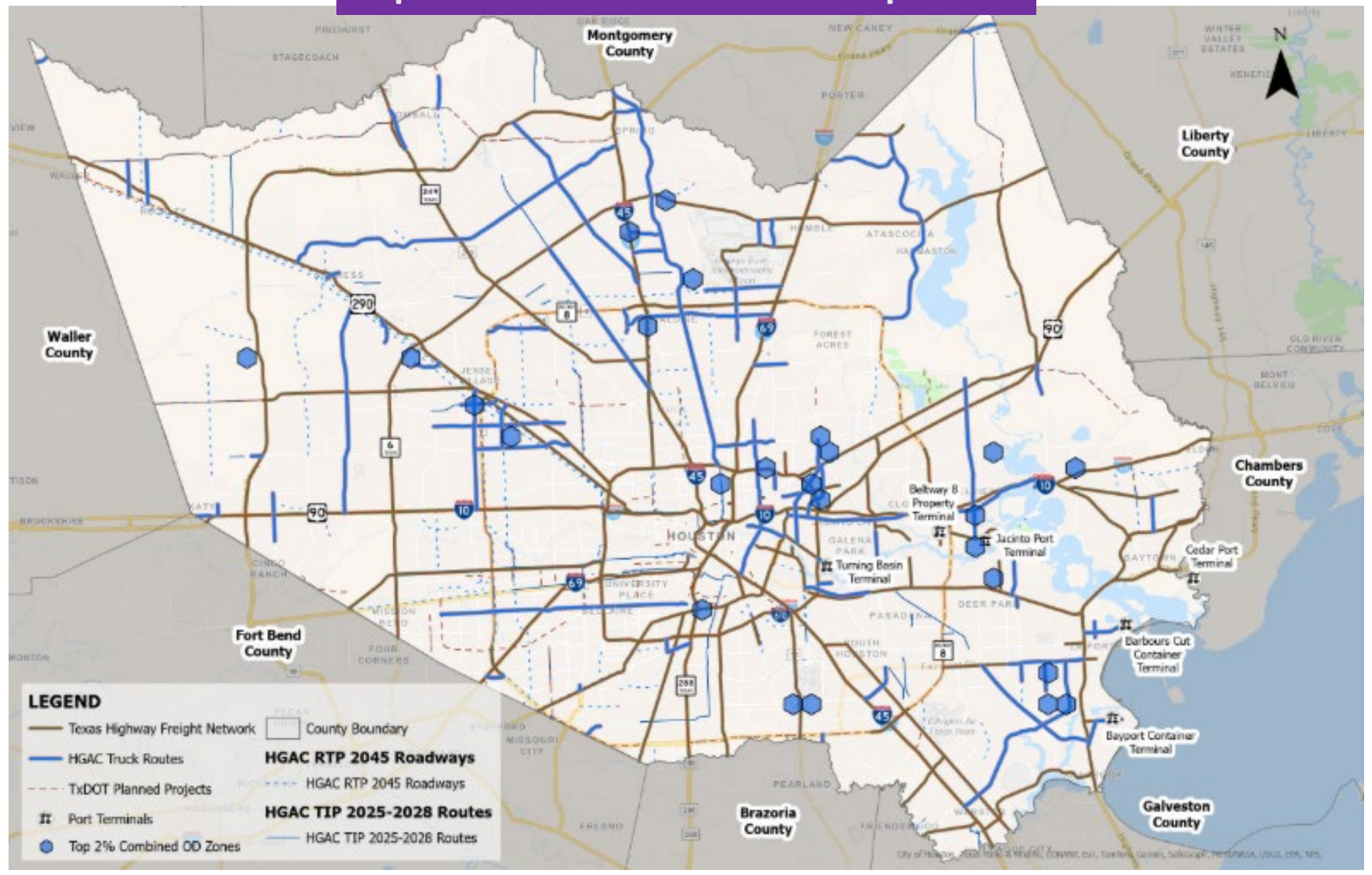
- GPS probe data (4-week data)
  - Aug & Oct 2023, Jan & Apr 2024
- Truck movements From, To, and within Harris County
- A total of 1,245 zones (1-mile hexagons) analyzed

- **Results**

- A small set of the zones accounts for ~ half of all truck trip ODs
- Decisive role of Port Houston's container terminals

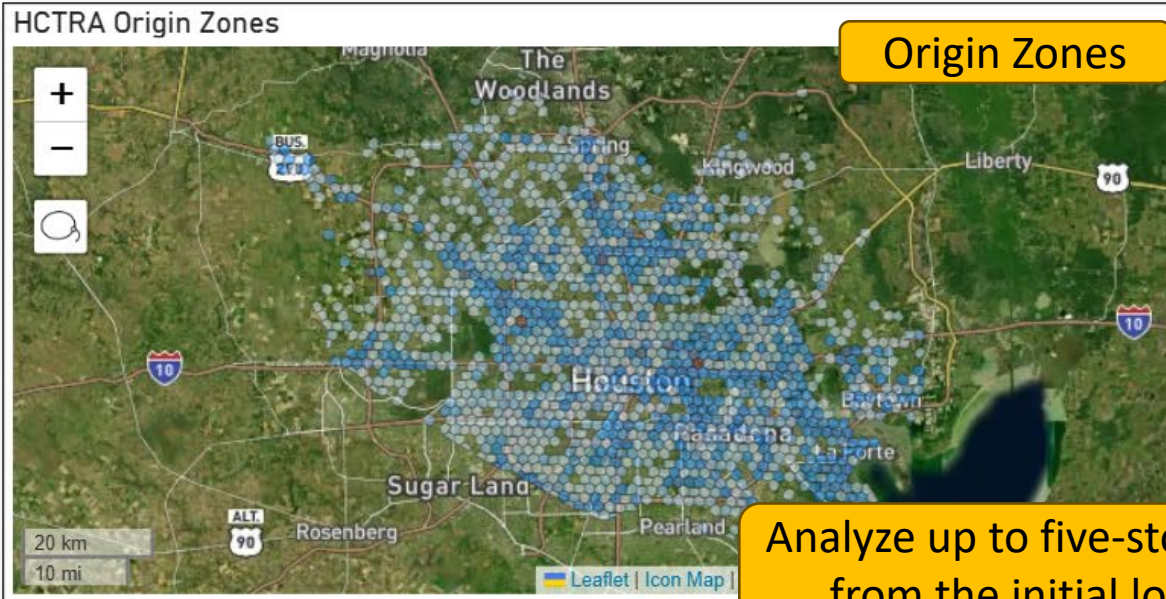


# Top 2% Combined Truck OD Trip Zones

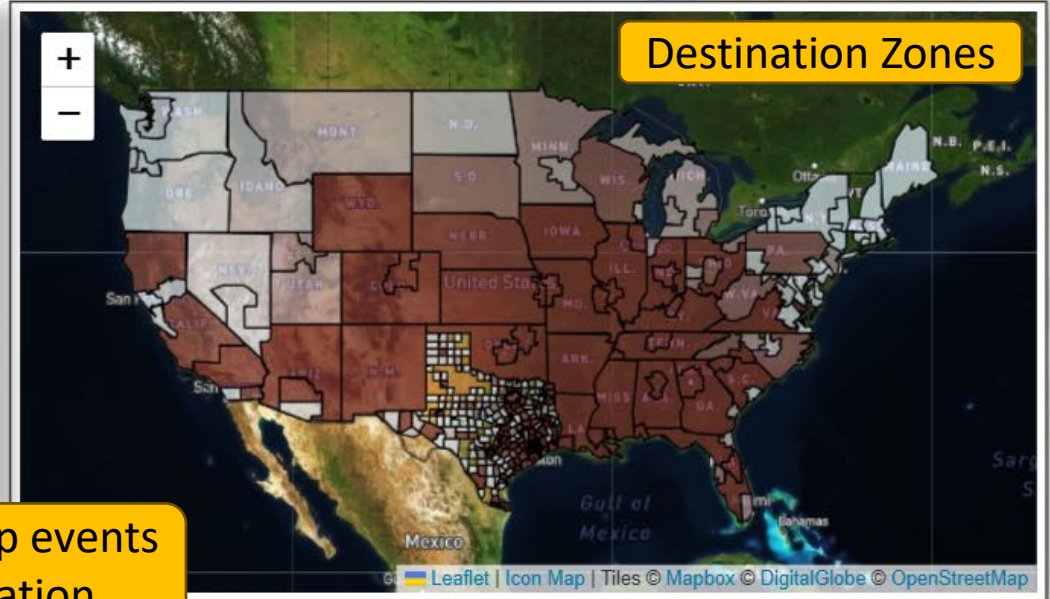


# HCTRA Truck Route Study - Truck Origin-Destination

## Origin Dashboard



Origin Zones



Destination Zones

Analyze up to five-stop events from the initial location

### Destination Zone Filter

- Counties Within Texas
- Custom Zones within Harris County
- States and Metro Areas Outside Texas
- Urban Areas Within Texas

Filter by how many stops since origin

Stops:

Within Zone Filter

- Trip ends outside of starting zone
- Trip starts/ends within same zone

Allows filtering out trips that start and end in the same zone

### Top Connecting Zones by Trip Count

Destination Zone	Truck Trip Count	% of Truck Trips
1433	6,268	3.3%
735	6,249	3.3%
Dallas--Fort Worth--Arlington, TX	4,039	2.1%
1063	3,874	2.0%
Houston, TX	3,565	1.9%
1323	3,320	1.7%
507	3,211	1.7%
1225	3,171	1.7%
LA remainder of state	2,703	1.4%
211	2,640	1.4%
<b>Total</b>	<b>190,130</b>	<b>100.0%</b>

Destination Zones Sorted Based on Truck Trip Counts



# Multimodal Freight Network Needs & Challenges



# Multimodal Freight Network Needs

- **Air**

- IAH cargo area expansion → road access to IAH

- **Maritime**

- Port Houston & Houston Ship Channel expansion project → roadway capacity ↑

- **Rail**

- Last-mile track maintenance, single track → train stops, longer trains → blockage

- **Roadway**

- Congestion, infrastructure (bridge, pavement, resiliency)

- **Freight Externalities**

- Truck crashes, truck parking, truck emissions, railroad crossing blockage



# ArcGIS Dashboard

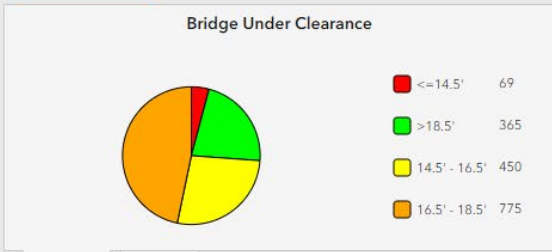
## Freight Infrastructure, Conditions, and Restrictions Dashboard

Filter by Precinct  
Show All

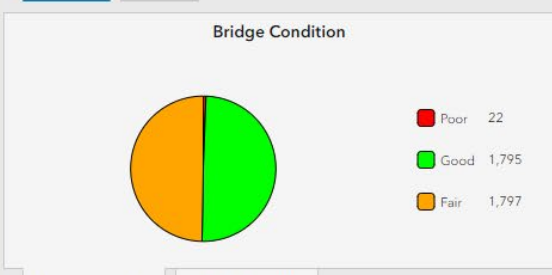
**Filter by Precinct**



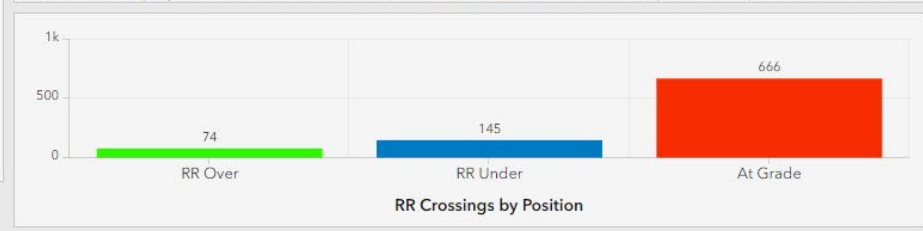
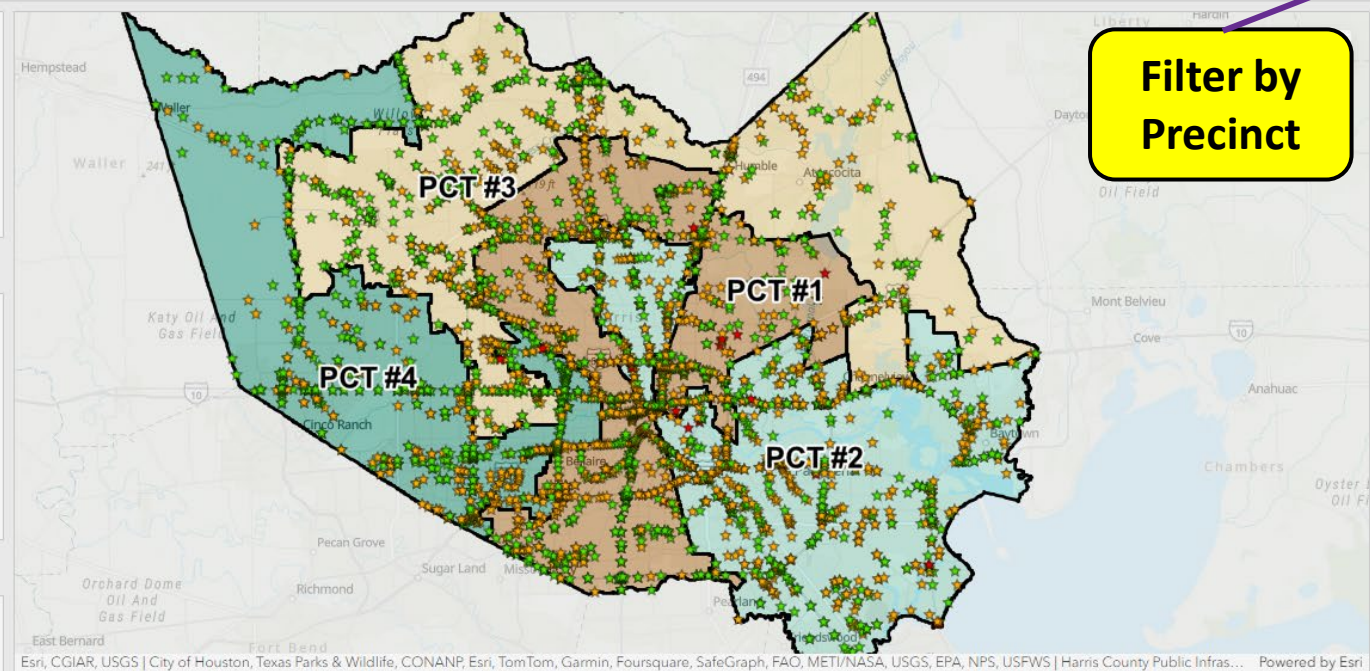
Major Roads | Local Roads



Under | Over



Bridge Cond. | Culvert cond.



Truck Parking  
**2363**

### Bridge Conditions

Bridges Condition

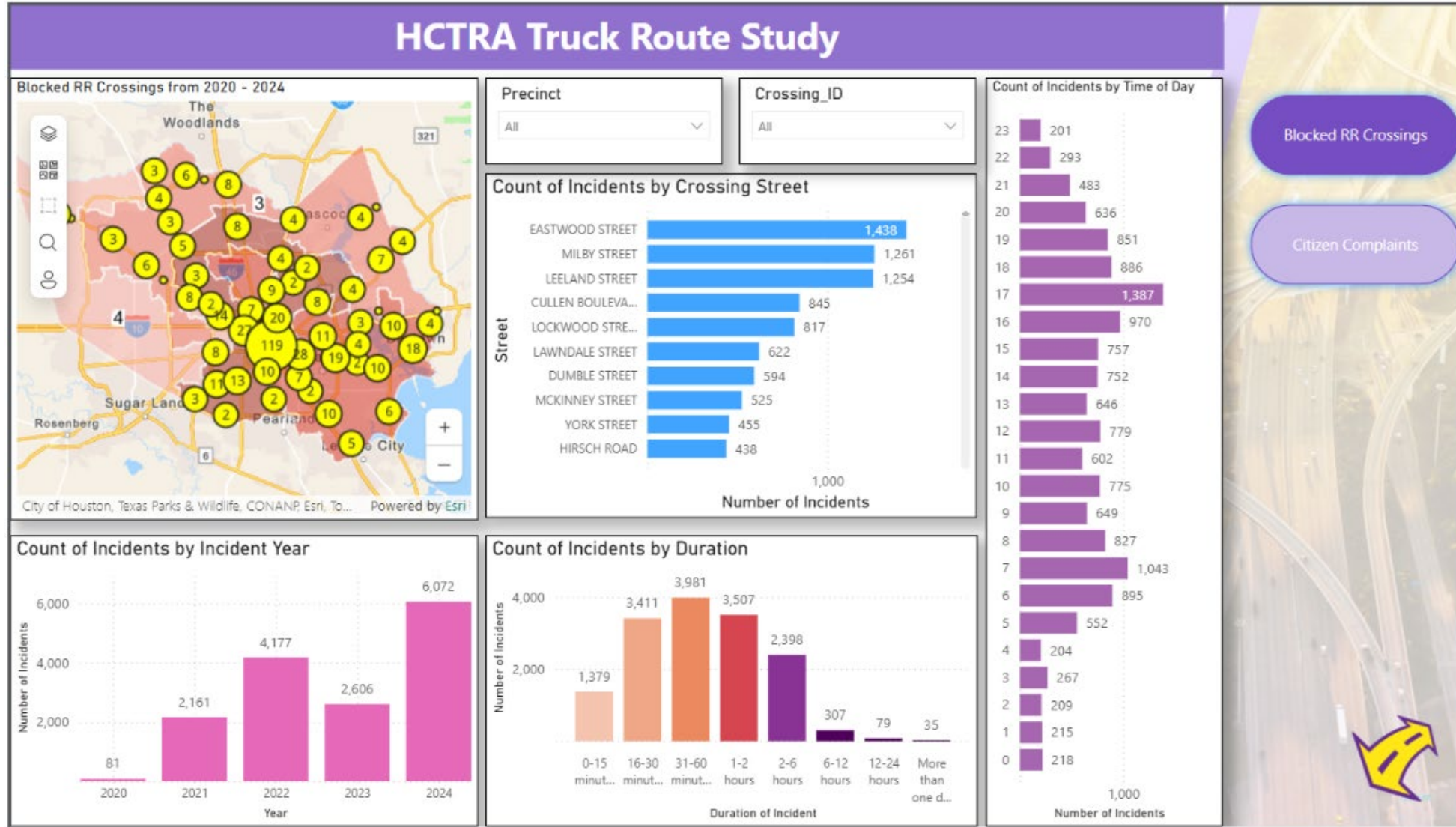
- ★ Good
- ★ Fair
- ★ Poor

### Harris County Precincts

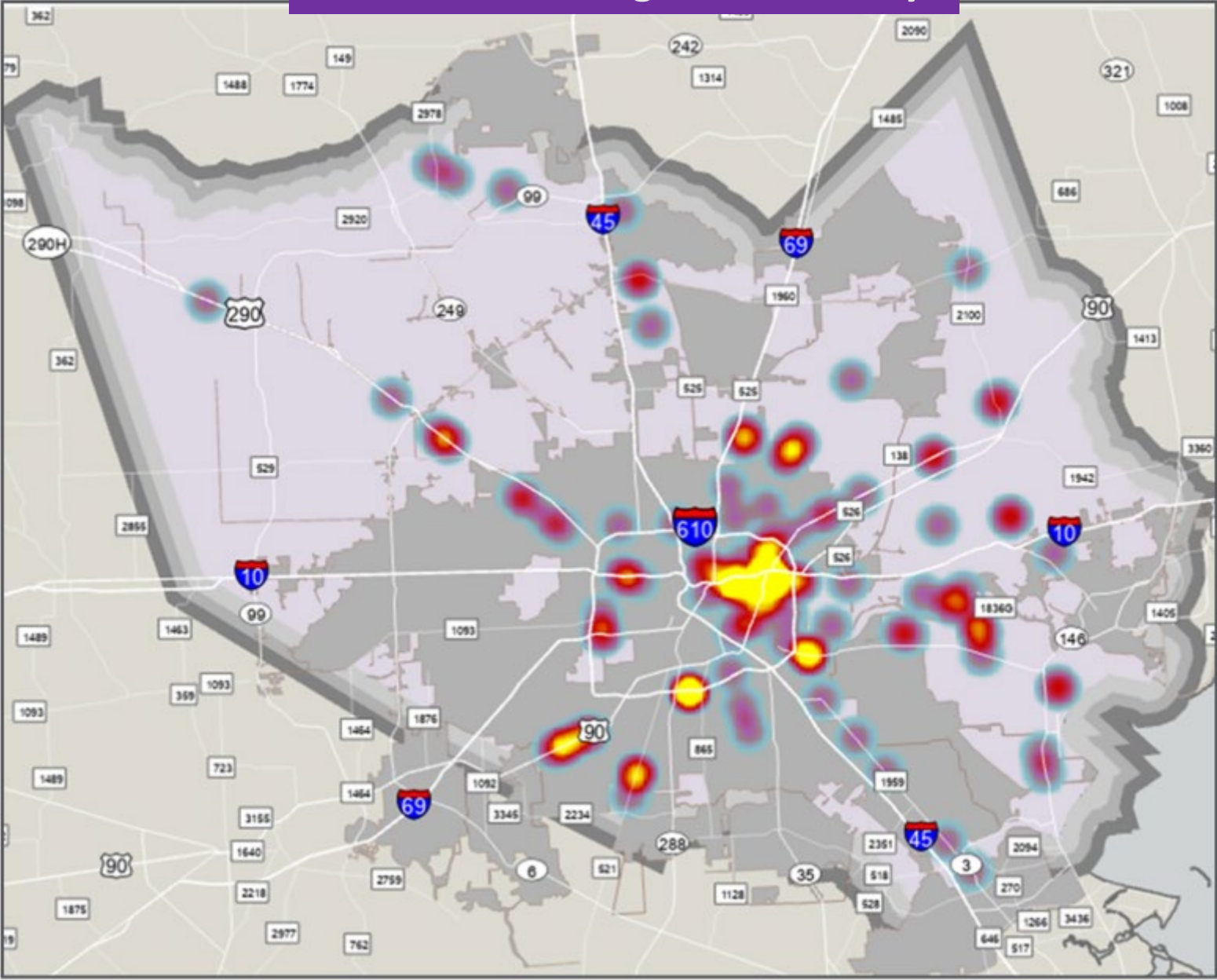
- Precinct 1
- Precinct 2
- Precinct 3
- Precinct 4



# Blocked Railroad Crossing Dashboard



# Railroad Crossing Crash Density



# Identification of Freight Projects, Policies & Programs



# Steering Committee & Stakeholder Inputs

## • Steering Committee Meetings

- Importance of reliable current transparent data to support prioritization
- Concerns about data imbalance → equity applied as a qualitative tool
- Truck operations in residential areas and the need for enforcement strategies

## • Stakeholder Interviews & Surveys

- Congestion near freight hubs → improve local access
- Limited truck parking (theft risks, enforcement, few overnight facilities)
- Interest in dedicated truck route, off-peak movement, freight technology
- Disruption from weather, construction, labor shortage
- Environmental and social impacts, esp. disadvantaged communities
- Interagency coordination



# Scoring Category & Indicator Weighting

Category	Category Weight	Indicator	Indicator Weight
Safety	40%	Truck Crash Rate	30%
		Truck Fatal and Injury Crash Rate	55%
		At-Grade RR Xing Crashes	15%
Infrastructure	30%	Pavement Condition	30%
		Bridge Condition	20%
		Bridge Loading	10%
		Vulnerability Index	15%
		Criticality Index	25%
Mobility	30%	ADT	10%
		Truck ADT	20%
		Heavy Truck ADT	25%
		Truck Delay / mile	20%
		Truck 95th% PTI	10%
		At-Grade RR Crossings	15%

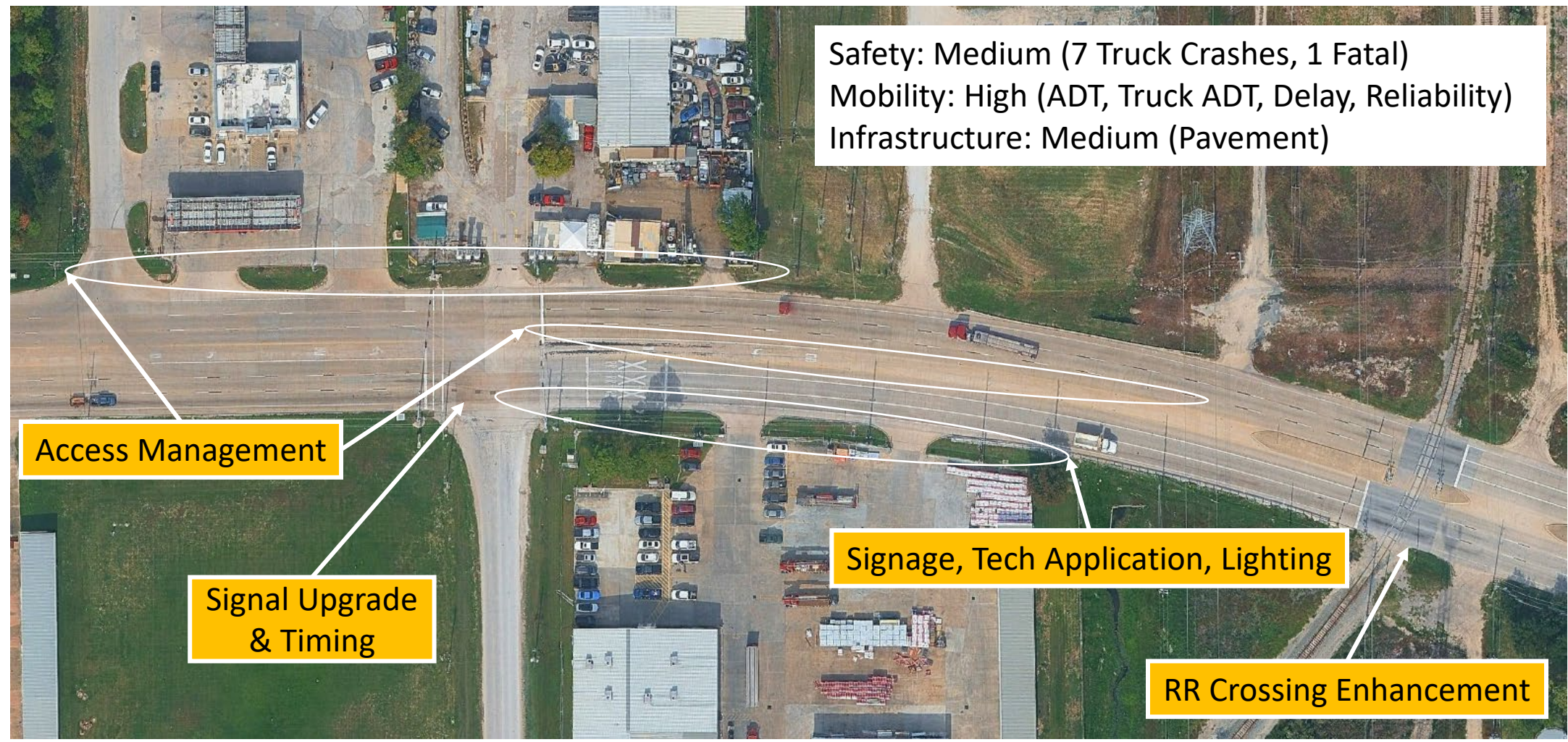


# Project Identification

Safety	Infrastructure	Mobility	Equity
Intersection improvements/design	Pavement reconstruction	Access management improvements	Buffer zones between freight and residential areas
Lighting Improvements	Bridge replacement/reconstruction	Interchanges construction (at freight heavy junctions)	Noise barrier construction
Crash barrier installation	Shoulder widening	Roadway widening	Complete Streets
Improved signage (e.g. Truck rollover warning)	Railroad crossing enhancements	Intersection improvements/design	
Railroad grade separation (e.g. Underpass)	Roadway widening	Railroad grade separation (e.g. underpass)	
Ramp improvements (merge and weave)	Road rehabilitation (mill and overlay, drainage improvements, re-striping, ADA ramps)	Direct connectors construction	
Access management improvements			
Ped/Bike safety enhancements			



# Example Project Identification



# Project Scoring Web App

**HCTRA Truck Study - Updated Scoring - Web App**

**HCTRA Highway Segments 05132025**

Total Scoring

- 12.4 - 47.2
- 47.2 - 82.0

**HCTRA NonHighway Segments 05132025**

Total Scoring

- 12.4 - 44.5
- 44.5 - 76.5

**City Boundaries**

Population Class

- 7 - 10
- 6 - 7
- 5 - 6
- 4 - 5
- 3 - 4

**Roadway Name**

Zoom to

**From - To Info**

**Recommended Projects**

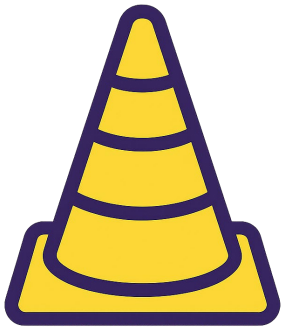
Corridor Significance	NHFN
Precinct Number	1
Project Length	3.19
Number of Lanes	4.00
Total Score	50.72
Safety Score	28.05
Infrastructure Score	53.25
Mobility Score	78.40
Equity Score	0.54
Vulnerability Index	0.16
Criticality Index	0.68
Vulnerable Population Index (VPI)	0.54
Total Truck Crashes	7
Fatal & Serious Injury Crashes	1
Truck 95% PTI	1.33
Truck Delay/mile	7,942.20
Final ADT	16,455

12.0 12.4 82.0

- Highway Scoring Slider
- Non-Highway Scoring Slider
- Vulnerable Population Index
- Highway Scoring Slider



# Freight Programs & Actions



Safety



Parking



Railroad  
Crossing



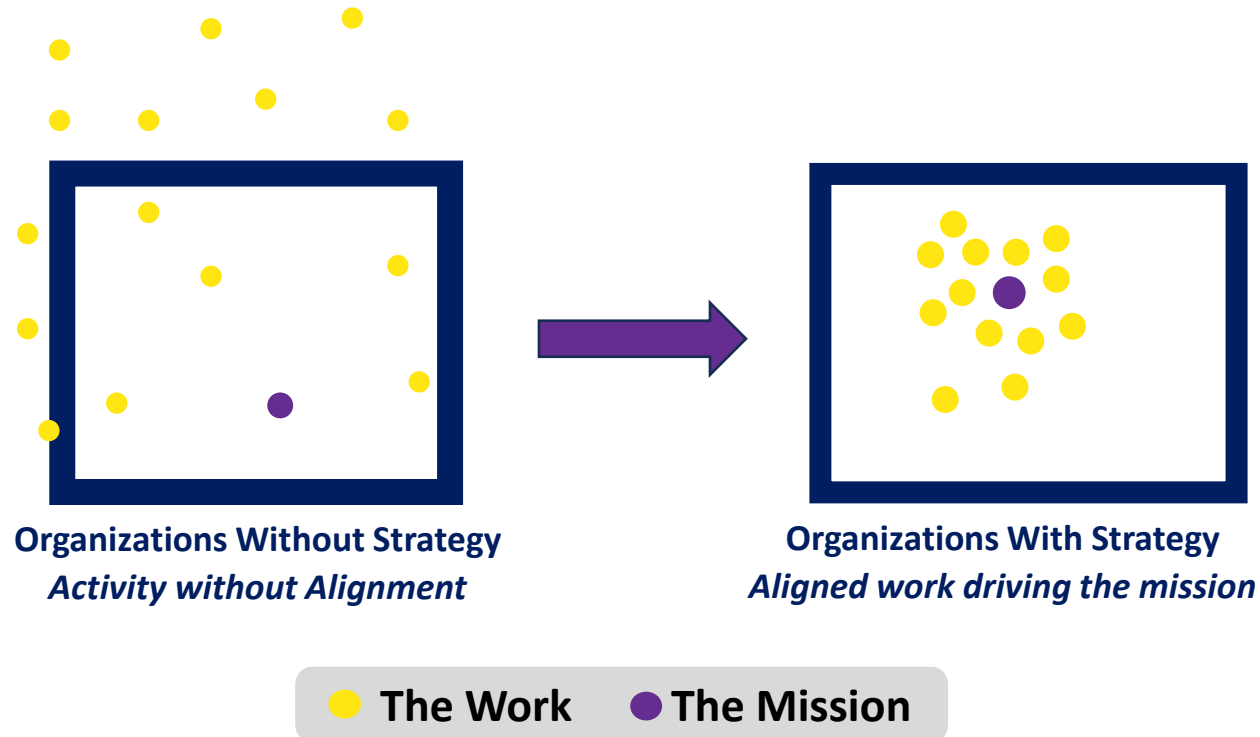
Air Quality



Port  
Out of Gate  
Initiatives



# Build a Stronger Freight System TOGETHER!



## Formula for Strategy

- Guiding Principles
- Challenge Identification
- Priority Alignment
- Problem Solving Techniques



# Acknowledgement



Steering Committee  
Stakeholders





# Stay connected with us!

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