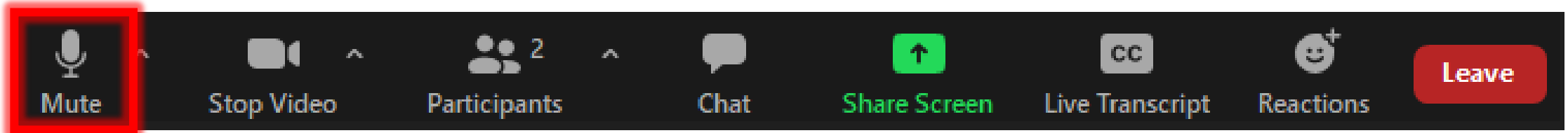


WEBINAR REMINDERS

- Please **Mute** your microphone unless speaking.
- You can place questions in the **Chat** which will be answered in the chat and during the Q/A Session at the end.
- You can use the **“Raise Your Hand”** feature to ask questions or make a comment during the QA portion of the webinar.
- This meeting will be **Recorded**.





North Central Texas
Council of Governments



Regional Transportation Council

SMARTER

Saving Money and Reducing Truck Emissions

Saving Money and Reducing Truck Emissions
Webinar Series

Environmental Justice and Trucking

Date: Thursday, November 10, 2022

Time: 11:00 – 12:00 PM Central Standard Time

Hosted by the **North Central Texas Council of Governments (NCTCOG)**

Webinar was presented through [ZOOM](#)

Contact: Huong Duong, hduong@nctcog.org

Presenters:

Dr. Kate Hyun. University of Texas, Arlington

Collin Moffett, NCTCOG

OVERVIEW



Image provided by Getty

Welcome, Introduction

Presenter: Huong Duong, Transportation Planner, NCTCOG

Post- Pandemic Last Mile Delivery and Equity Impacts

Presenter: Dr. Kate Hyun, Associate Professor, University of Texas, Arlington

Freight Land Use and Environmental Justice in North Central Texas

Presenter: Collin Moffett, Transportation Planner, NCTCOG

QA Discussion

Local Updates and Close



Saving Money and Reducing Trucking Emissions Program



GOALS

Promote emissions reduction and cost saving strategies within the trucking industry



INITIATIVES

Build relationships within the trucking industry

Share information about emission reduction strategies

Connect SmartWay verified technology to trucking owner/operators and fleet managers

SMARTTE

Saving Money and Reducing Truck Emissions



Post- Pandemic Last Mile Delivery and Equity Impacts

North Central Texas Council of Governments

Kate Hyun, Associate Professor, Civil Engineering

University of Texas at Arlington

Contents

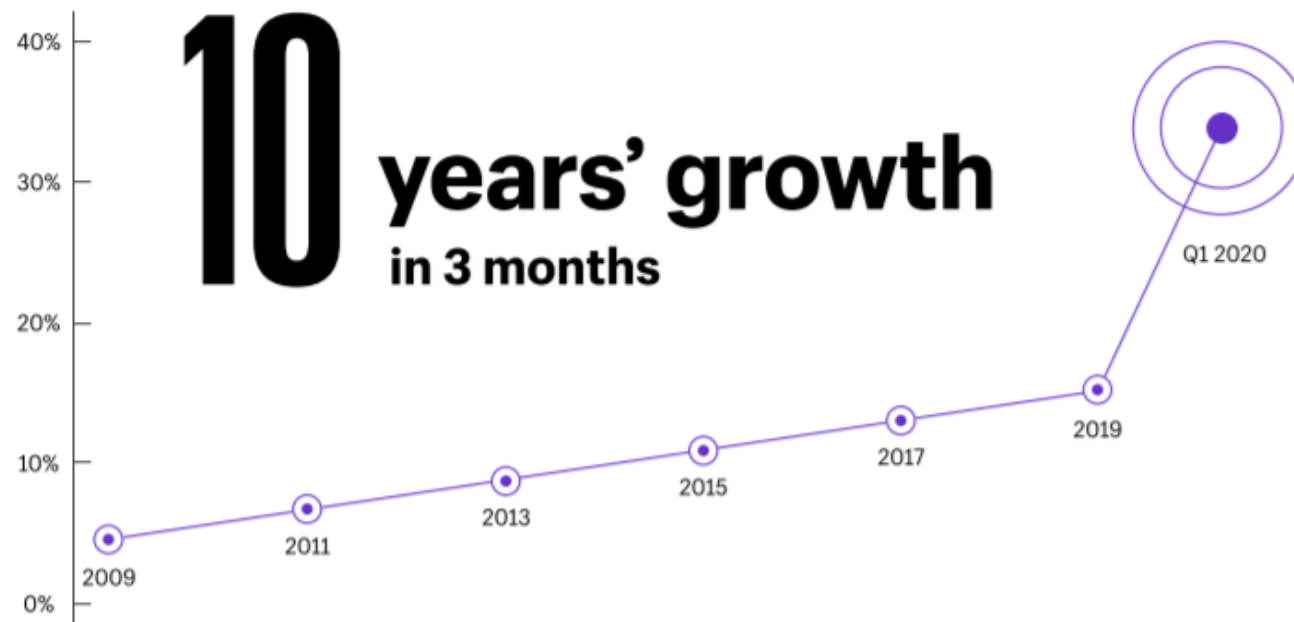
- Motivation
- Data and Study Area
- Analysis 1 – Shopping and Last mile trip predictions (Scenario development)
- Analysis 2 – Equity assessments
- Q & A / Discussion

Motivation

Background

- For the past 10 years, e-commerce was growing an average of 15% year-over-year. In 2020, 10 years' of growth was shown in 3 months.

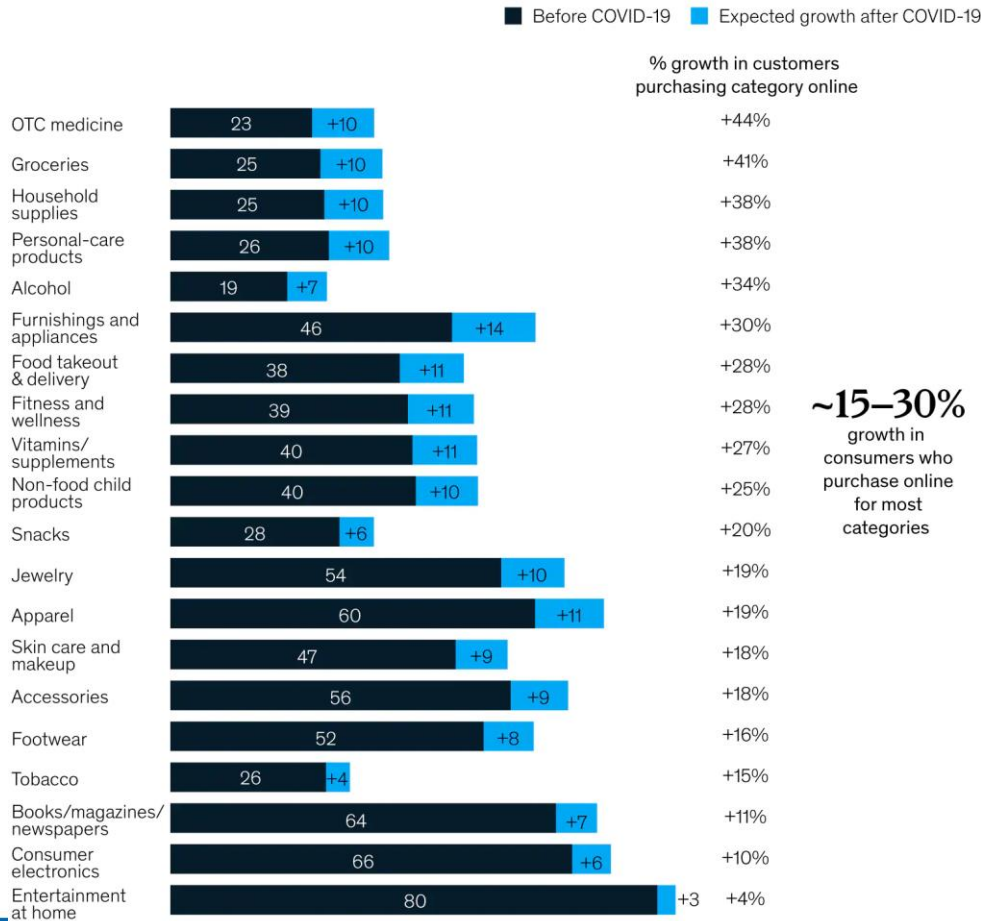
U.S. ecommerce penetration, %



Background

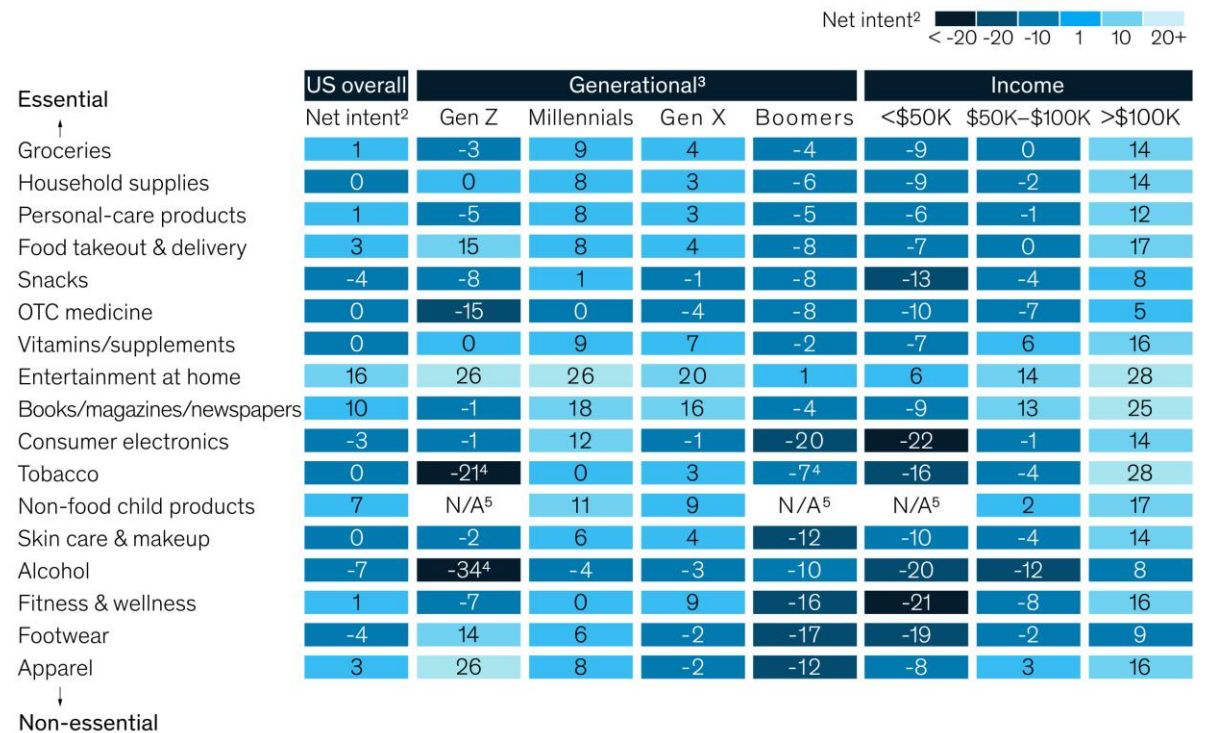
More people expect to make a portion of their purchases online post-COVID-19 than before.

Consumers' use of online channels before and expected use after COVID-19^{1,2}
% of respondents purchasing online³



Online shopping intent for nonessential categories is strongest for millennials and high-income earners.

Expected change in online shopping per category over the next 2 weeks¹
Net intent²



New Patterns of Last-Mile Delivery

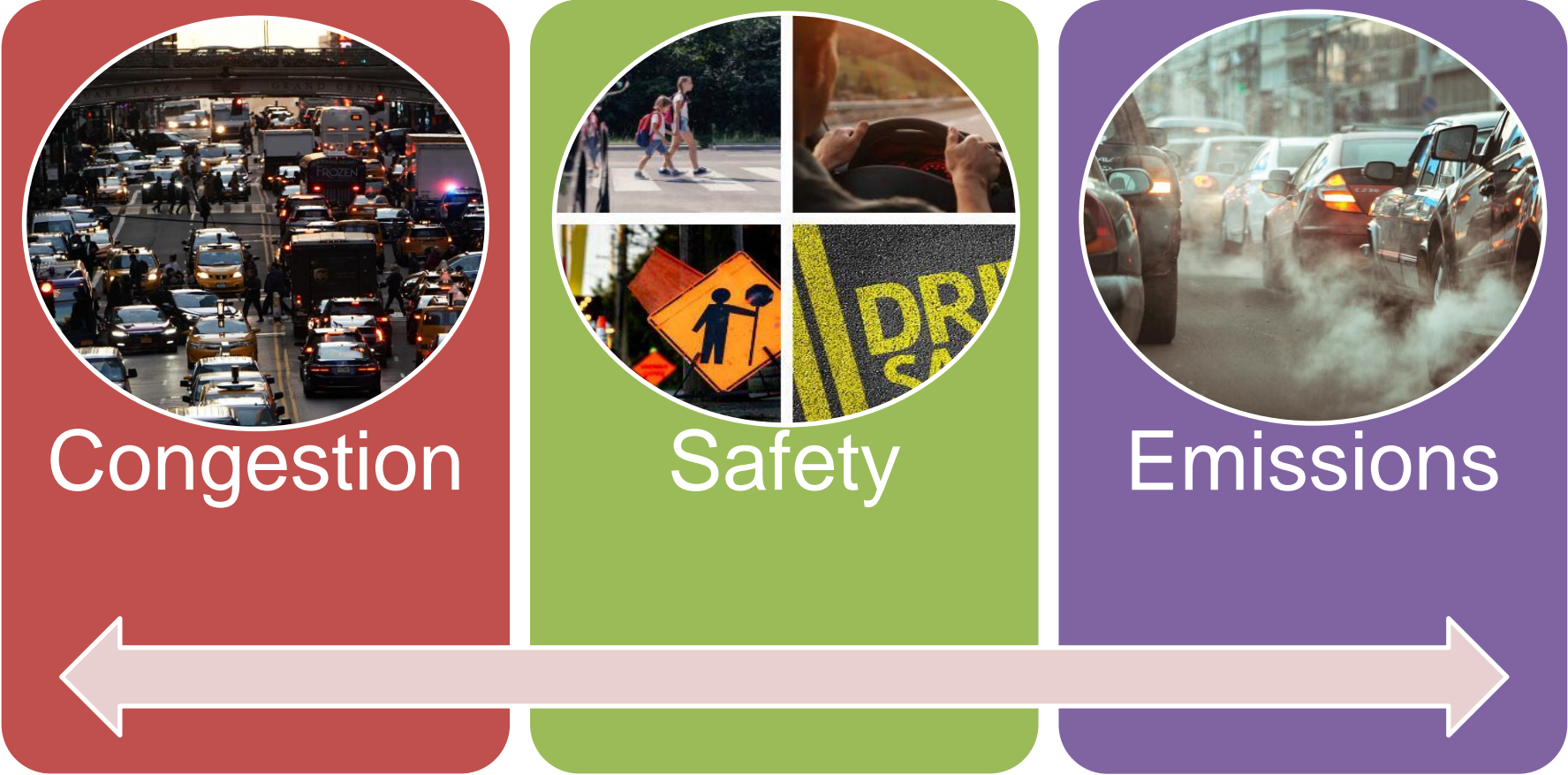
1. COVID-19 increases online shopping activities

- Walmart grocery e-commerce increased over 74% during the pandemic, and consumer spending on Amazon between May and July 2020 increased by 60% from the same time in 2019.
- A study by PwC Global found that 86% of respondents are likely to continue to shop online for groceries when social distancing measures are removed.

2. Frequent and fragmented delivery trend

- Consumers expect fast delivery
- In January 2021, Target reported that their same-day shipping services grew a combined 193% during the holiday season.
- Rather than outsource last mile delivery, some retailers have instead opted to handle everything internally, relying on their own fleet of vehicles or a personal vehicle to fulfill orders.

Impacts of Increased E-Commerce

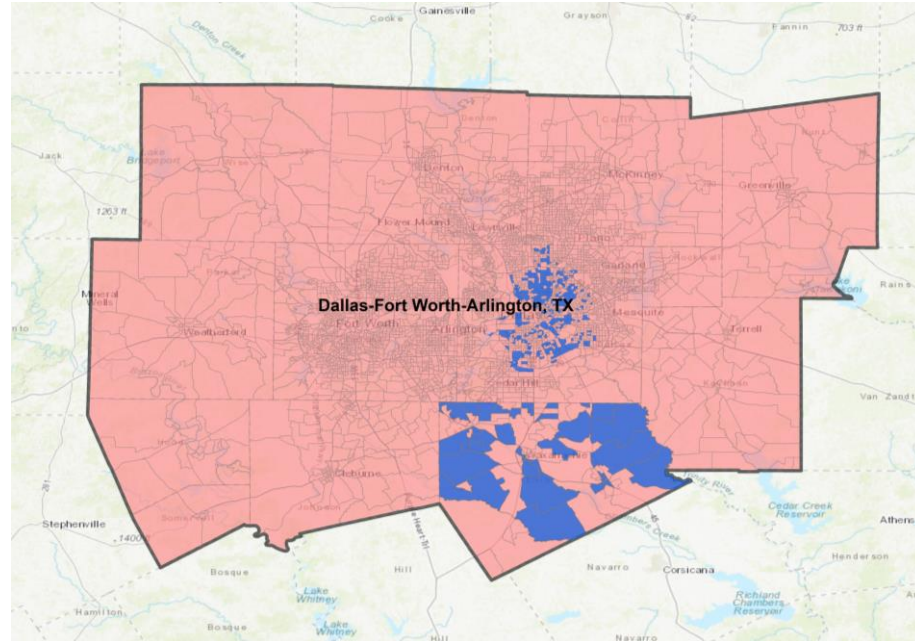


Study Objectives

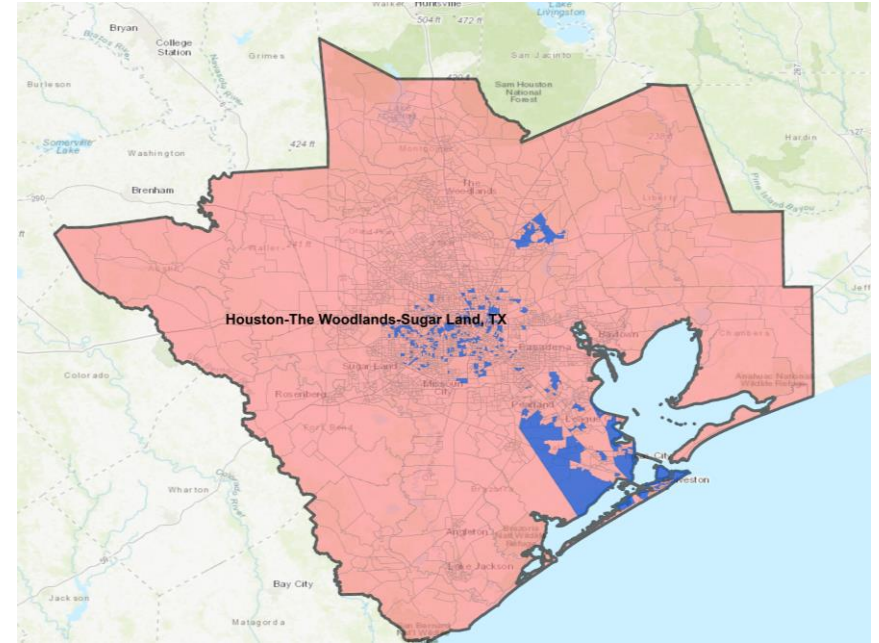
- 1) Understanding household travel demand and e-commerce participation
 - Does eCommerce substitute or complement traditional shopping trips?
- 2) Predict future demands of e-commerce
 - What would happen if physical and online shopping trip patterns during the pandemic hold in the future? Would there be significant increases in last-mile traffic?
- 3) Evaluate equity impacts of the current e-commerce
 - How do the changes in last-mile and shopping trips affect equity?

Data and Study Area

Study Area



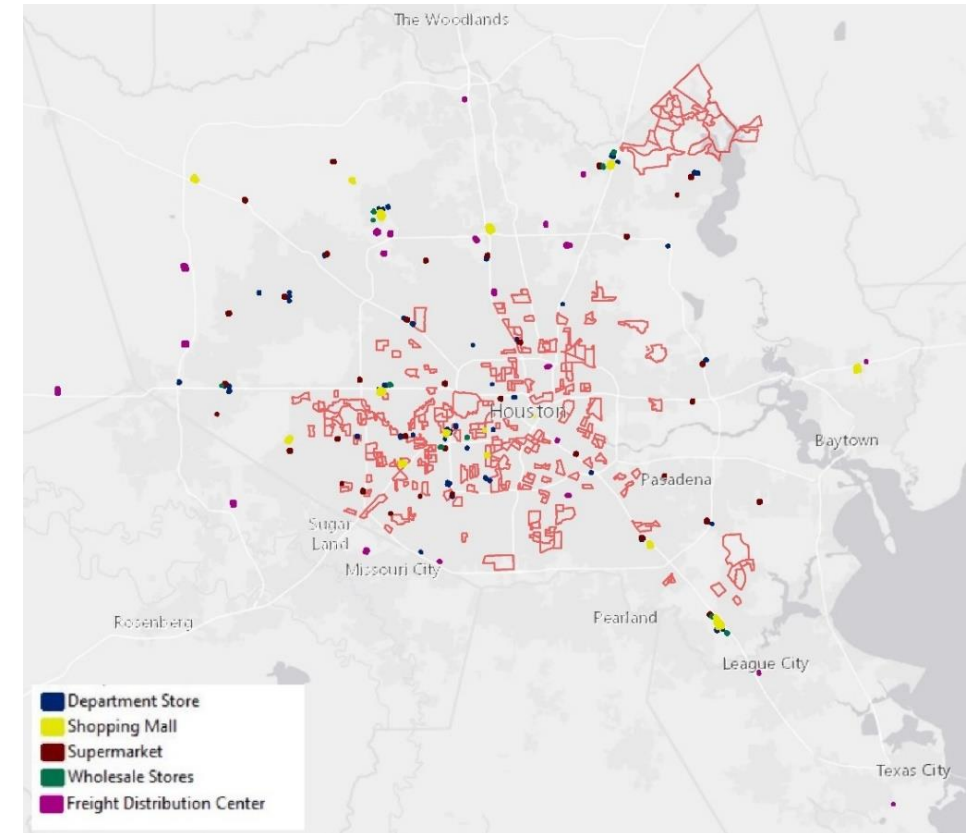
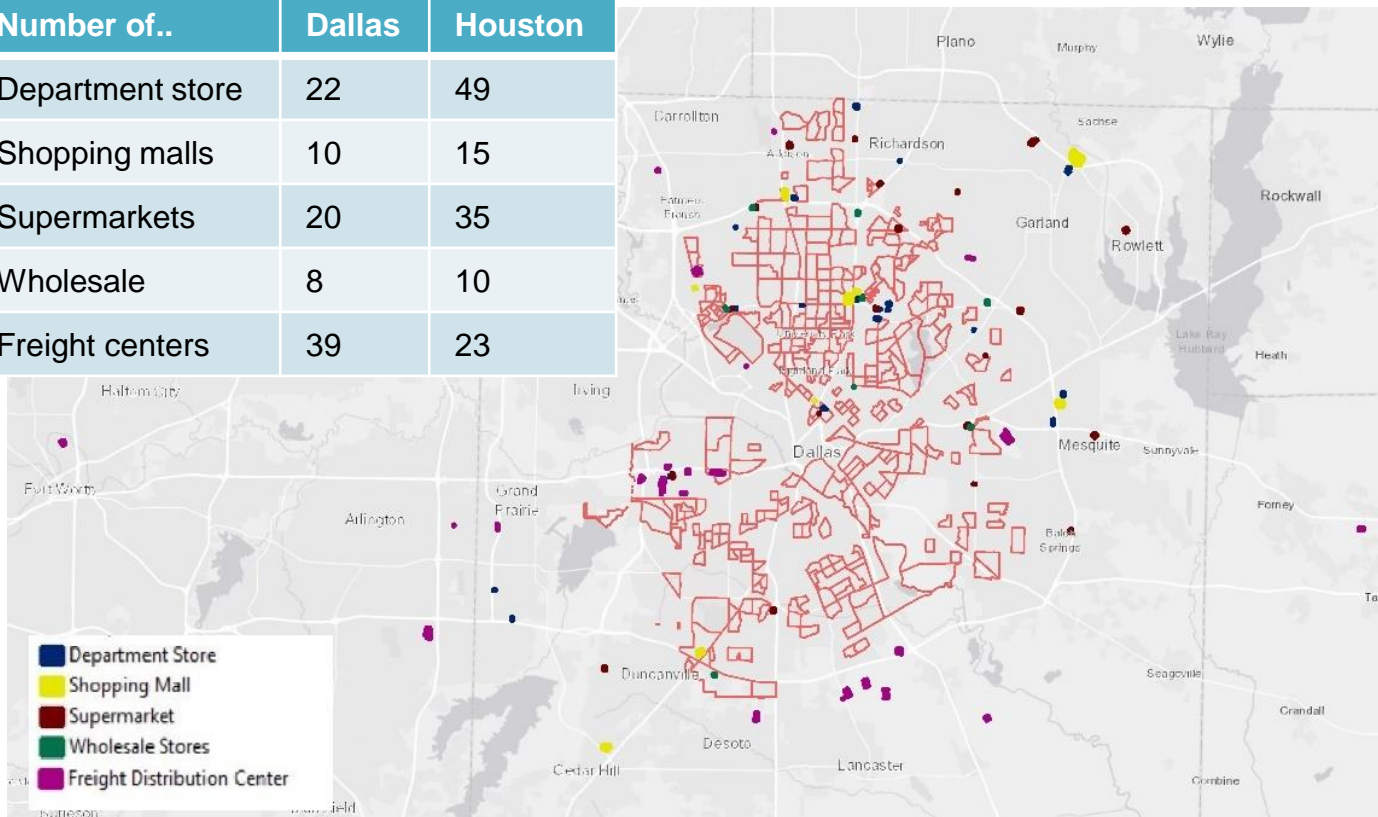
Dallas



Houston

Spatial Distribution of Freight Facilities

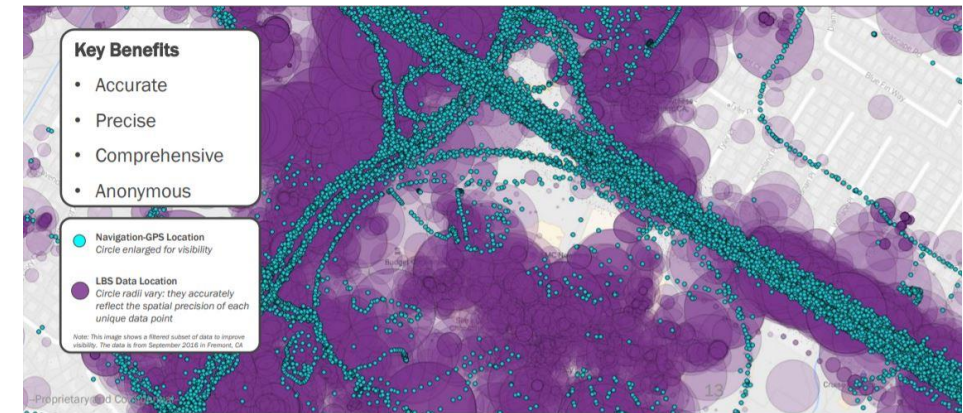
Number of..	Dallas	Houston
Department store	22	49
Shopping malls	10	15
Supermarkets	20	35
Wholesale	8	10
Freight centers	39	23



Major Shopping and Distribution Centers in Dallas and Houston Areas

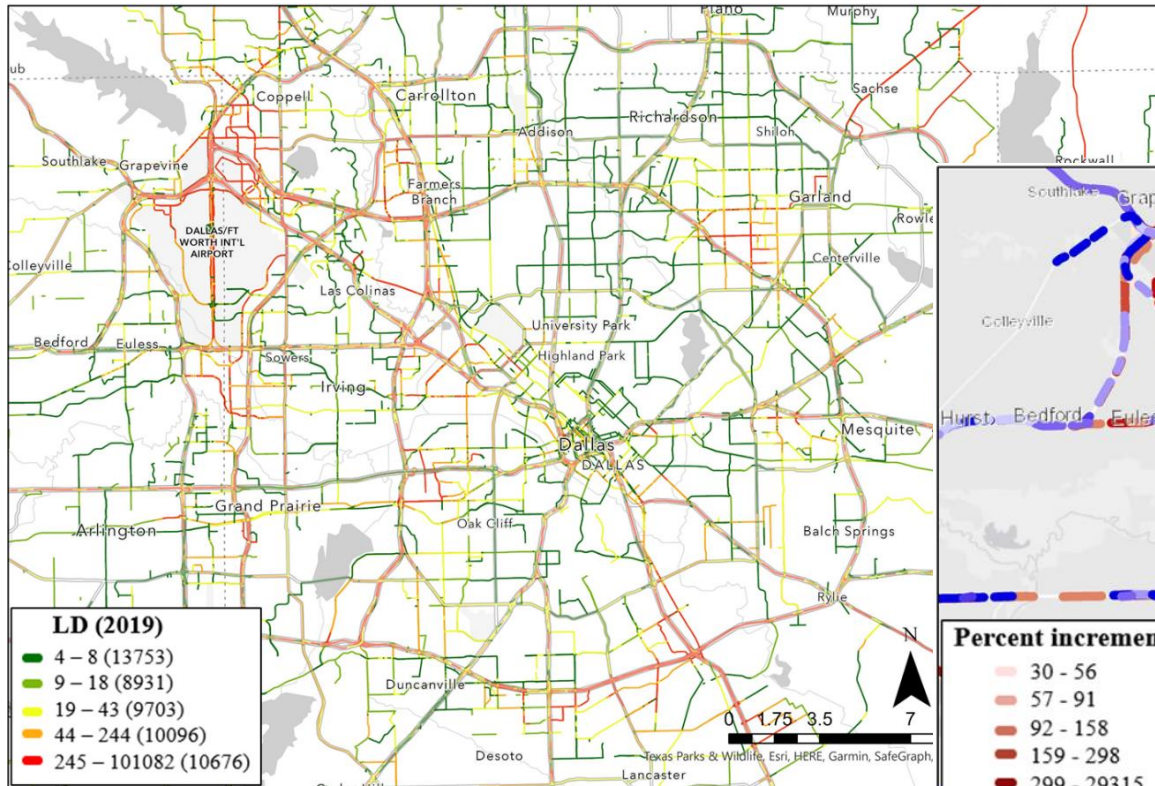
Data – Truck Movements

- Metric-based GPS dataset collected by Streetlight.
- Streetlight collects anonymized location records from smart phones and navigation devices equipped in vehicles and transforms the location data points to aggregated travel patterns.
- Reports to process over 12% of commercial vehicles nationally.
- Widely adopted in the U.S. and Canada including all top 25 MSAs in the U.S. and top 15 MSAs in Canada



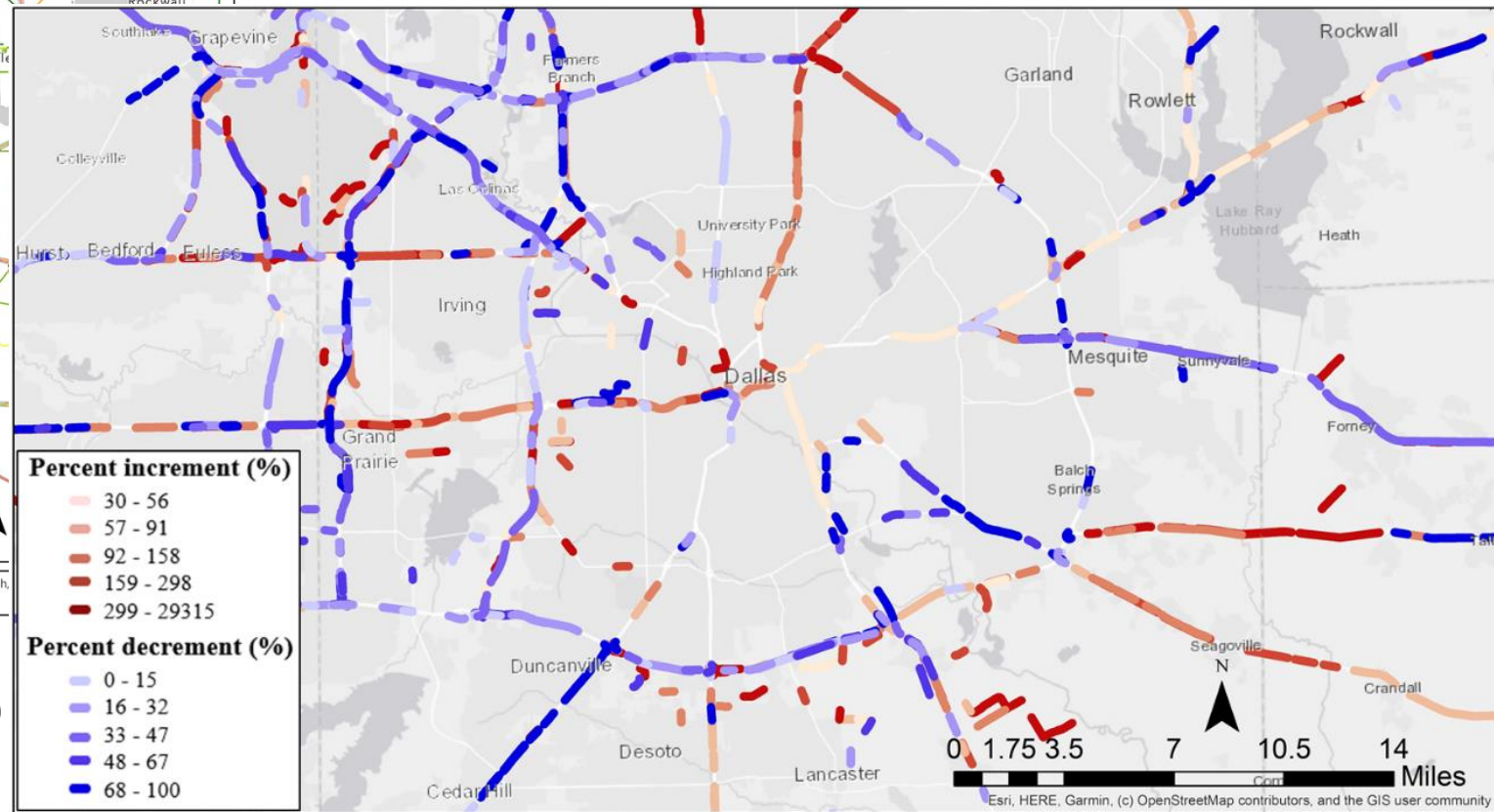
Trip Profiles

Link Traffic Changes in Dallas

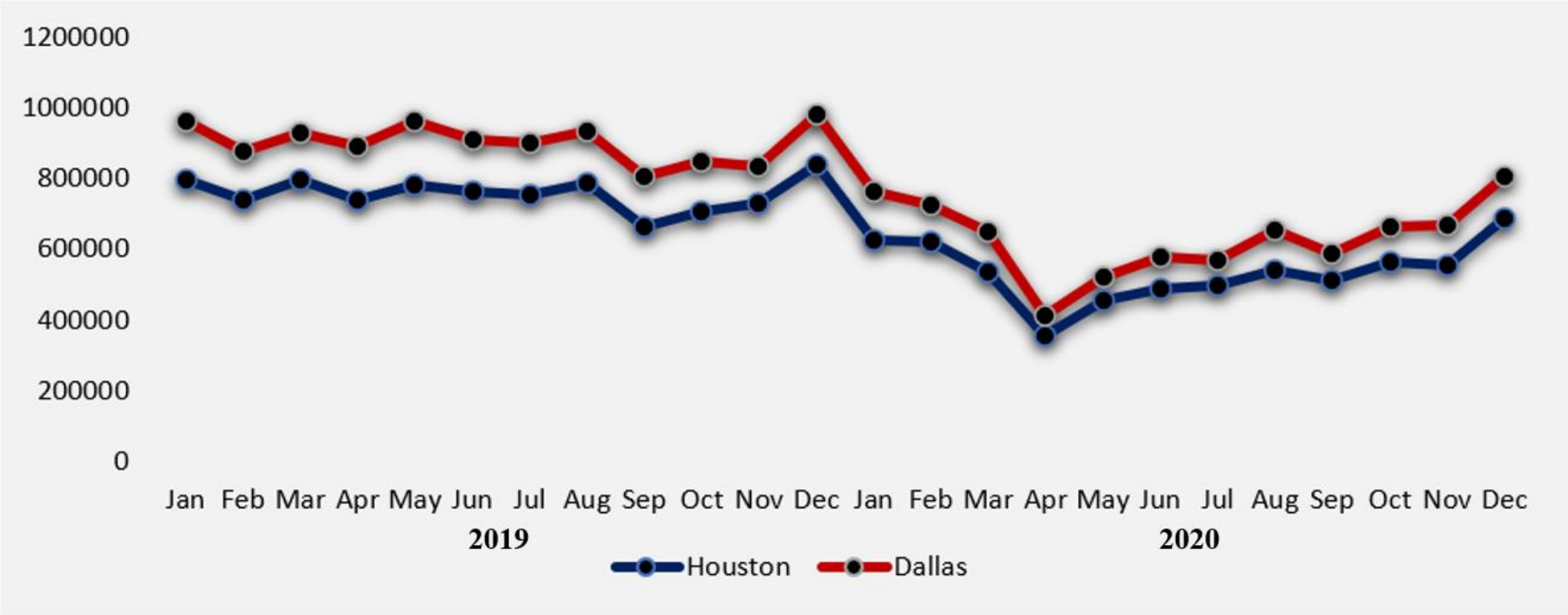


Baseline Link Loading (2019)

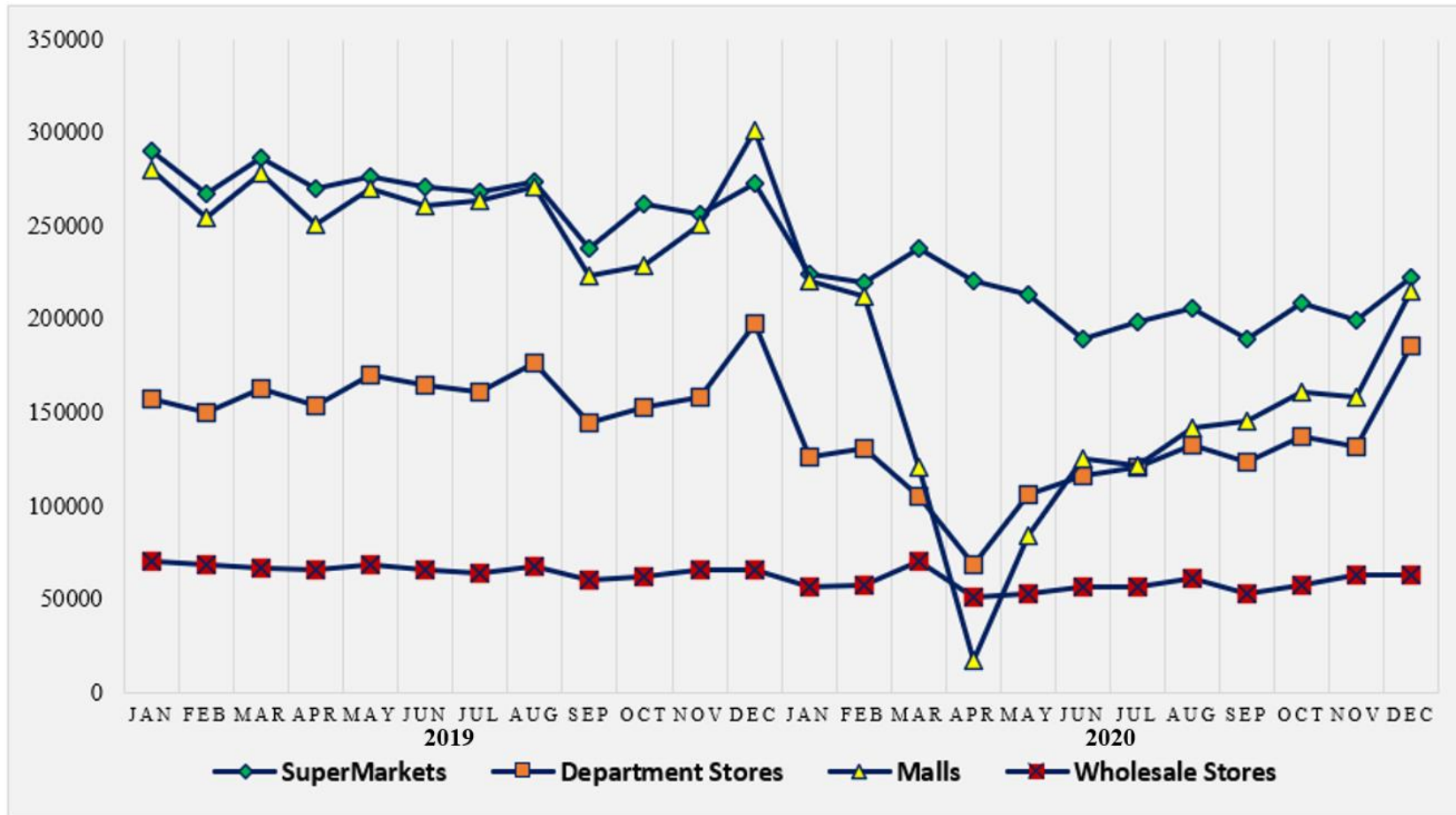
Increment and Decrement of Link Loading



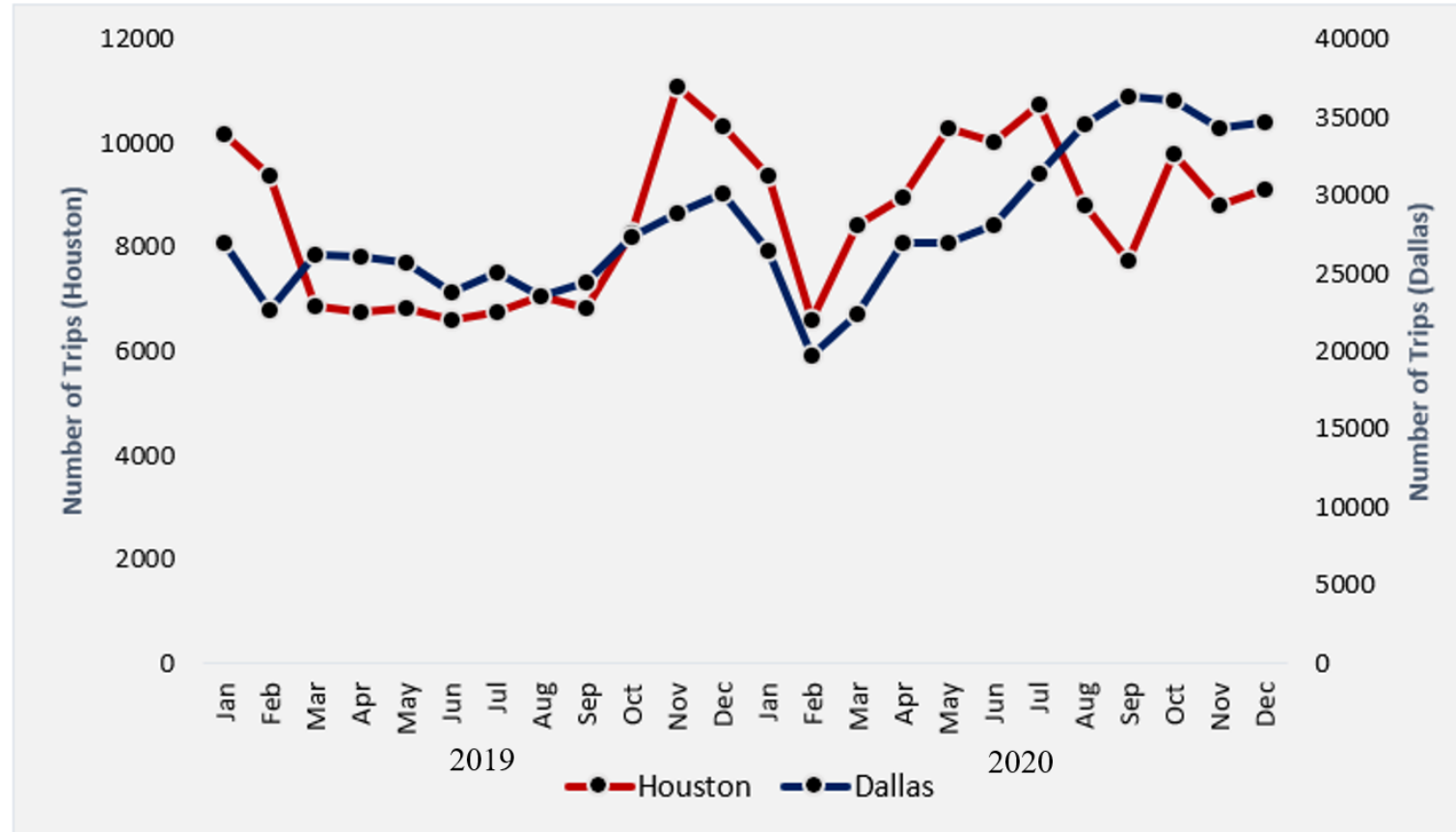
Monthly Shopping Trips



Different Types of Shopping Trips



Trips from Distribution Centers to Home (Last-Mile Trips)



Scenarios and Future Predictions

Scenario Development Methods

Step 1: Baseline trip trends

Step 2: Scenario development (Four scenarios based on 4 noticeable periods: normal, peak, recovery, and stable periods during the pandemic)

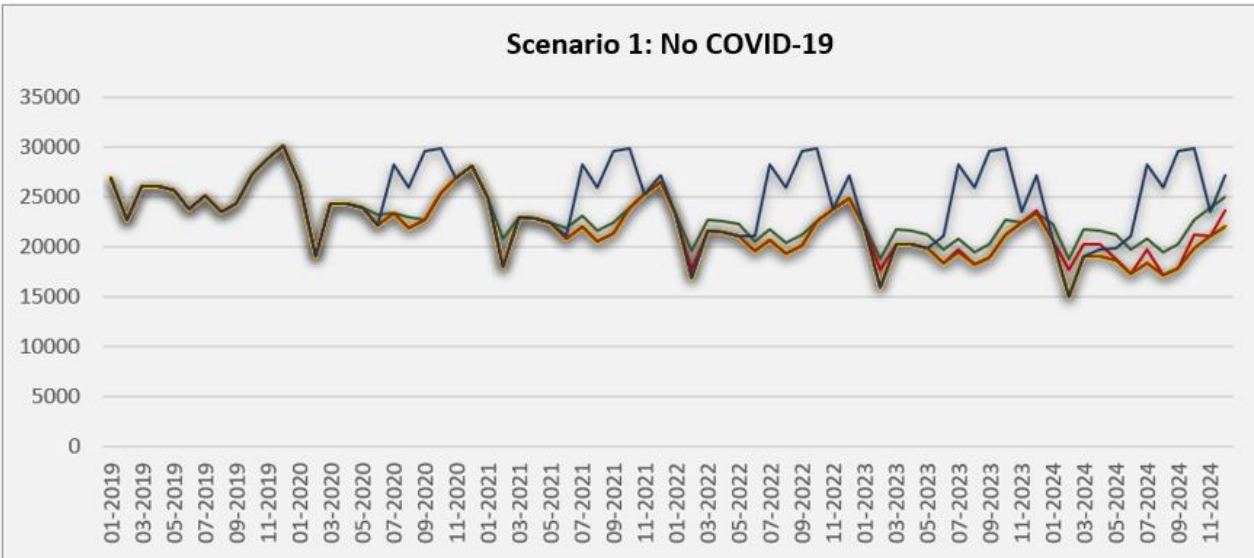
Step 3: Trip rate reductions (increases) calculation

	Future Trend Rate			
	Scenario 1: No-COVID scenario	Scenario 2: Peak COVID scenario	Scenario 3: Recovery COVID scenario	Scenario 4: All combined scenario
Houston	-0.176	+0.413*	-0.020	+0.131
Dallas	-0.057	+0.148	+0.293	+0.167

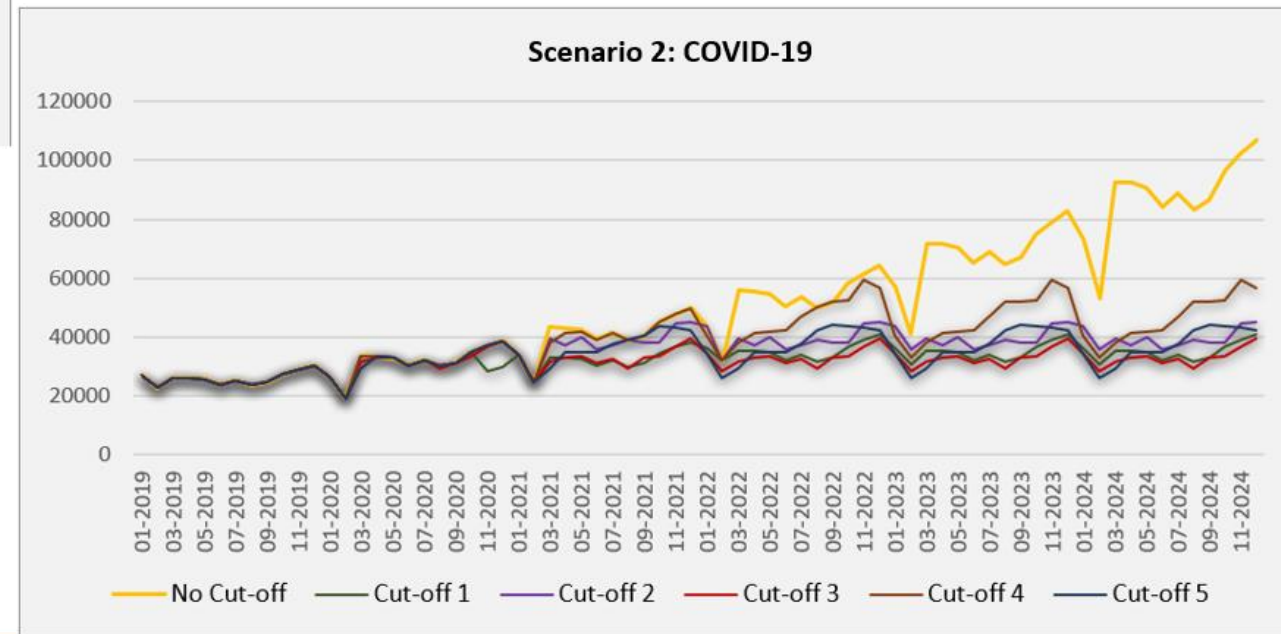
Step 4: Future estimations by applying the trip rates

Step 5: Comparative analysis with different population groups

Results – Last Mile Trips in Dallas

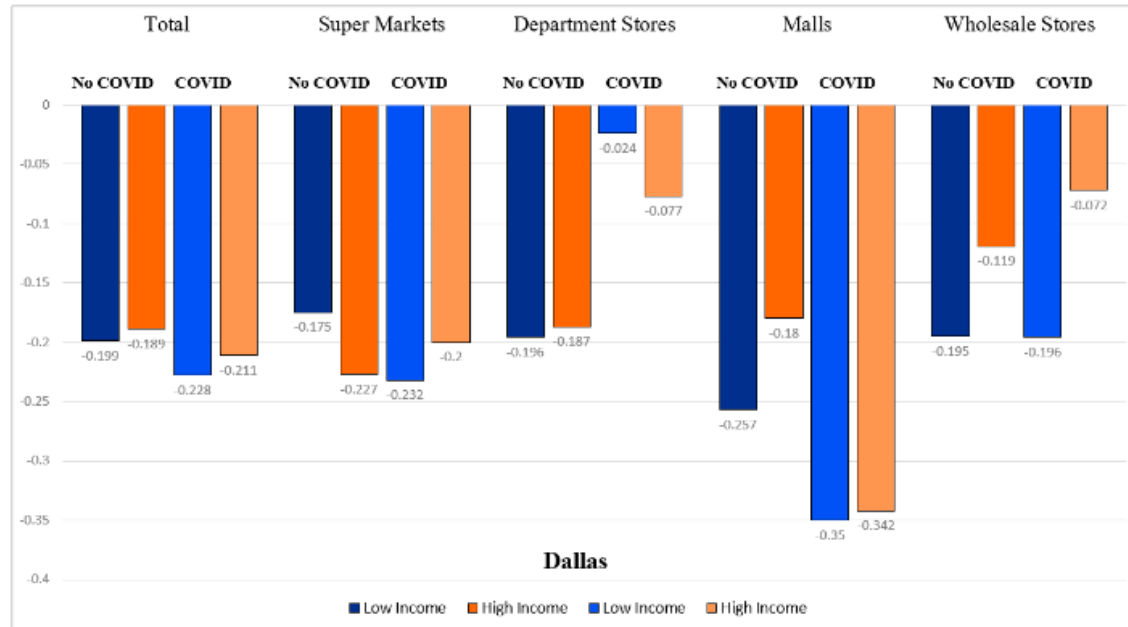


Last-mile trips continue to increase, and a conservative scenario predicts future trips with a **150% growth** in 2040

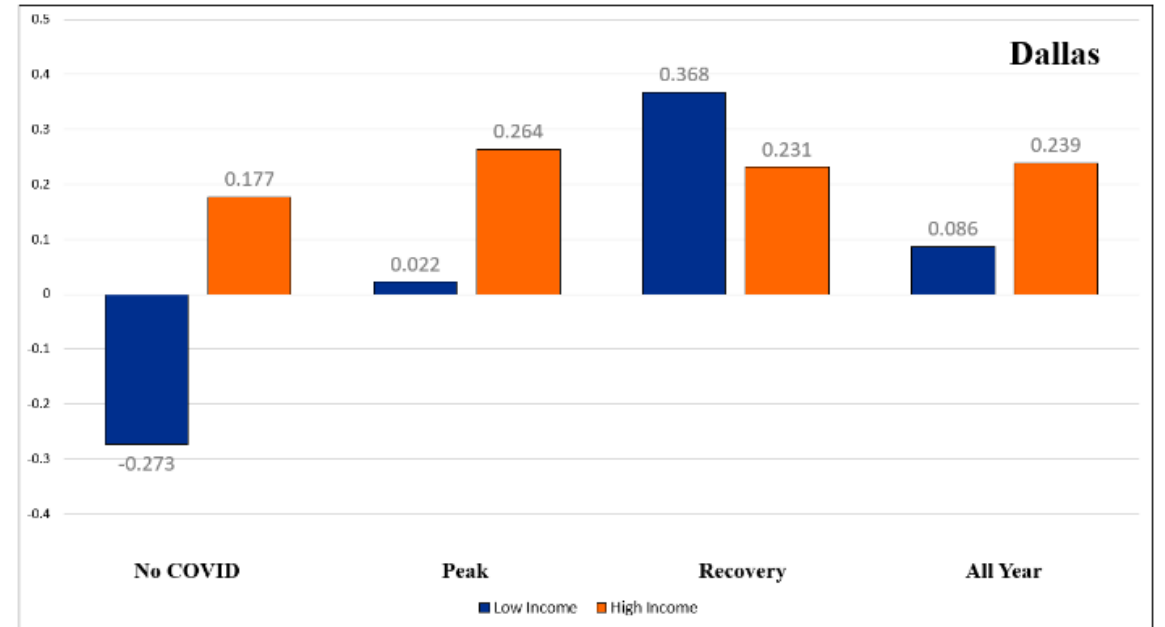


Results – Trip Rates by Income

Shopping trips



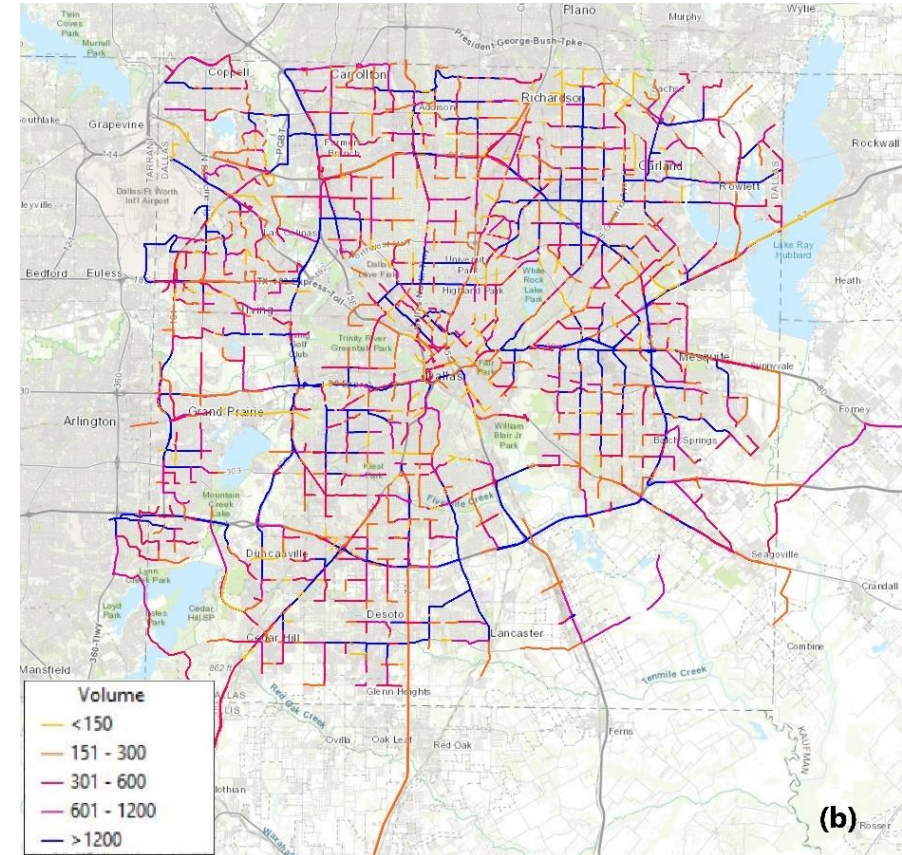
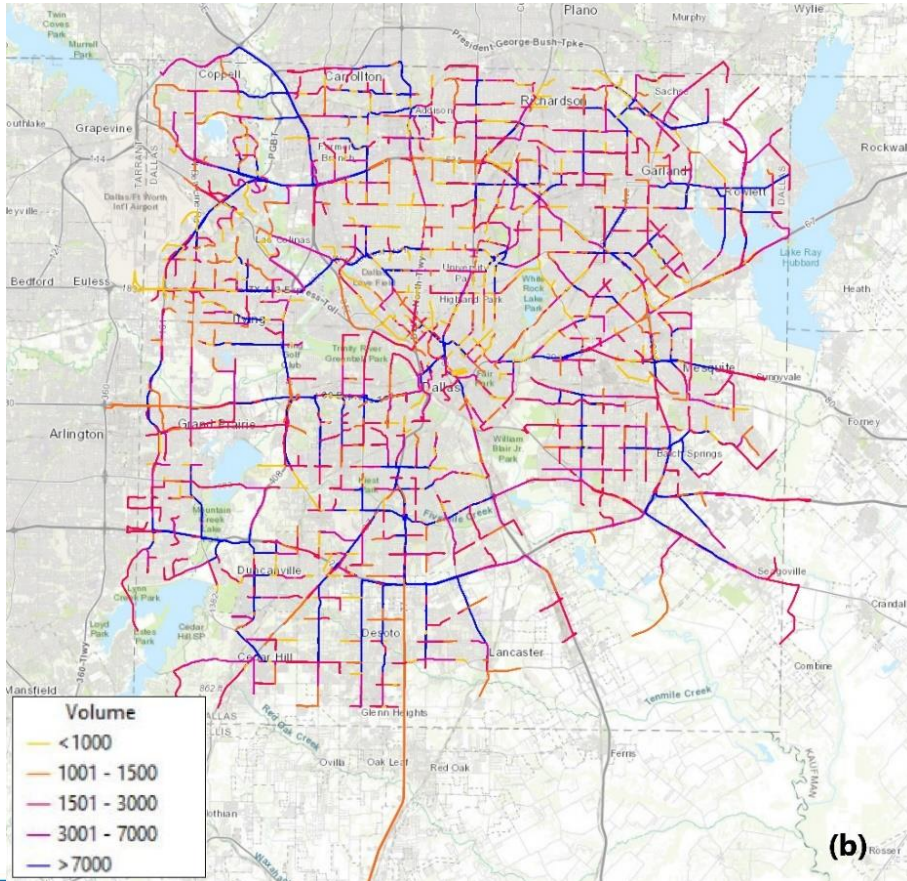
Last mile trips



Results – Link Volume Prediction in 2040 (Monthly)

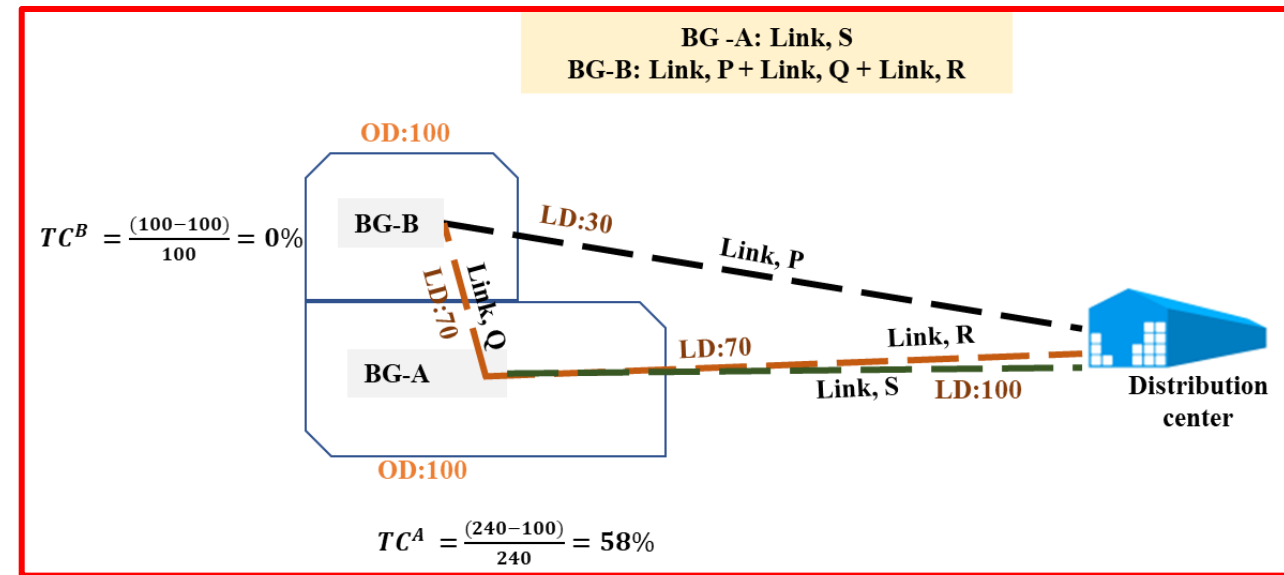
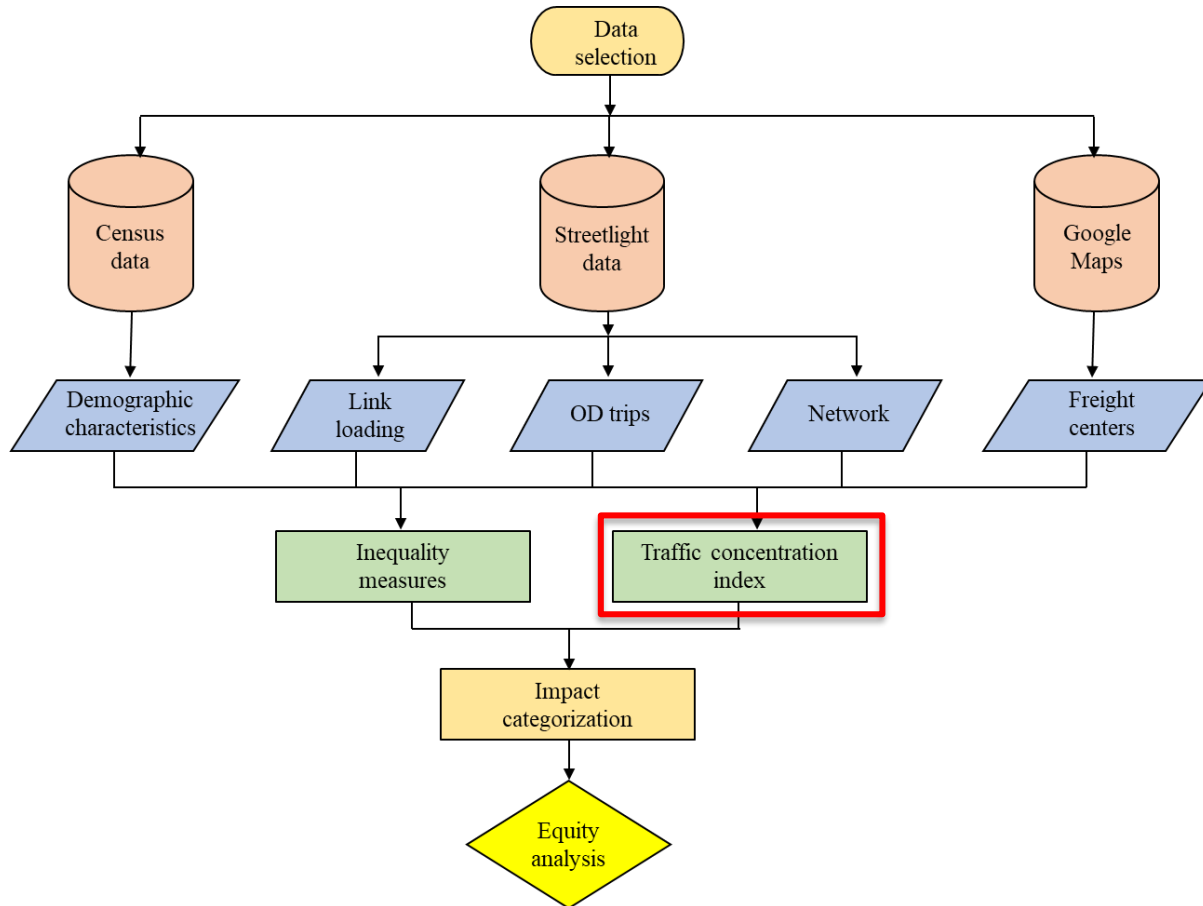
Shopping trips

Last-mile trips

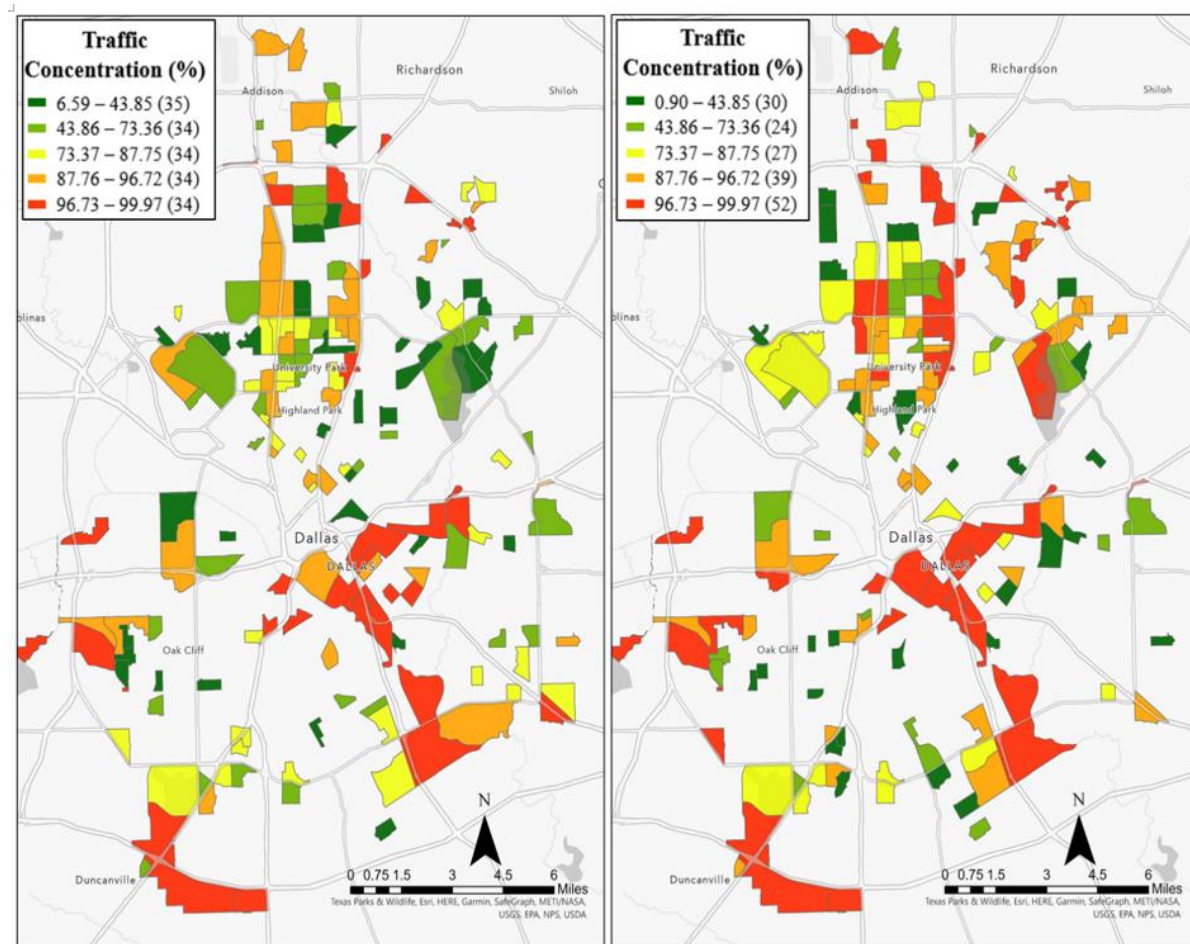


Equity Analysis

Methods



Traffic Concentrations



(a) 2019.

(b) 2020.



Categorize the traffic concentrations into three groups

- Significantly less (SL)
- Moderately less (ML)
- Highly impacted groups (H)

Traffic Concentrations

Categorize the traffic concentrations into three groups

Significantly less (SL)

Moderately less (ML)

Highly impacted groups (H)



Figure 56. Spatial Distribution of Traffic Concentration Index.

Population Group Comparisons

Variables	SL			ML			H		
	Base	COVID	Changes	Base	COVID	Changes	Base	COVID	Changes
Under 18 years	12	5	-58%	14	14	0%	44	50	+14%
65 years and above	14	8	-43%	15	14	-7%	40	48	+20%
No school	14	9	-36%	10	11	+10%	36	40	+11%
Under poverty	9	7	-22%	11	10	-9%	47	52	+11%
No internet	9	7	-22%	13	10	-23%	47	52	+11%
No vehicle	10	7	-30%	11	6	-45%	48	56	+17%
Non-white	6	7	+17%	15	9	-40%	48	54	+13%

Conclusion

Summary

- Used location-based data to understand the trend changes in shopping and last-mile traffic during the pandemic.
- Estimated future trips post-pandemic for Dallas and Houston regions in the state of Texas.
 - Developed a scenario-based framework that estimates the number of trips using growth or reduction rates observed before and during the COVID-19 pandemic.
 - These scenarios incorporate uncertainties present in future trends.
- Evaluated equity impacts of last-mile trips in different scenarios

Main Findings

- The results showed significant growth in the number of last-mile trips if the trip behaviors observed during the peak COVID-19 hold in the future.
 - The total number of trips could be up to 5.5 times higher than the number of trips before the pandemic in Houston and up to 2.4 times higher in Dallas.
 - The number of trips to all types of shopping centers continues to decline, indicating no significant impacts from COVID-19.
- This study found a disparity in last-mile trips for EJ communities.
 - The pandemic in 2020 caused more communities to be exposed to the highest traffic concentration in the southern part of Dallas.
 - A higher number of EJ (i.e., people in poverty, with no internet and vehicle, and non-white) groups appeared in the high-traffic concentration cluster, and COVID-19 increased the disproportionate impacts on these groups. This increment is due to the more online shopping activities in the affluent neighborhood of EJ communities.

Thank you
Questions – kate.hyun@uta.edu
817-272-9748



NCTCOG Transportation
Department

Freight Land Use Environmental Justice Analysis

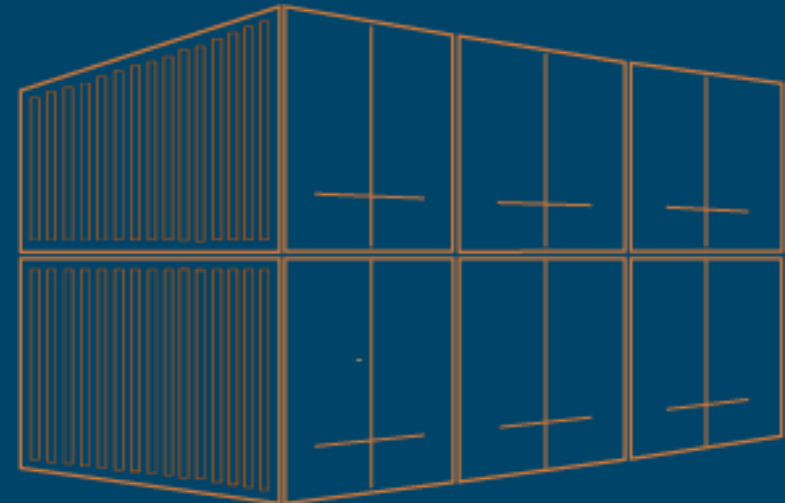
COLLIN MOFFETT | TRANSPORTATION PLANNER
11.10.2022

Background

Freight North Texas

- Multiple Follow-Up Studies Recommended
- NCTCOG Freight Land Use Analysis Completed
- Standalone EJ Report

**FREIGHT
NORTH TEXAS**



What is Environmental Justice?

EPA Definition:

“the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”



Introduction & Purpose

Introduction

- Freight Land Use Analysis
- Freight North Texas 2022 Update
- Standalone Report

Purpose

- Examine relationship between:
 - Freight Network Infrastructure
 - AND
 - Populations under EJ Policy Protection
- Identify potential for disproportionate negative impact



Methodology

Data

- Regional Development Monitoring Program (NCTCOG RIS)
 - Industrial buildings/developments
- Field Observations
- Environmental Justice Index
- Transportation Infrastructure (NCTCOG/TxDOT/FRA)
 - Freight Railroads

Assumptions

- Proximity to freight infrastructure is a reliable predictor of negative interaction
- Limitations
 - Proximity may not always mean LUC presence
 - Facility design (or other features) may eliminate conflict



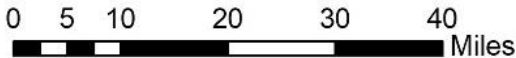
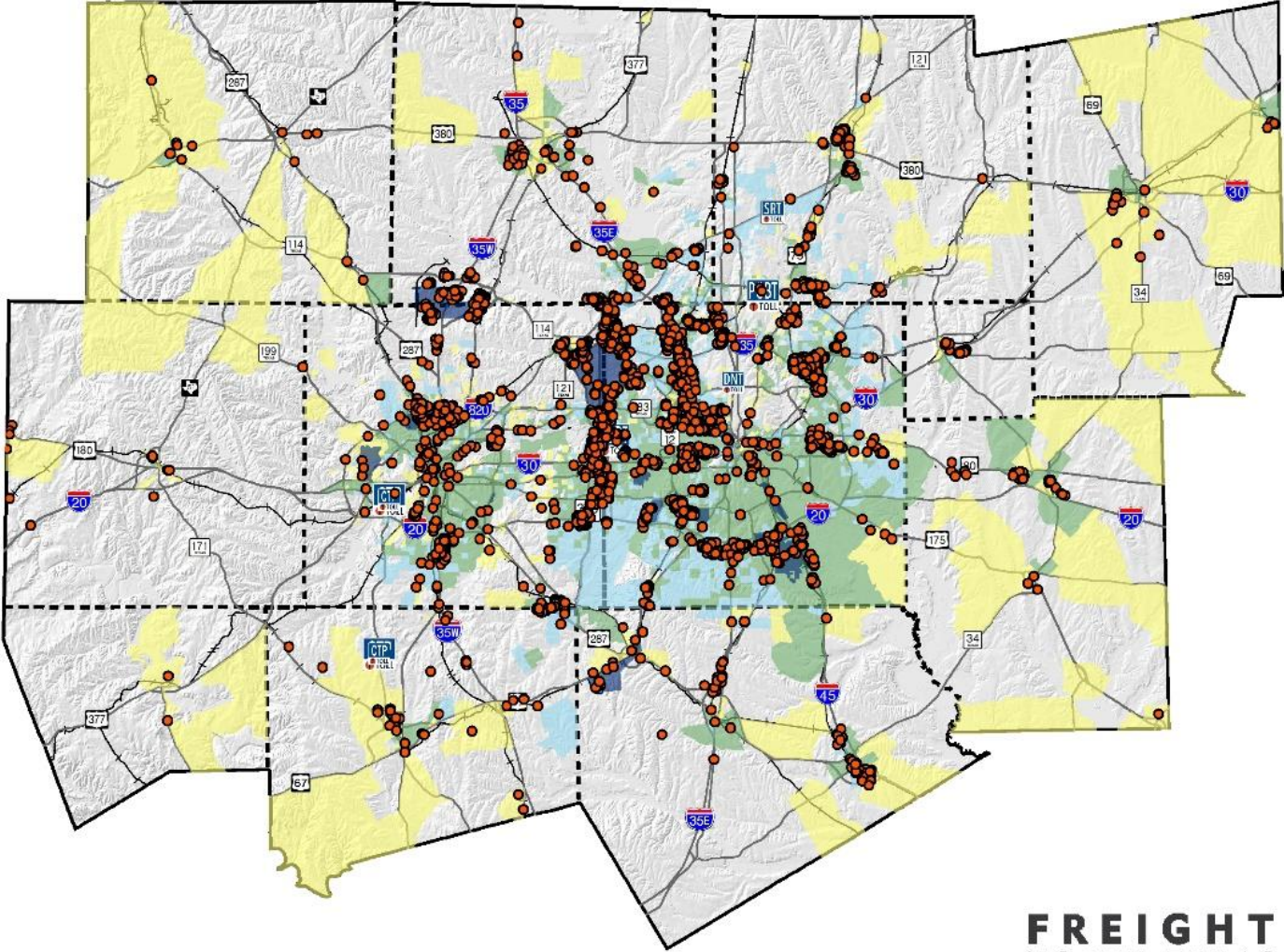
The background of the slide is a photograph of the interior of a bus, showing rows of seats and overhead handrails. The entire image is overlaid with a semi-transparent blue filter. The text is centered in the middle of the image.

Freight Facilities & Freight-Oriented Developments

Freight Development And EJ Areas

Legend

- Freight Facilities in MPA
- Freight-Oriented Developments
- EJ Population Census Tracts**
- Above Regional Percentage: Poverty
- Above Regional Percentage: Minority Population
- Above Regional Percentage: Both Minority Population & Poverty
- Major Highways
- +— Railroads
- - - County Boundaries
- MPA Boundary



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Freight Facility Location and EJ Areas (MPA Only)

Census Tract Demographic	Number of Freight Facilities	Percent of Total
Above Regional Percentage Poverty	163	6.67%
Above Regional Percentage Minority Population	444	18.18%
Above Regional Percentage Poverty & Minority Population	1178	48.24%
Other	657	26.90%
Total	2442	100.00%



School Proximity to Freight Facilities

Location	Average Distance from Freight Facility	Number of Schools
All Schools in MPA	2.16 mi	2561
Schools in EJ Areas	1.38 mi	1354
Schools Outside of EJ Areas	3.04 mi	1207










Land Use Conflict Sites In EJ Areas

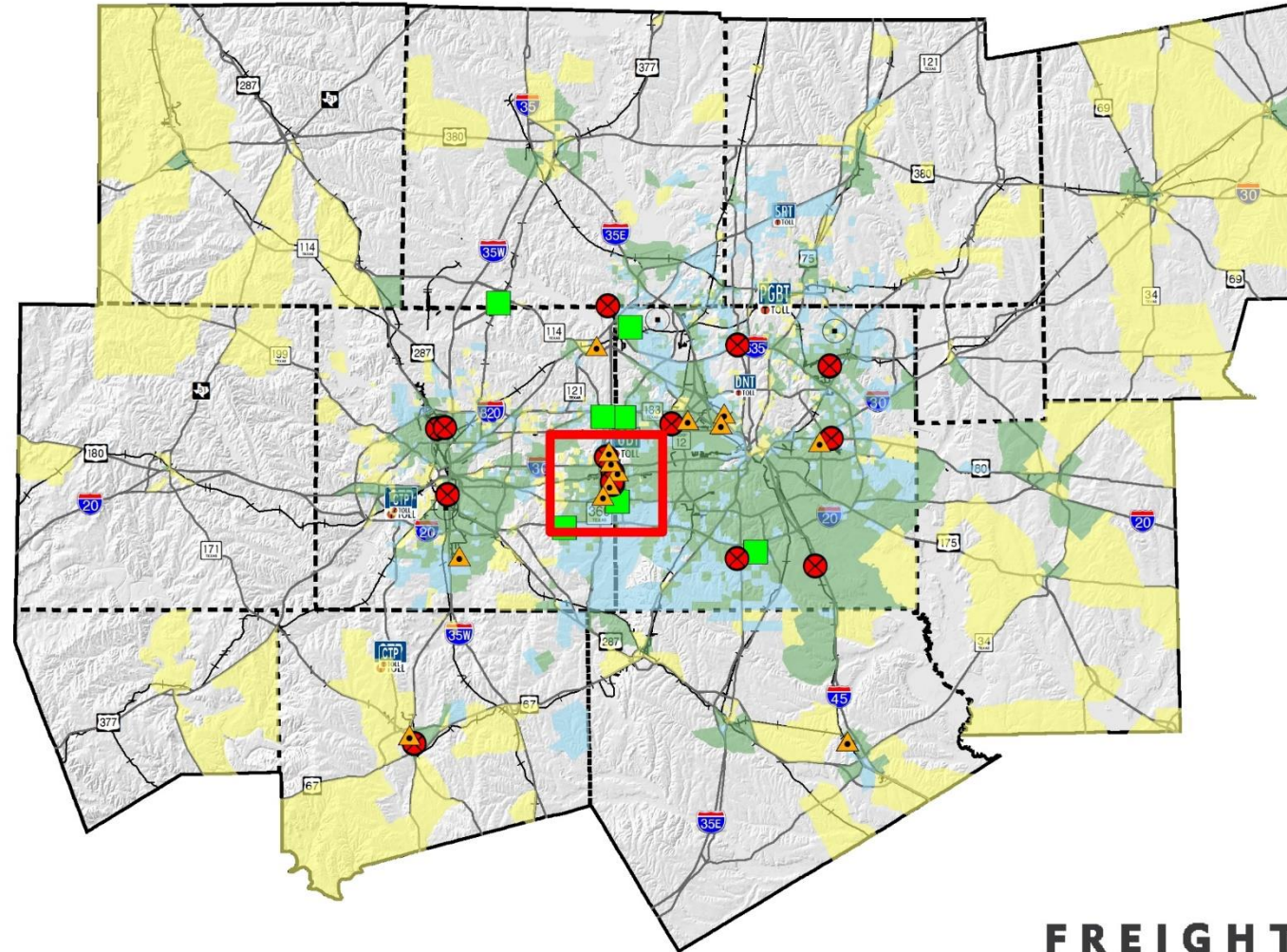
Legend

Land Use Analysis Sites

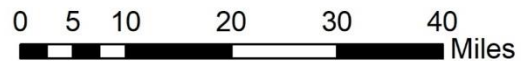
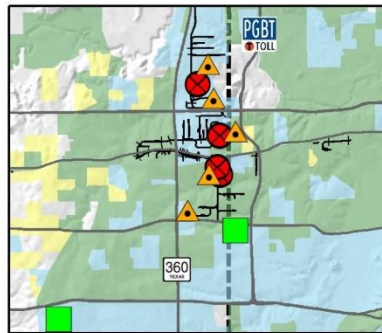
-  Area of Concern
-  Good Neighbor Site
-  Idling Complaint
-  Land Use Conflict

EJ Population Census Tracts

-  Above Regional Percentage: Poverty
-  Above Regional Percentage: Minority Population
-  Above Regional Percentage: Both Minority Population & Poverty
-  Major Highways
-  Railroads
-  County Boundaries
-  MPA Boundary



SH 360 Corridor



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The image shows the interior of a freight train car, viewed from the perspective of someone standing in the aisle. The car is filled with rows of metal shelving units, likely for transporting goods. The lighting is dim, and the entire image is overlaid with a semi-transparent blue filter. The text "Freight Railroad Infrastructure" is centered in the middle of the image in a white, sans-serif font.

Freight Railroad Infrastructure








Freight Rail In EJ Areas

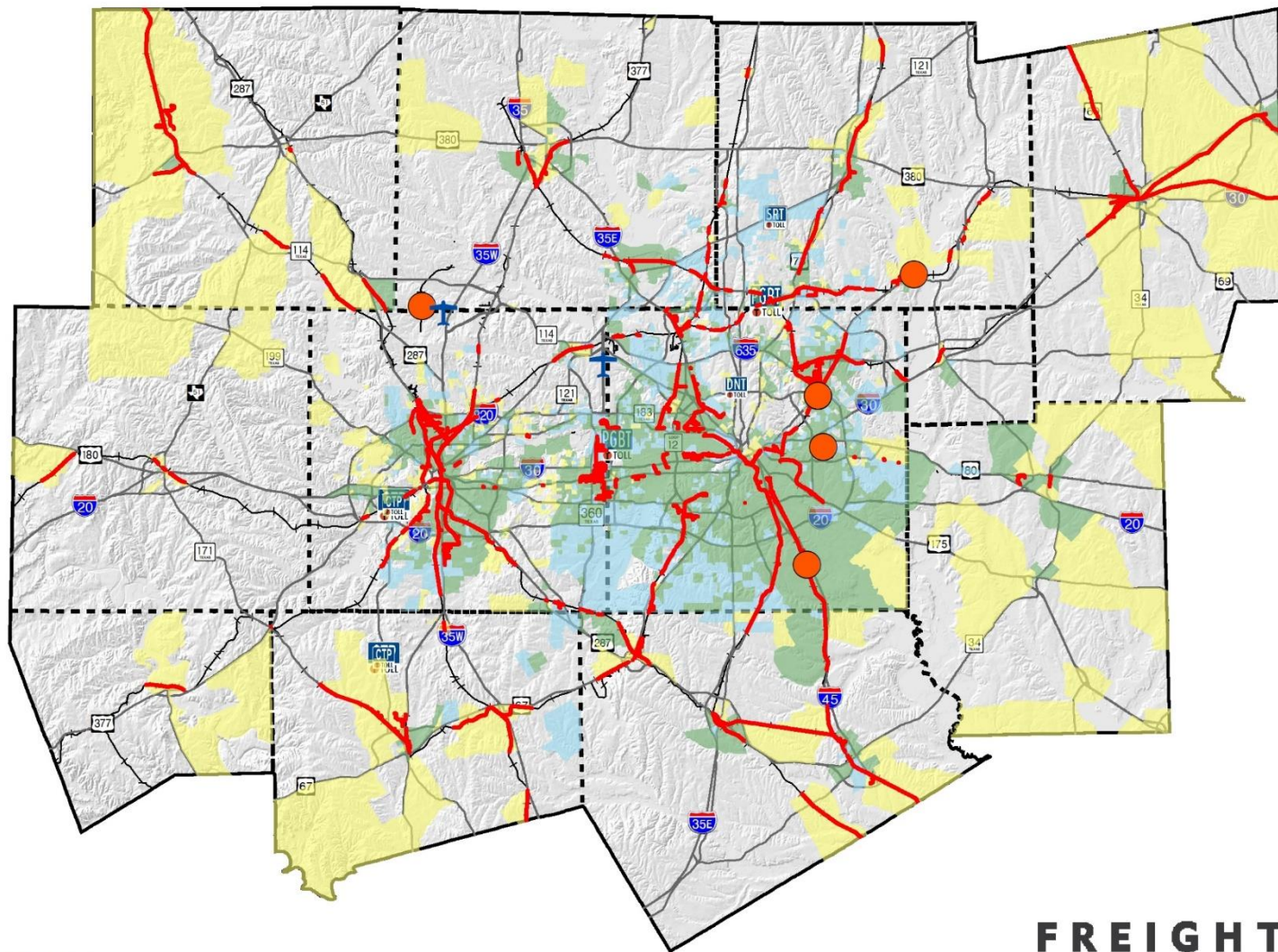
Legend

Type

-  Airport Intermodal Hub
-  Rail Intermodal Yard
-  RR in EJ Area

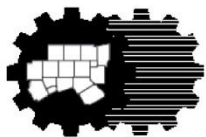
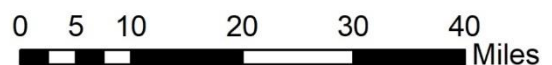
EJ Population Census Tracts

-  Above Regional Percentage: Poverty
-  Above Regional Percentage: Minority Population
-  Above Regional Percentage: Both Minority Population & Poverty
-  Major Highways
-  Railroads
-  County Boundaries
-  MPA Boundary



2267.72 mi of RR Total

997.67 mi Located in EJ Areas (43.99%)



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School Proximity to Freight Facilities

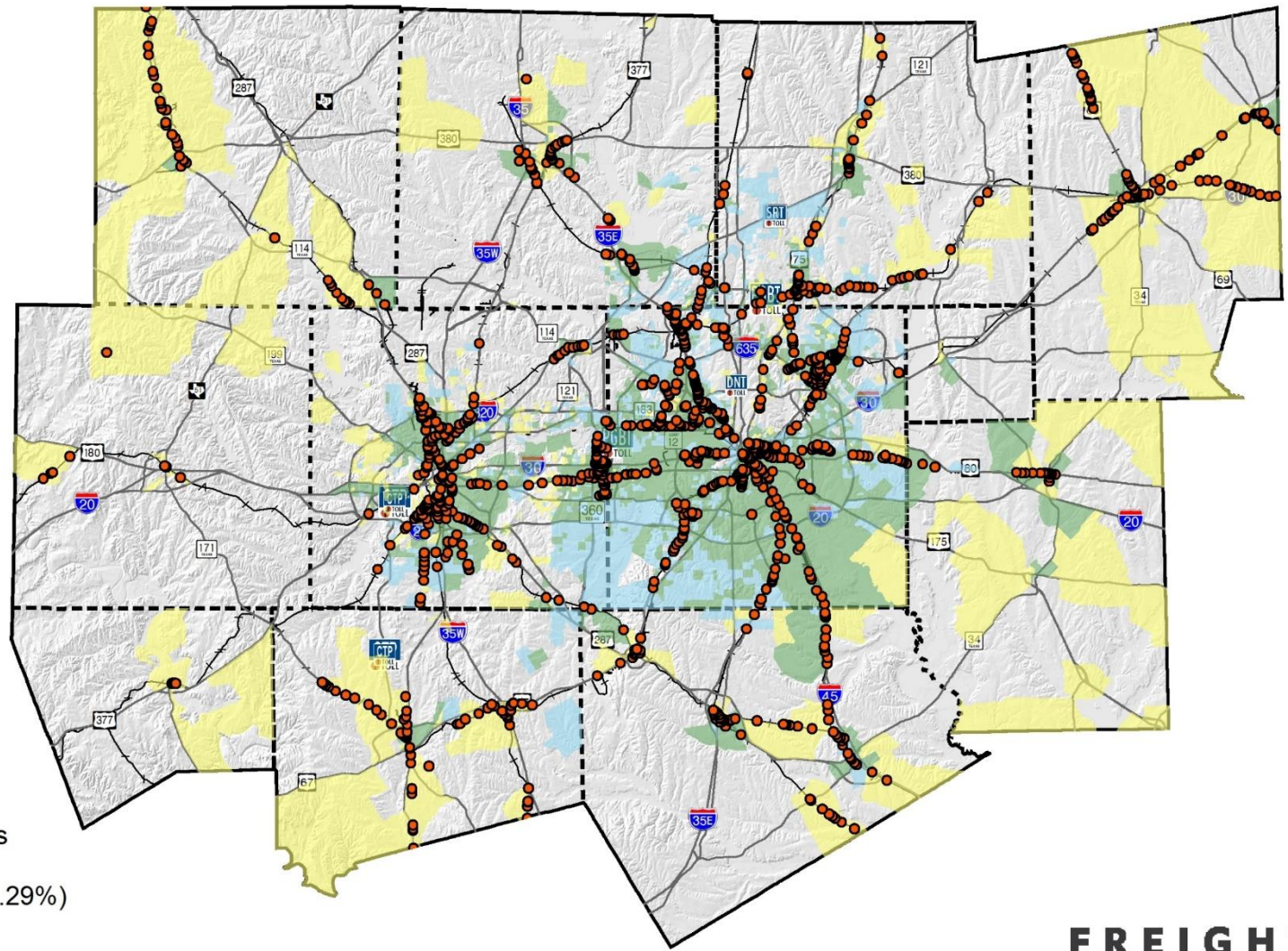
Location	Average Distance from Railroad	Number of Schools
All Schools in MPA	2.20 mi	2561
Schools in EJ Areas	1.77 mi	1354
Schools Outside of EJ Areas	2.69 mi	1207



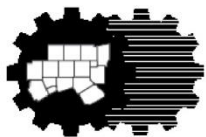
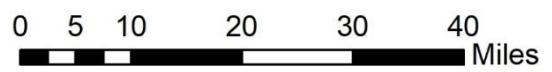
Rail Crossings in EJ Areas

Legend

- At Grade Crossings in EJ Areas
- EJ Population Census Tracts**
 - Yellow: Above Regional Percentage: Poverty
 - Light Blue: Above Regional Percentage: Minority Population
 - Green: Above Regional Percentage: Both Minority Population & Poverty
- Major Highways
- +— Railroads
- - - County Boundaries
- ▭ MPA Boundary



3,293 Total Rail Crossings
 1,689 Located in EJ Areas (51.29%)



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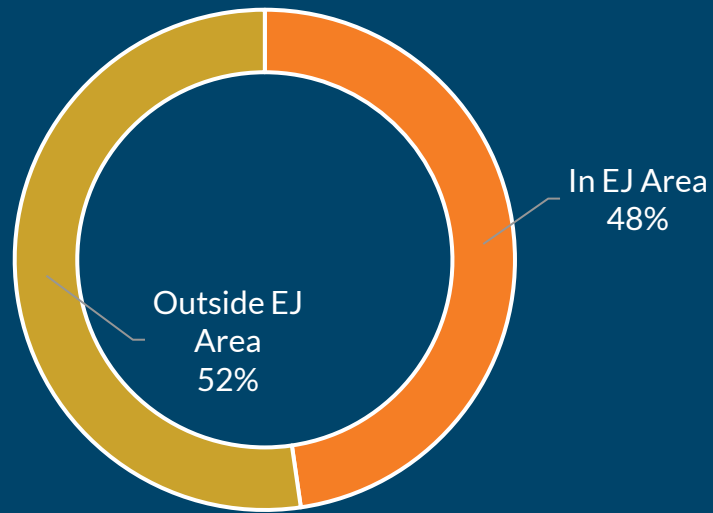


**FREIGHT
 NORTH TEXAS**



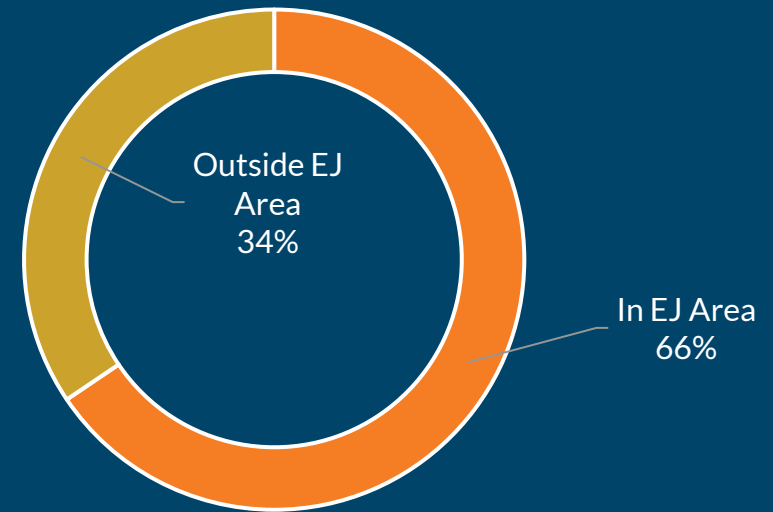
Railroad Crossings in EJ Areas

At-Grade Railroad Crossings



■ In EJ Area ■ Outside EJ Area

Grade Separated Crossings



■ In EJ Area ■ Outside EJ Area



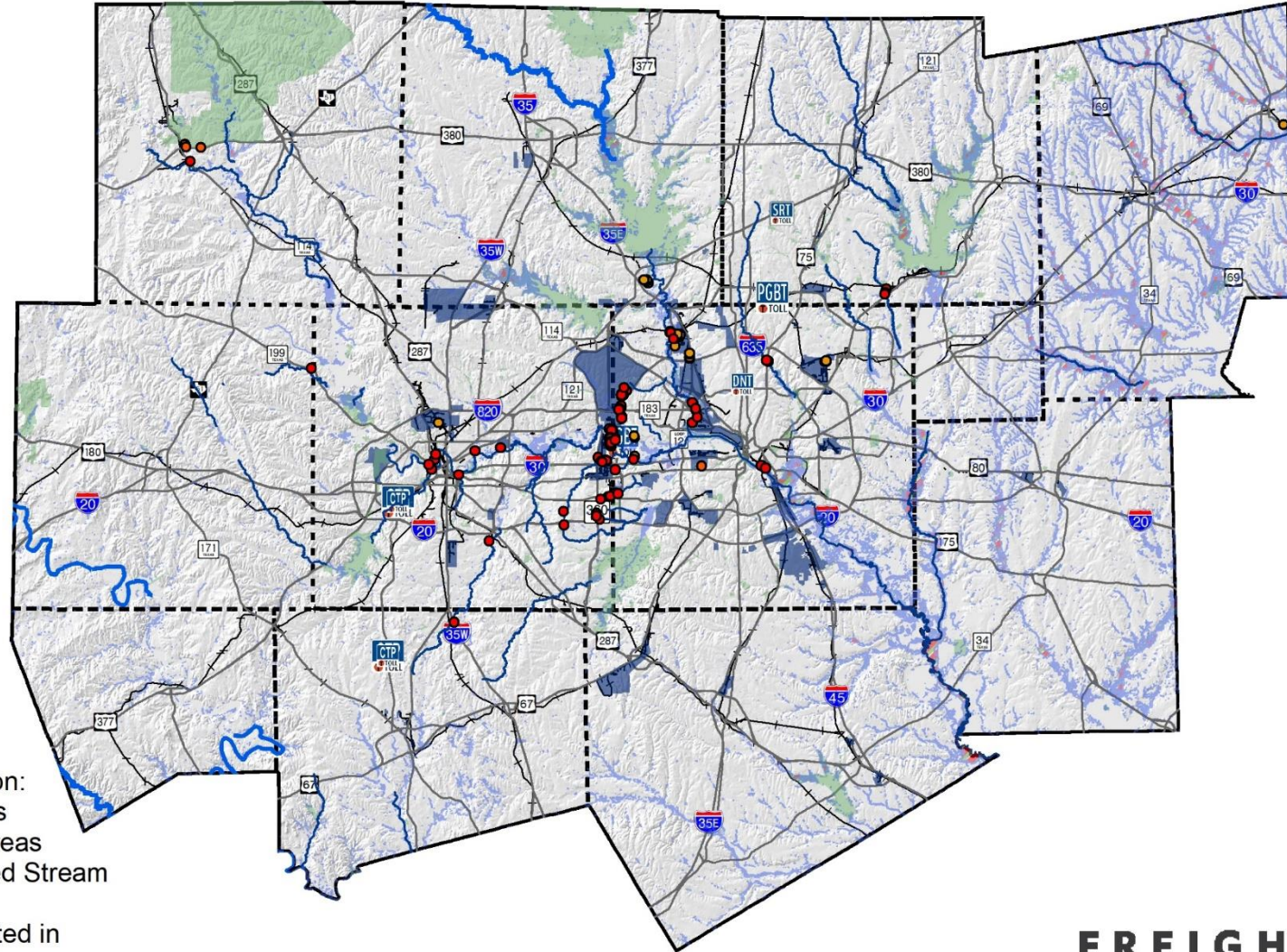


Environmental Features

Freight Facility Proximity to Environmental Resources

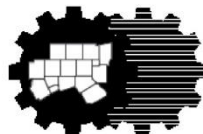
Legend

- Freight Facilities in USGS Protected Areas
- Freight Facilities In Wetlands
- Freight Facilities Near Impaired Streams
- Ecologically Significant Streams
- Impaired Streams
- Combined Existing Wetlands
- USGS Protected Lands Database
- Freight-Oriented Developments
- Major Highways
- Railroads
- County Boundaries
- MPA Boundary



Freight Facility Location:
 30 in Wetlands Areas
 4 in USGS Protected Areas
 77 within .25 mi of an Impaired Stream

22.55 Acres of FOD Located in
 Wetlands or Protected Area



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**FREIGHT
 NORTH TEXAS**

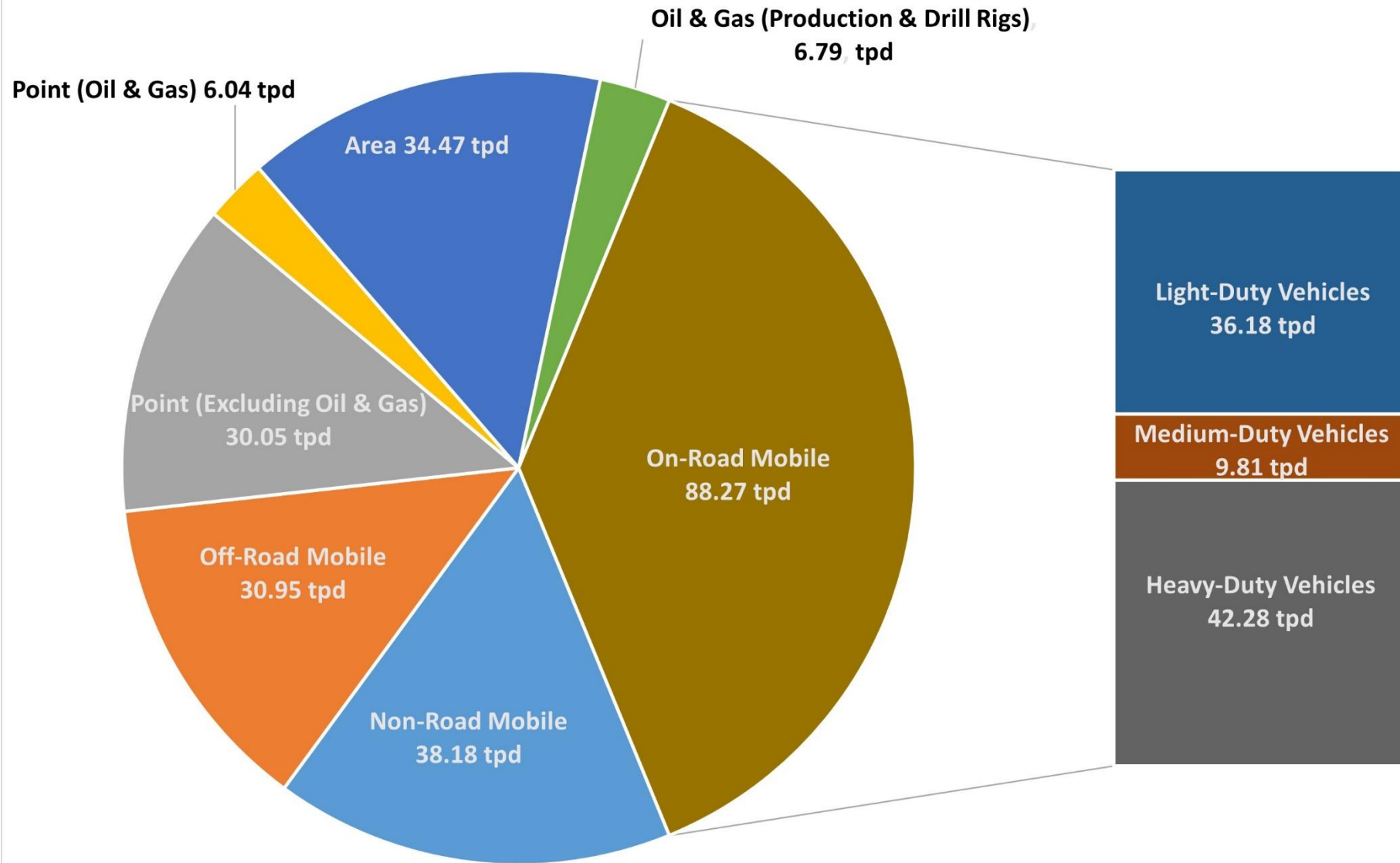


National Register Properties - Average Distance from Freight Facilities

Location	Average Distance from Freight Facility	Number of NRPs
All NRP in MPA	2.61 mi	384
NRP in EJ Areas	2.25 mi	256
NRP Outside of EJ Areas	3.34 mi	128



2020 Total Nitrogen Oxides (NO_x) = 234.75 tons per day (tpd)

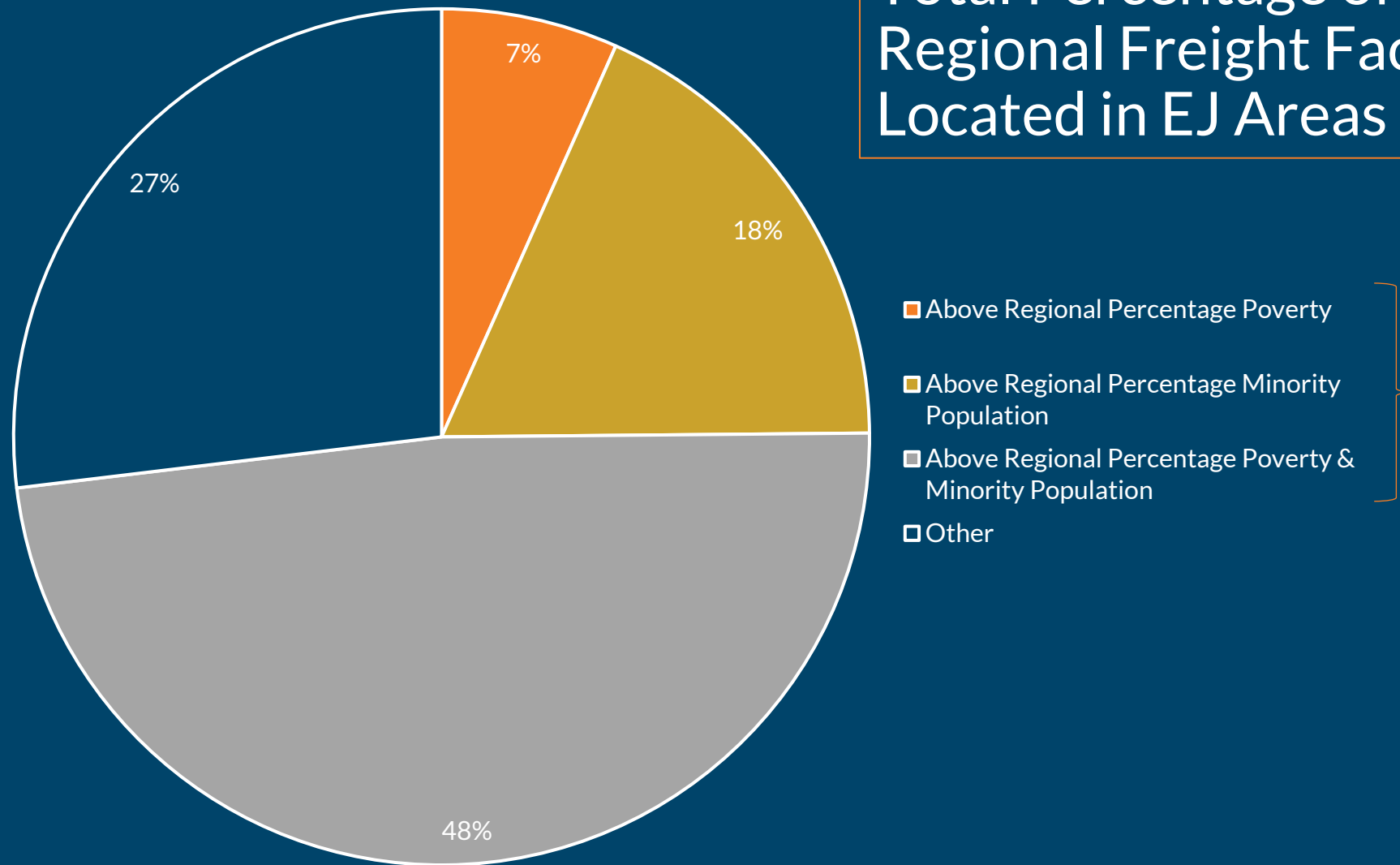




Conclusions & Recommendations

Findings

Total Percentage of Regional Freight Facilities Located in EJ Areas is 73%



Findings



Distance to Schools

Freight facilities are on average 1.66 miles closer to schools in EJ areas compared to non-EJ areas.



Freight Rail Miles

The percentage of all regional freight rail miles running through EJ communities is 43.99%.



School Proximity

Schools in EJ areas are 41.26% closer to freight rail lines than schools in non-EJ areas.



Recommendations

NCTCOG Recommends the following areas of emphasis:

- School proximity to freight facilities and railroad infrastructure
- Freight infrastructure proximity to historical, social, and cultural assets
- Proximity and interaction with nearby ecological features



Recommendations

NCTCOG Actions

- Encourage municipalities to utilize Good Neighbor Strategies in EJ areas
- Invest in freight transportation network upgrades
- Public involvement and engagement

Follow-Up Studies

- Investigate the relationship between land values and freight facility development
- Survey land use policies within the MPA and their impact on development
- Investigate localized interactions between freight facilities and housing in EJ areas
- Freight infrastructure interaction with National Register Properties and other social/cultural/historical resources



CONTACT US



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Questions?



Local Updates

North Texas Freight Terminal Electrification

[NCTCOG.ORG/NTFTE2020](https://nctcog.org/NTFTE2020)

Deadline: 01/13/2023

North Texas Clean Diesel Project

[NCTCOG.ORG/NTCDP2021](https://nctcog.org/NTCDP2021)

Deadline: 01/13/2023



CONTACT US



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