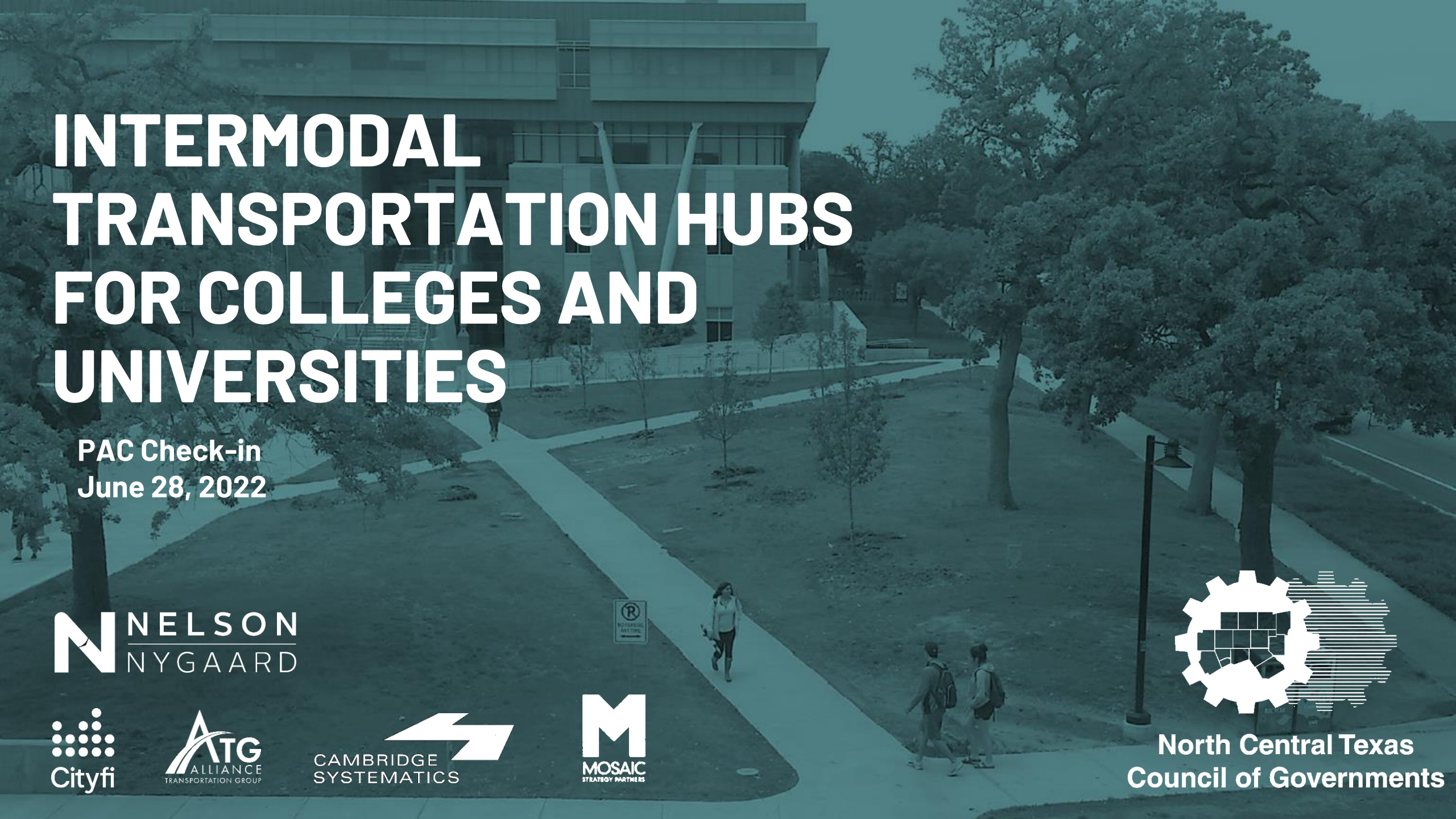


# INTERMODAL TRANSPORTATION HUBS FOR COLLEGES AND UNIVERSITIES

PAC Check-in
June 28, 2022

NELSON NYGAARD

Cityfi

ATG ALLIANCE TRANSPORTATION GROUP

CAMBRIDGE SYSTEMATICS

MOSAIC STRATEGY PARTNERS

North Central Texas Council of Governments

# Agenda

| | |
|---|---|
| WELCOME AND RECAP | 10:00-10:05 |
| EXISTING CONDITIONS OVERVIEW | 10:05-10:15 |
| PROPENSITY ANALYSIS AND METHODOLOGY | 10:15-10:25 |
| MARKET ANALYSIS | 10:25-10:35 |
| SITING ANALYSIS AND METHODOLOGY | 10:35-10:50 |
| FEEDBACK AND QUESTIONS | 10:50-11:00 |

# Check-in Objectives

- Share a high-level overview of the existing conditions analysis
- Review trends and highlights of the market analysis
- Present the regional propensity analysis tool and methodology
- Go over our approach to the initial mobility hub siting process
- Gather feedback on the process so far and input for next steps

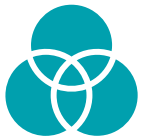
# Developments from Directional Workshop

## Campus Mobility Hub Vision

*Campus mobility hubs are the **physical and digital intersection** of mobility options, transportation information, campus life, and social interactions. Campus mobility hubs are **centralized points both on- and off-campus** where people have **on-demand access** to a range of shared mobility options and mobility storage solutions. They enable campus affiliates to access multiple transportation options and amenities that **support campus access or connections across modes**. Typically built on a **backbone of public transit and campus shuttles**, mobility hubs offer a **safe, comfortable, convenient, and accessible** space to seamlessly transfer across different mobility options.*

# Developments from Directional Workshop

## Campus Mobility Hubs Should...



be **highly accessible, convenient, sustainable, and safe,** with a **wide array of amenities** to complement the available mobility offerings.

**seamlessly tie-in to the fabric** of the campus or community where they are located, both in terms of **aesthetics** and the **amenities** offered.

provide more than just a connection between transportation modes – they should be **activated** and **comfortable** enough to spend anywhere from a **short stopover to a long stay**.

cater to the **diverse mobility needs** and abilities of **students, faculty, staff, and visitors**.

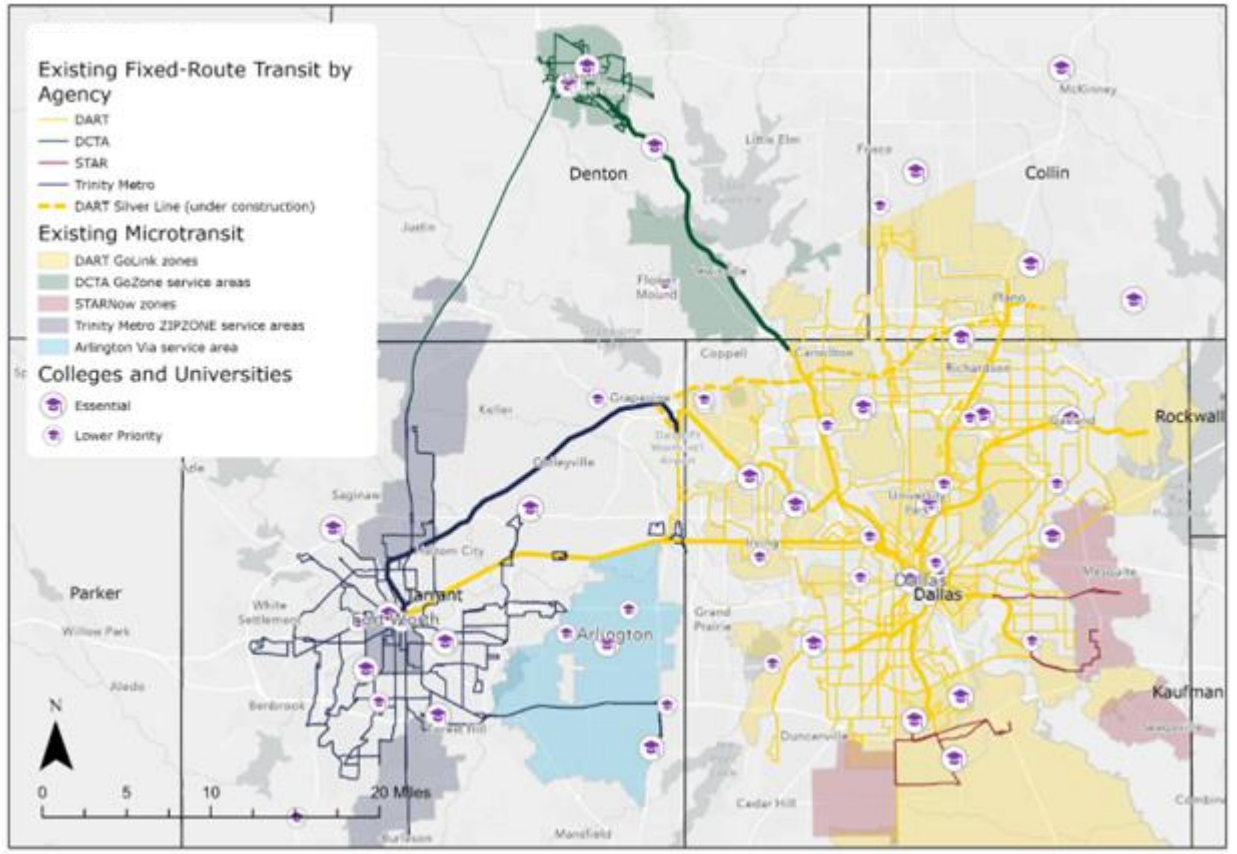
# EXISTING CONDITIONS OVERVIEW

# Existing Conditions Analysis

- Reviewed 15 existing planning studies for mobility hub policy and planning
  - Mobility 2045 (2018)
  - Dallas County Mobility Plan (2020)
  - Connect Dallas Strategic Mobility Plan (2021)
  - Southern Dallas County Transit Study (2021)
  - DART Red and Blue Line TOD Study (2021)
  - Transit Moves Fort Worth (2020)
  - Connect Arlington Transportation Strategy (2017)
  - Arlington Comprehensive Plan, "99 Square Miles" (2015)
  - Tarrant County Transit Study (2021)
  - Collin County Transit Study (2021)
  - Irving to Frisco Passenger Rail Corridor Study (2022)
  - City of Denton: Mobility Plan (2022)
  - Downtown Denton Master Plan (2002)
  - Oak Area Gateway Plan (2018)
  - UNT Campus Master Plan (2005)

# Existing Conditions Analysis

- Compiled all existing and planned alternative modes of transportation in the region, with more focused inventories at universities
  - Intercity rail
  - Light rail
  - Commuter rail
  - Streetcar
  - Express bus
  - Local bus
  - Microtransit providers
  - Bicycle infrastructure
  - Pedestrian infrastructure
  - Micromobility service



# Existing Conditions Analysis

- Identified mobility hub best practices

- **Physical infrastructure**
  - Multimodal infrastructure
  - Community building
  - Resiliency

- **Digital infrastructure**
  - Demand responsive service
  - Mobility as a service
  - Advanced mobility
  - Connectivity

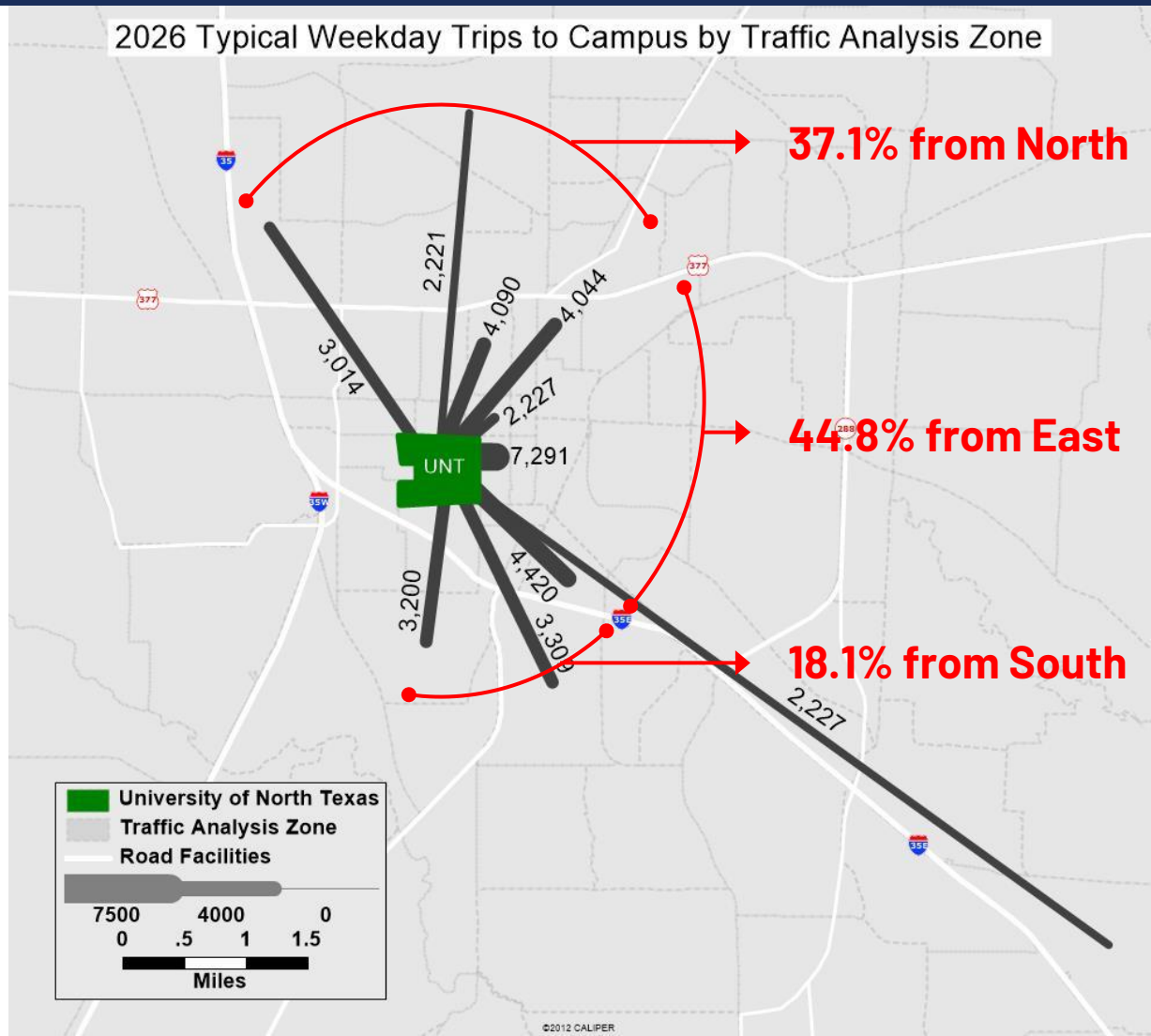
- **Programming and design**
  - Modular, context aware, adaptive implementation
  - Cohesive, human-scale design
  - Curbside management
  - Parking for desired modes
  - Placemaking, public space
  - Retail and amenities
  - Programming and operations
  - Wayfinding, trip planning, and user information
  - First/last mile access
  - Universal access and ADA
  - Visibility and public education

# Existing Conditions Analysis

## Future trip origins to UNT - 2026

- Majority of trips to UNT come from North and East
- 93.8% of trips are from within two miles
- Large number of trips from Corinth area

**This suggests that with available mobility options and infrastructure, micromobility and transit can replace some of these trips**

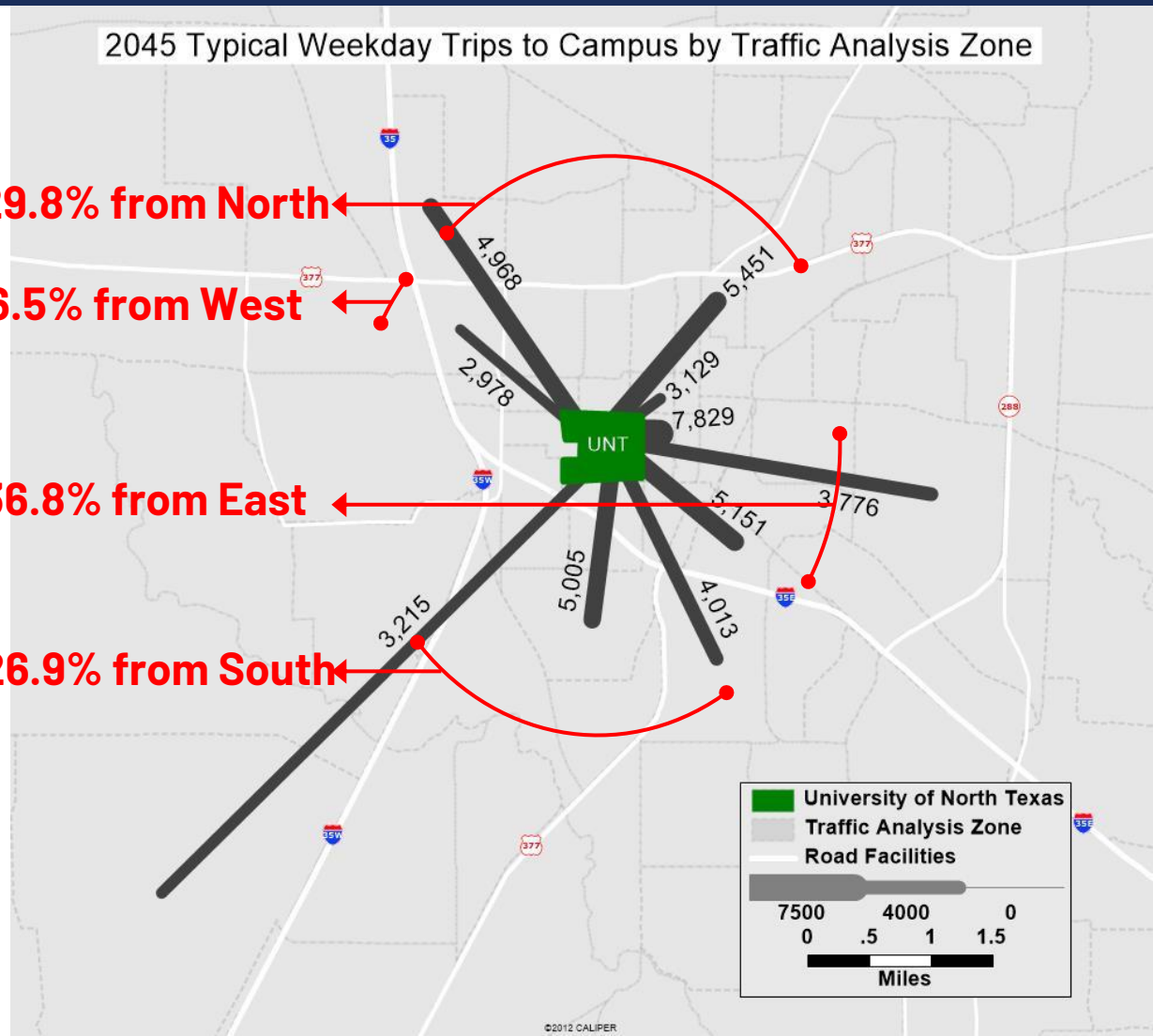


# Existing Conditions Analysis

## Future trip origins to UNT - 2045

- Trips from south gain traction
- Travel footprint grows from 2026
- Share of trips from southwest area emerges

**As average trip distance increases in the future, UNT needs services that serve longer trips, better hub connections, and microtransit to connect areas not served by transit**



# Existing Conditions Analysis

## Key Takeaways and Opportunities

- Mobility hub = Improved campus experience
- Mobility hubs vary in **definition and prominence**
- **Existing infrastructure and mobility services** vary by campus
- **First/last mile** enhancement and **short trip replacement** opportunities
- Opportunity to develop a **regional and local mobility hub network**
- **State/federal funding** under TxDOT's Unified Transportation Program

# What are some bigger existing issues that need to be investigated in this study?

Safety of last mile for micromobility access to UNT

Connectivity between hubs

Smart integration of micro-mobility in Denton/UNT

Safety is an issue that has shown up in our work on student transportation needs. How is that researched and addressed by your work?

Parking

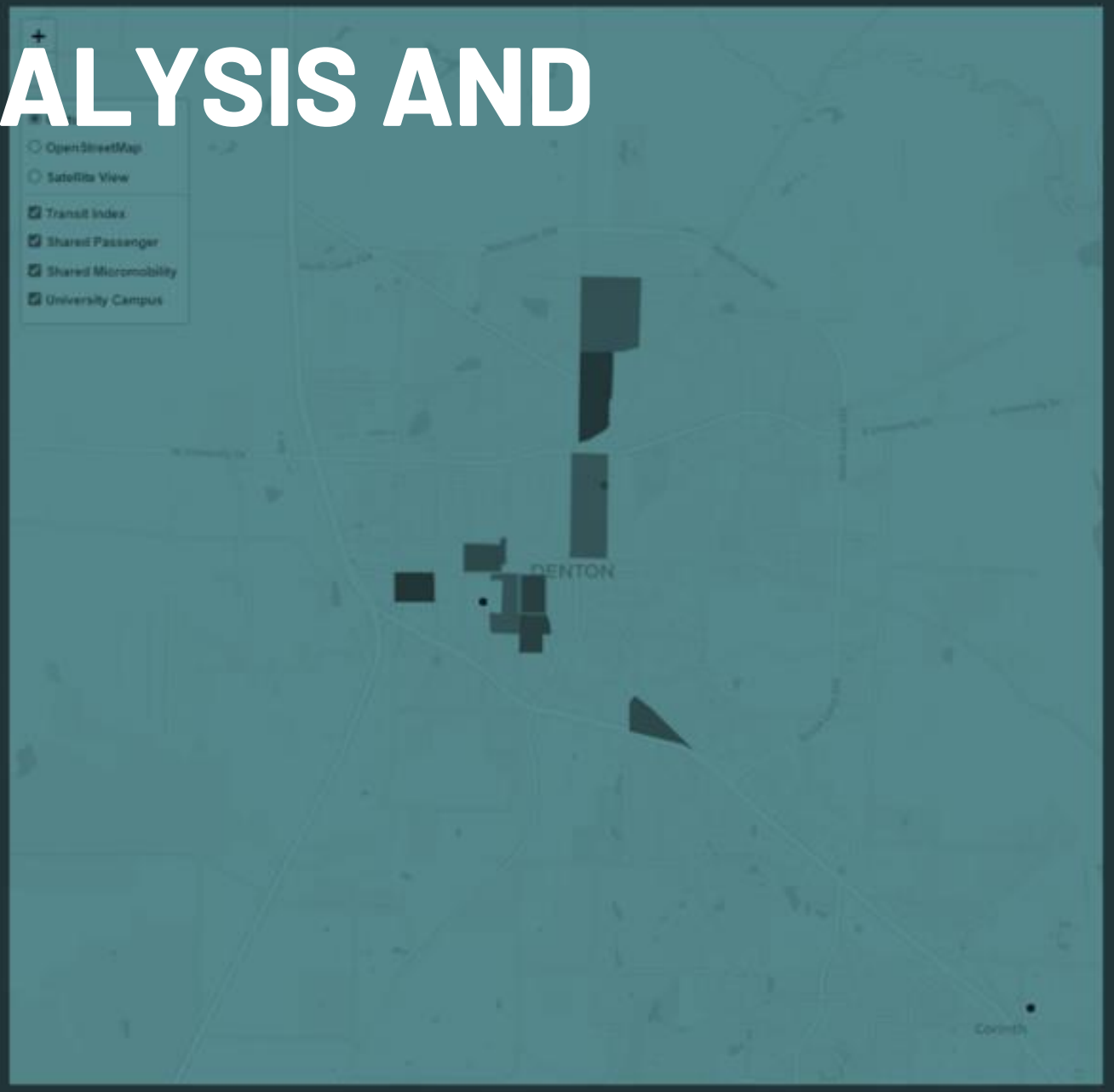
Ways to build a flexible multi-modal system from the ground up (scooters, bikes, bus, pedestrians, integration with parking and streets, etc.).

Options

First/last mile connections. Difficult to get from home/work to schools via transit without easy, reliable connectivity

Commuter colleges

# PROPENSITY ANALYSIS AND METHODOLOGY

# NCTCOG Intermodal Hubs - Propensity Indexes

Index Thresholds

Use the sliders below to select the desired threshold for each propensity index

Transit Propensity Index Threshold

0 8 10

0 1 2 3 4 5 6 7 8 9 10

Shared Passenger Propensity Index Threshold

0 8 10

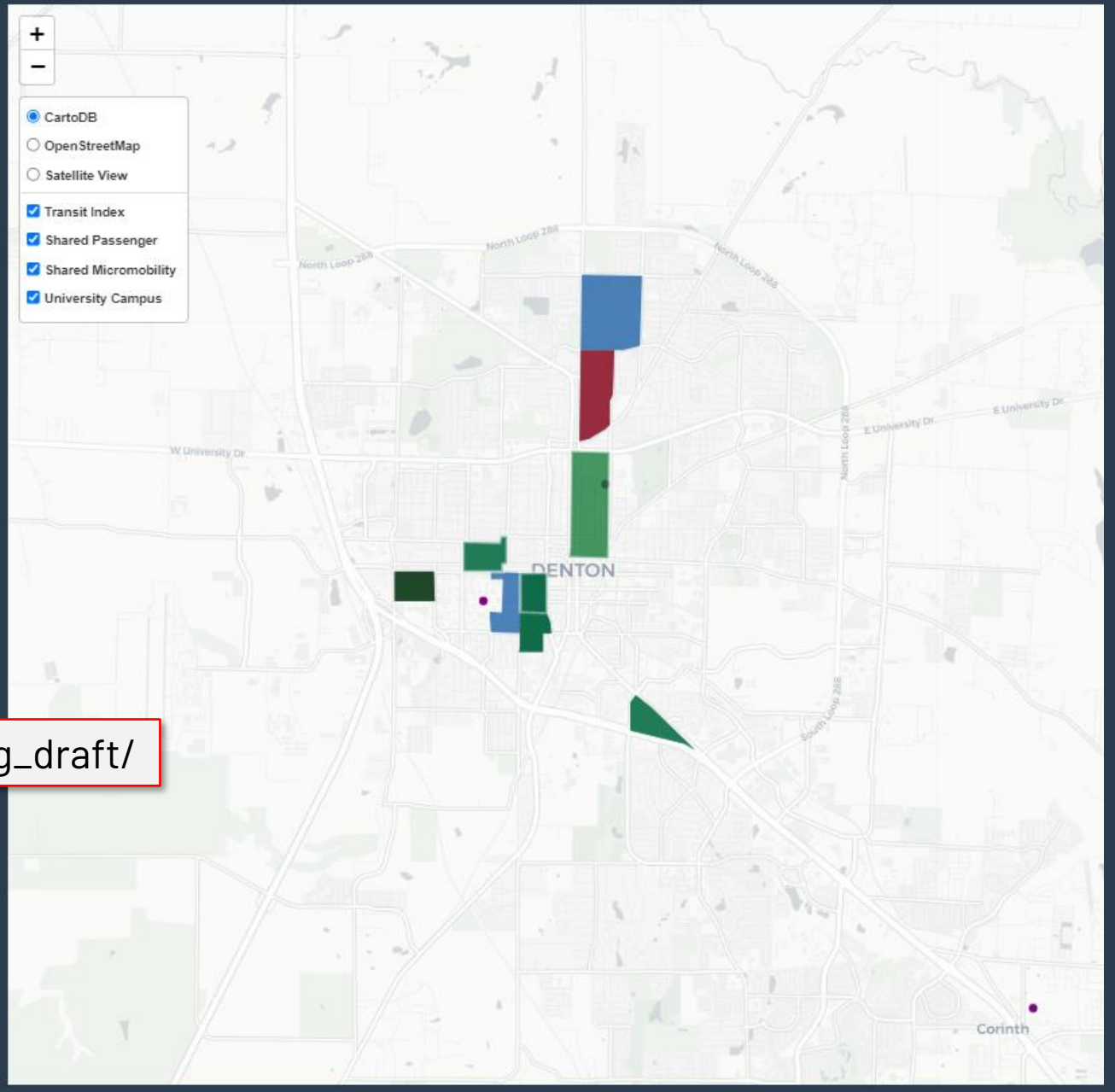
0 1 2 3 4 5 6 7 8 9 10

Shared Micromobility Propensity Index Threshold

0 8 10

0 1 2 3 4 5 6 7 8 9 10

https://nelsonnygaard.shinyapps.io/nctcog_draft/



# Propensity Analysis

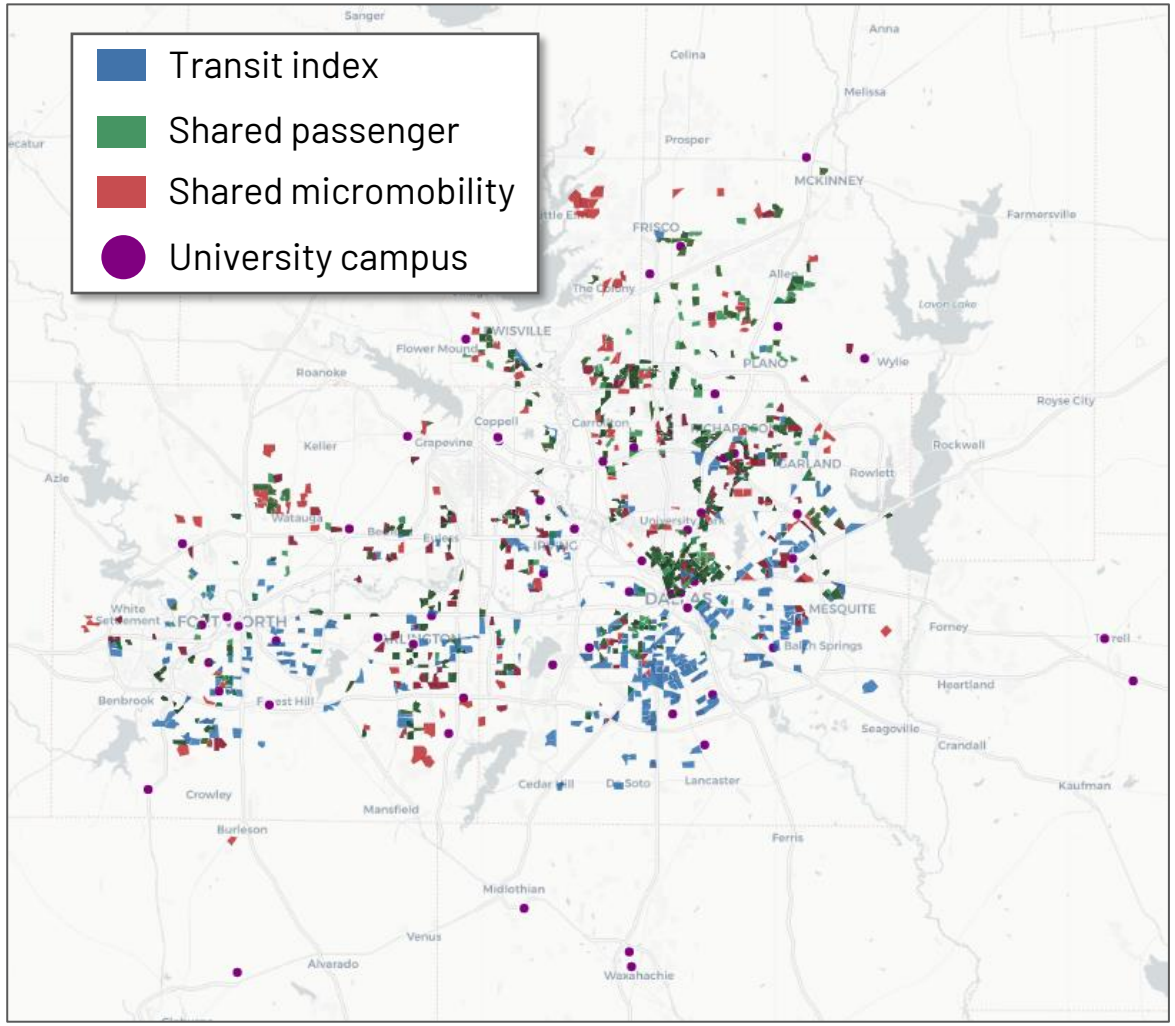
## Why is it important?

- Analyzing locational propensity towards non-drive-alone mobility helps identify key locations where mobility hub investment can be the most impactful from a **demographic perspective**
- Propensity analysis is just one piece of the puzzle – other analyses presented today combine to paint a full picture of where mobility hubs can have the most influence

# Propensity Analysis

## Overview

- **Shared mobility propensity**: behavioral tendency and ability to use shared passenger mobility (Uber/Lyft) or shared micromobility (bike share and scooter share) services.
- **Transit propensity**: demographic spectrum of likelihood and need to use public transit for mobility.
- Methodology derived from academic research and statistical practices employed in previous mobility hub siting projects in peer regions across the country.



# Propensity Analysis Methodology

## Variables included in shared mobility propensity analysis

| Population group | Variable used | Analysis |
|---|---|---|
| People identified as White, Asian, or some other race | Population by race | Shared passenger mobility, shared micromobility |
| People between the age of 20 and 40 years | Population by sex and age | Shared passenger mobility, shared micromobility |
| Middle income households, with an income in 2nd and 3rd quantile | Household income in the past 12 months (2019 inflation-adjusted) | Shared passenger mobility, shared micromobility |
| People with a bachelor's degree or higher | Educational attainment for people 25 and older | Shared passenger mobility, shared micromobility |
| Families without children | Family type by presence and age of own children under 18 years | Shared passenger mobility, shared micromobility |
| Single individuals | Marital status for the population 15 years and older | Shared passenger mobility, shared micromobility |
| People working full of part-time | Employment status for the population 16 years or older | Shared passenger mobility, shared micromobility |
| Non-auto-oriented intersections | Number of pedestrian- and multimodal-oriented intersections per census block group | Shared micromobility |
| Bike network facilities | Miles of bicycle infrastructure within census block group | Shared micromobility |

# Propensity Analysis Methodology

## Variables included in transit propensity analysis

| Population group | Variable used |
|---|---|
| Non-white population | Population by race |
| Population between 15 and 24 years old | Gender by age |
| Population 65 years and older | Gender by age |
| Households with annual income of $50,000 or lower | Household income in the past 12 months |
| People with disabilities | Disability status |
| Zero-car households | Household tenure by vehicles available |

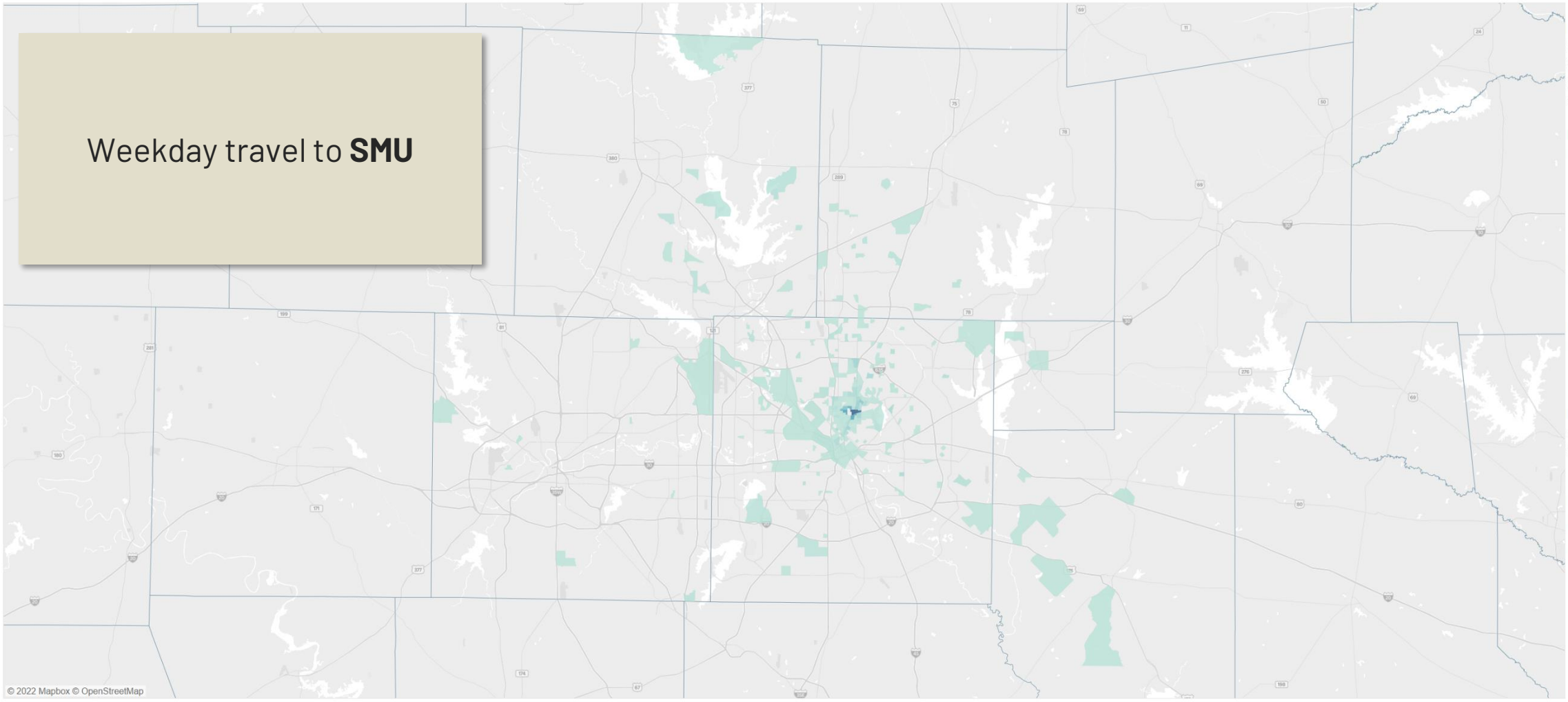
# MARKET ANALYSIS

# Summary

- **Total Travel to Campuses** by
  - Purpose (Home-based vs all other)
  - Equity Group (Based on device home location)
  - Mode (Based on speed)
  - Distance
- **Educational Travel to Campuses**
  - (percent students + education employees) x (number of trips from block group to campus)
- **Geographic analysis**
- **Next Steps**

SMU

# Weekday travel to **SMU**




Destination Campus
SMU

Education Discount
- (●) All Residents
- ( ) Students
- ( ) Employees
- ( ) Students + Employees

Time Of Day
All

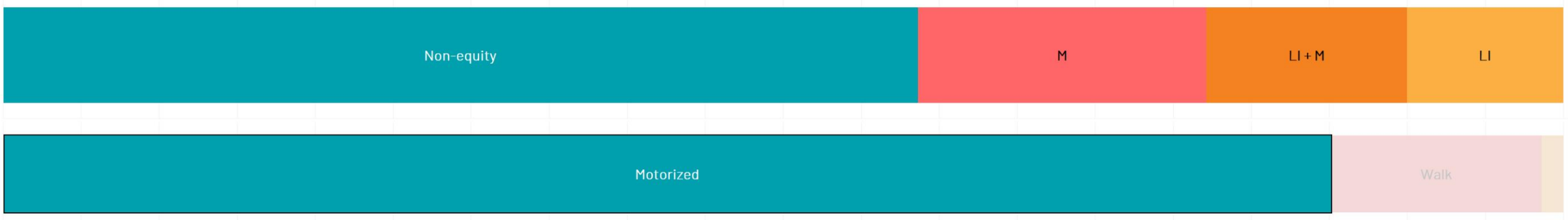
Day Type
All

Purpose
All

Geography
- (●) External
- ( ) Internal

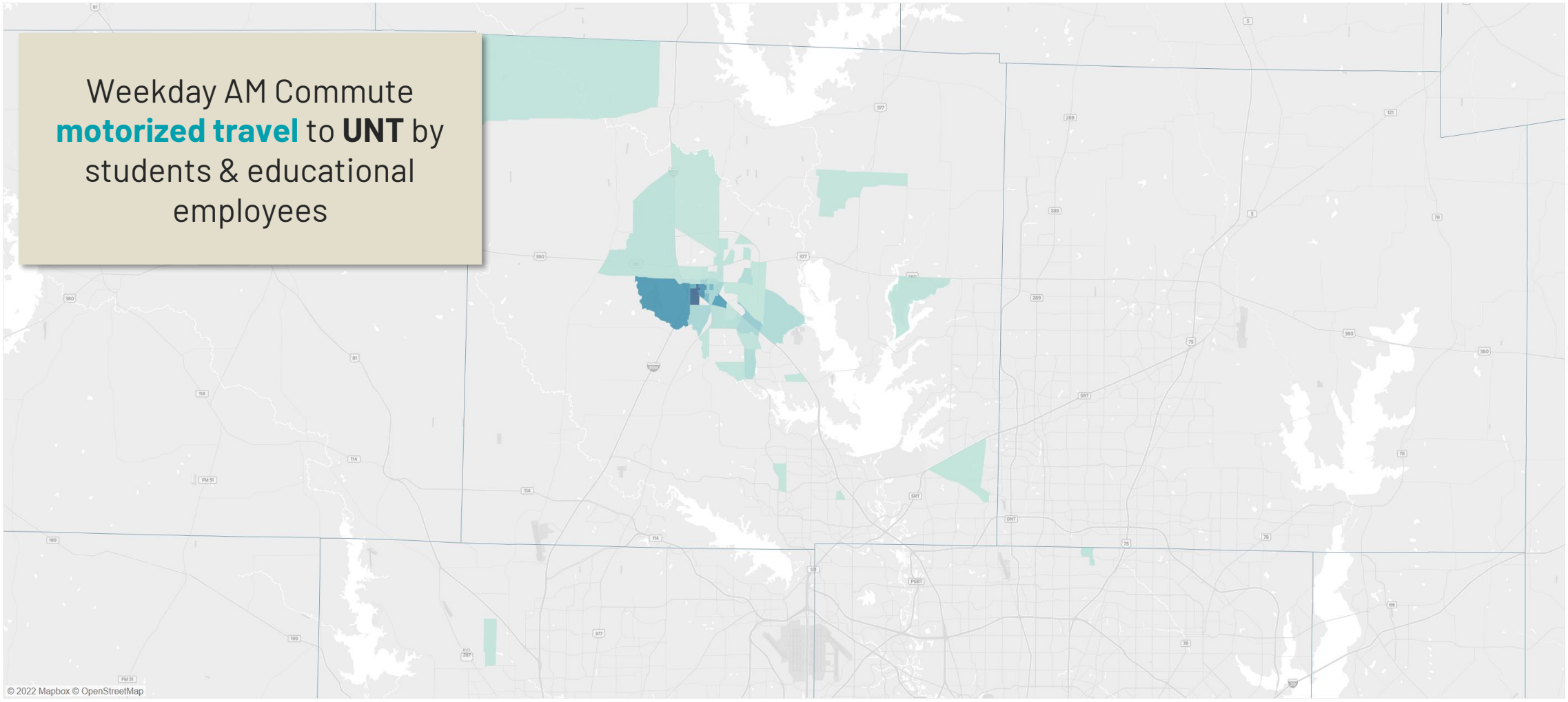
Daily Trips
10 — 1,362

Minimum Trips to Display
From 10



**UNT**

Weekday AM Commute **motorized travel** to **UNT** by students & educational employees




Destination Campus
UNT

Education Discount
- All Residents
- Students
- Employees
- Students + Employees

Time Of Day
- AM Peak
- Midday
- PM Peak
- ZZZZZZZ

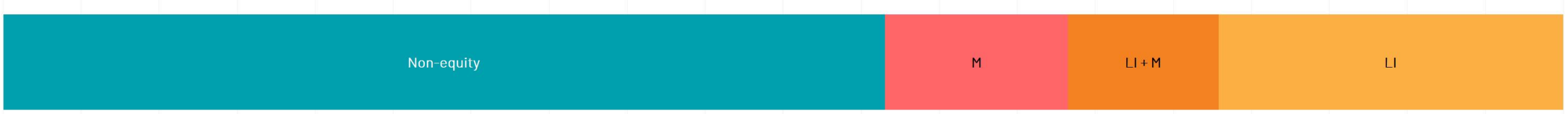
Day Type
All

Purpose
- Home-based
- Not Home-based

Geography
All

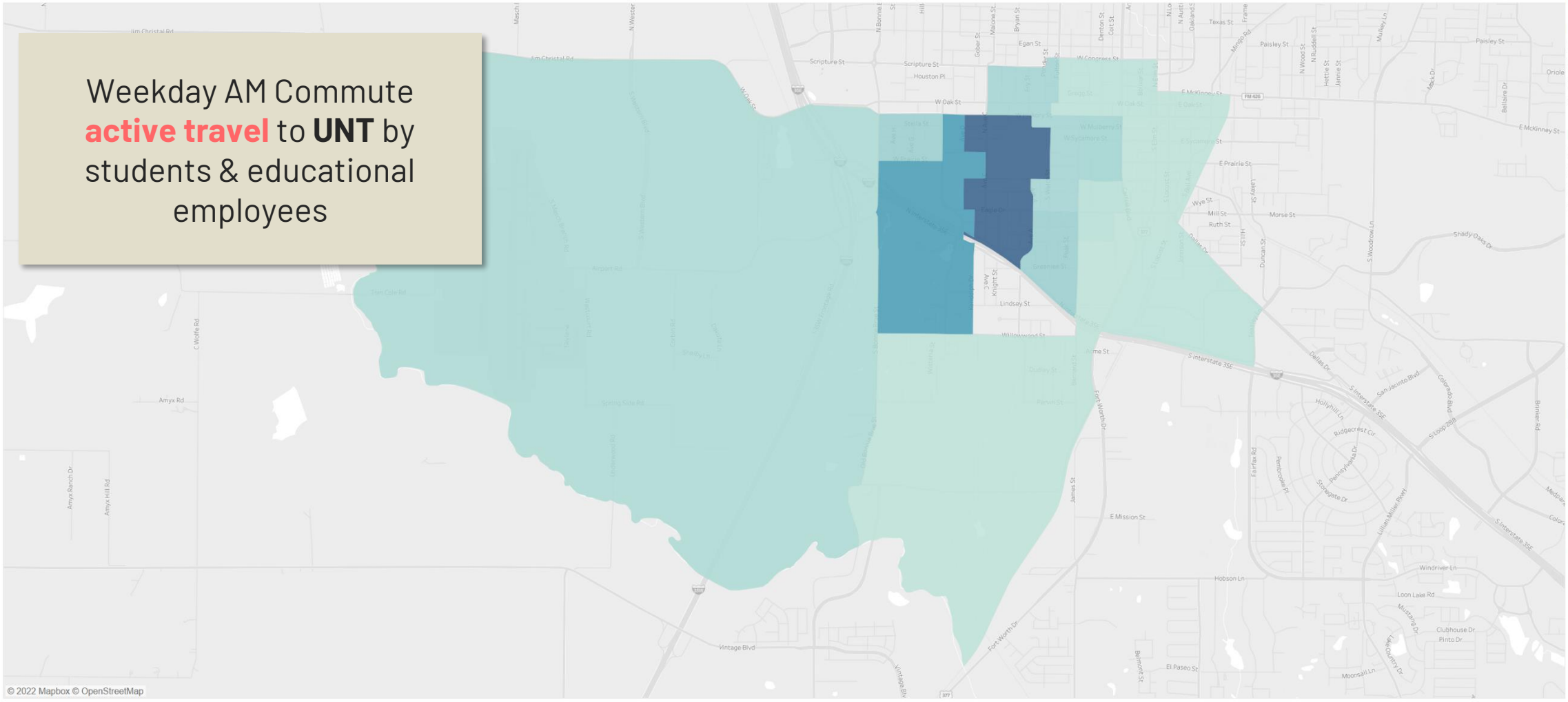
Daily Trips
11 — 651

Minimum Trips to Display
From 10




UNT

Weekday AM Commute **active travel** to **UNT** by students & educational employees




Destination Campus
UNT

Education Discount
- ○ All Residents
- ○ Students
- ○ Employees
- ● Students + Employees

Time Of Day
- ● AM Peak
- ○ Midday
- ○ PM Peak
- ○ ZZZZZZZ

Day Type
All

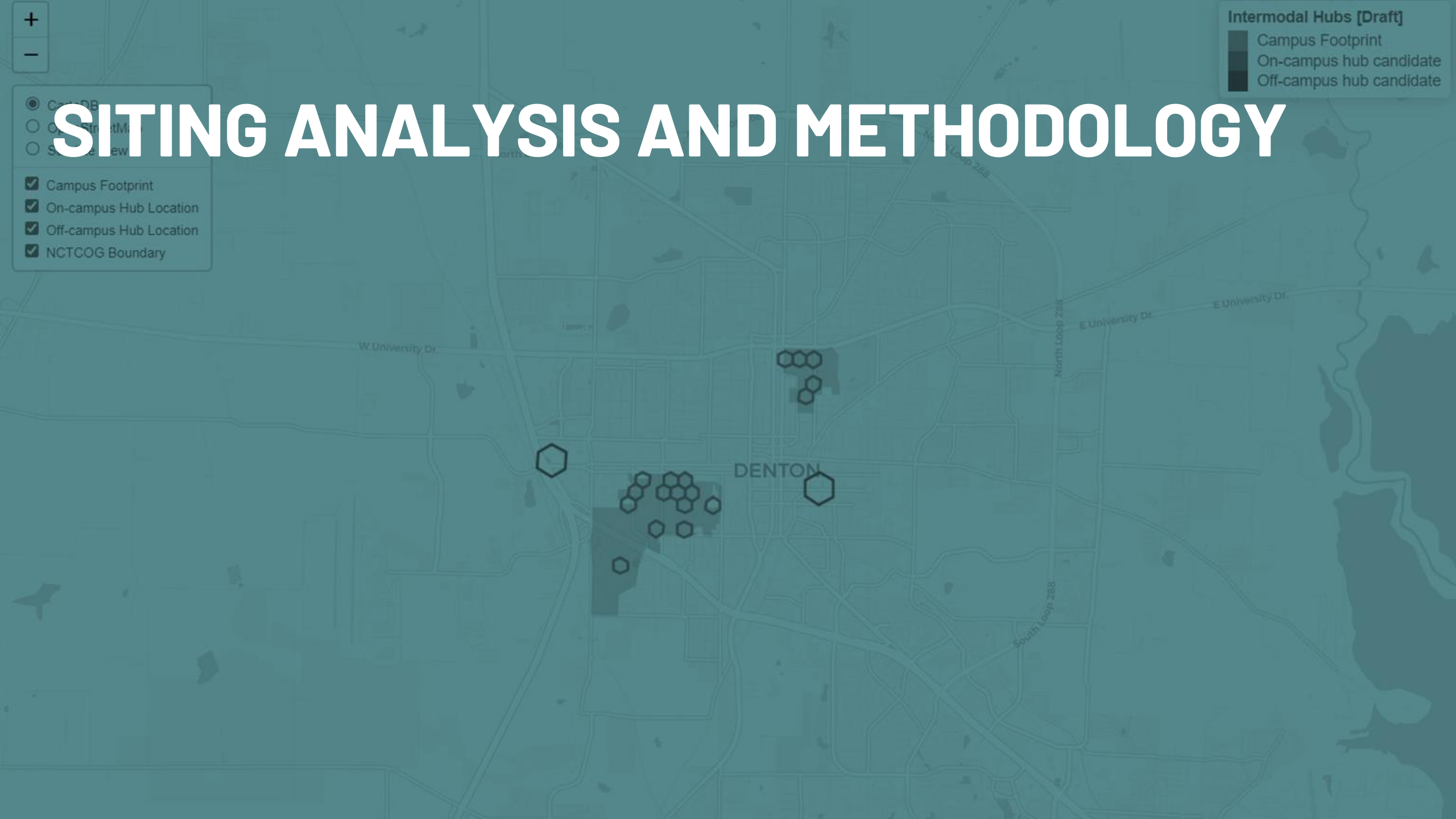
Purpose
- ● Home-based
- ○ Not Home-based

Geography
All

Daily Trips
13 — 584

Minimum Trips to Display
From 10


# SITING ANALYSIS AND METHODOLOGY

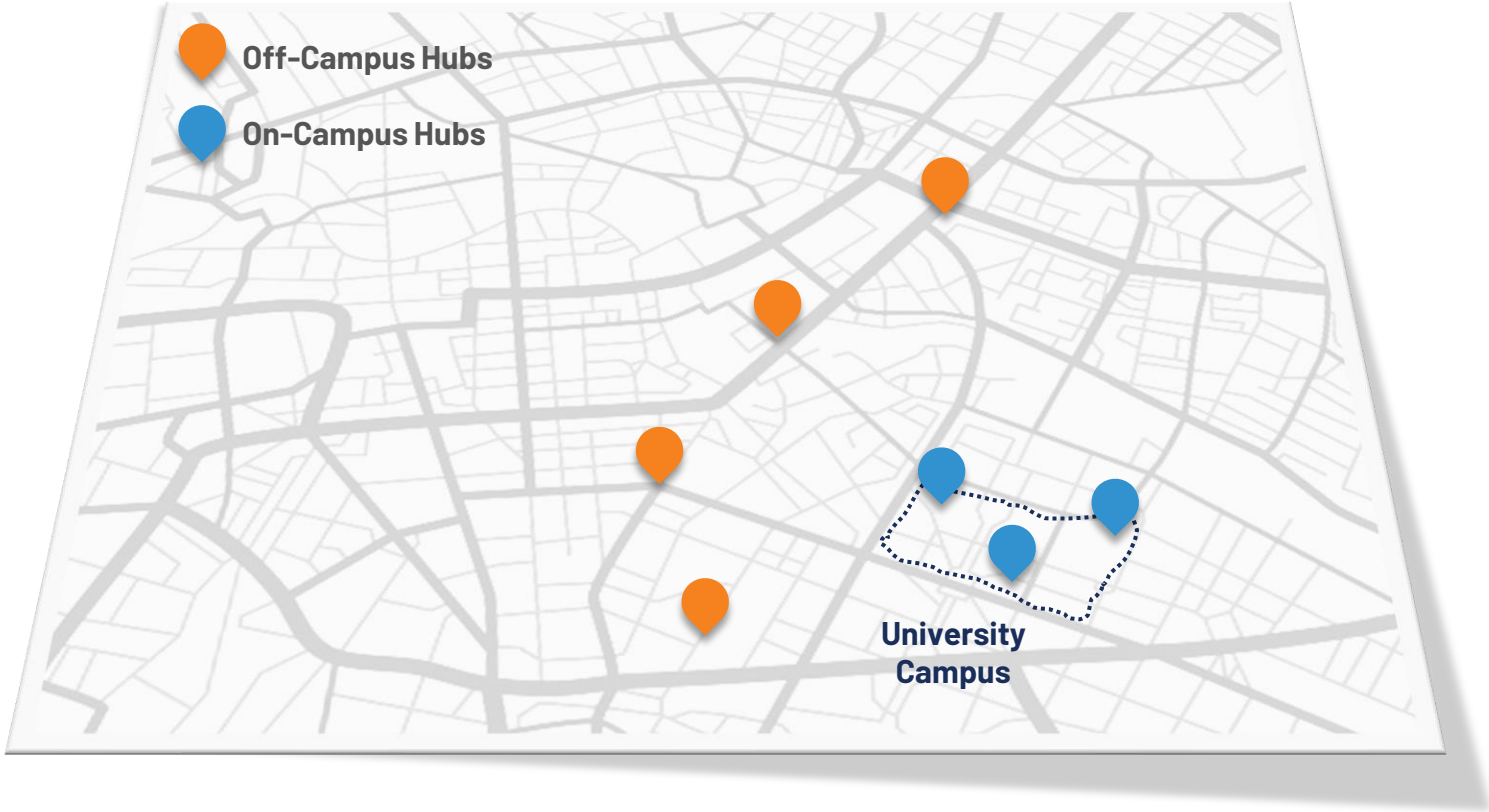


# Mobility Hub Siting Analysis

## Hub Context

- **Off-Campus Hubs:** Mobility hubs outside university campus that serve as a portal to access transit and other services

- **On-Campus Hubs:** Mobility hubs within university campus boundaries that connect university services efficiently



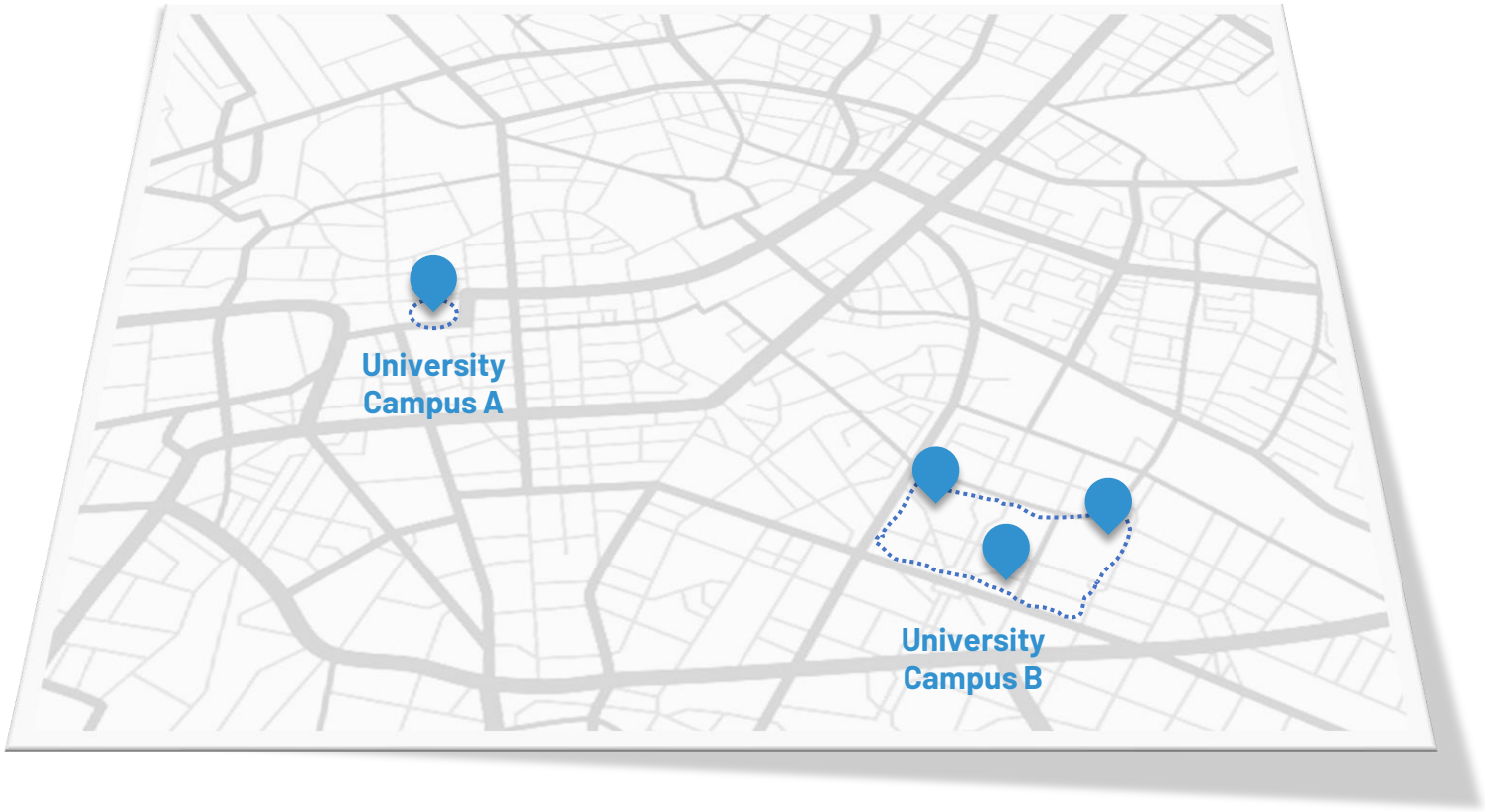
# Mobility Hub Siting Analysis

## Campus Context

- **Single Hub (University A)**
- **Multiple Internal Hubs (University B)**

Larger campuses, especially those that cover more land area, are candidates for multiple mobility hubs. Smaller campuses may only need one mobility hub.

A threshold based on area coverage and/or student enrollment is established to separate out campus context.



# Mobility Hub Siting Methodology

## Off-Campus Hubs

STEP 1

**Map core mobility indicators in campus proximity**

STEP 2

Select candidate locations based on concentration of mobility indicators

STEP 3

Define specific location based on pre-defined indicator hierarchy

- High-Capacity Transit Stations
- Park & Ride Locations/ End-of-Line Terminus
- Transit Centers and Quality Transit Connections (two or more)
- Fixed Route Transit Connections (two or more)
- Microtransit Demand Concentrations
- Car Share/Bike Share Stations

Others? – note them in Menti poll at end of this section

# Mobility Hub Siting Methodology

## Off-Campus Hubs

**STEP 1**

**Map core mobility indicators in campus proximity**

**STEP 2**

**Select candidate locations based on concentration of mobility indicators**

**STEP 3**

**Define specific location based on pre-defined indicator hierarchy**

# Mobility Hub Siting Methodology

## Off-Campus Hubs

**STEP 1**

**Map core mobility indicators in campus proximity**

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**Select candidate locations based on concentration of mobility indicators**

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# Mobility Hub Siting Methodology

## Off-Campus Hubs

**STEP 1**

**Map core mobility indicators in campus proximity**

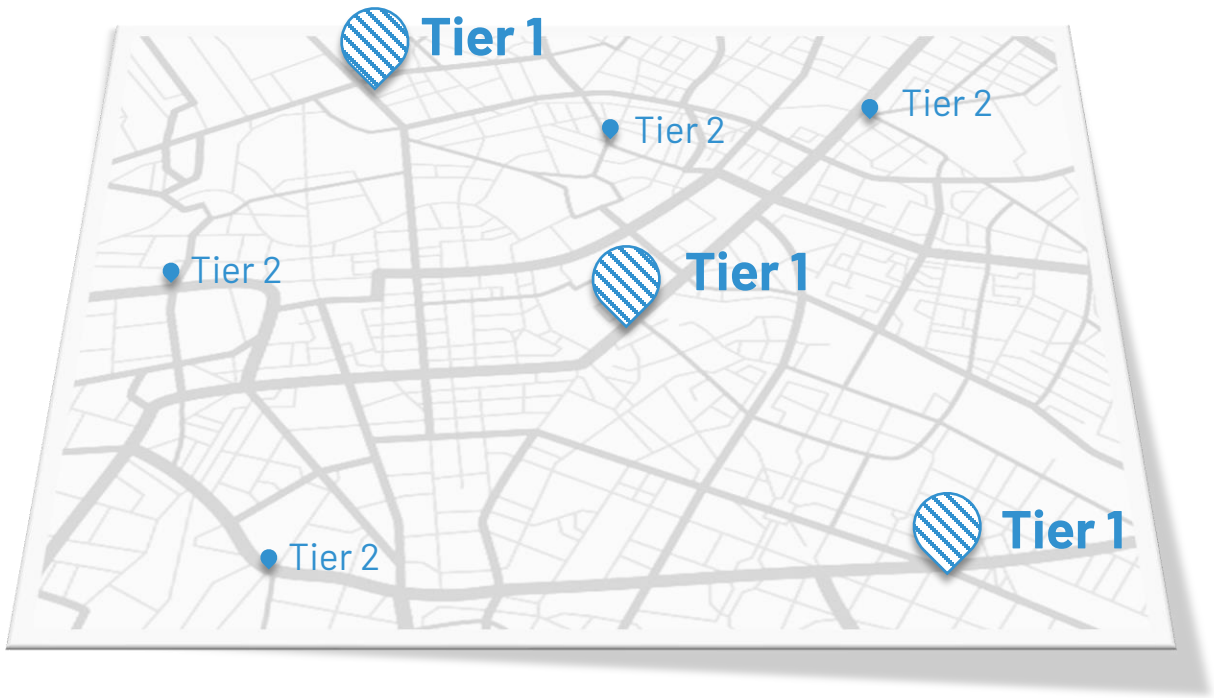
**STEP 2**

**Select candidate locations based on concentration of mobility indicators**

**STEP 3**

**Define specific location based on pre-defined indicator hierarchy**

# Mobility Hub Siting Methodology




## On-Campus Hubs

**STEP 1**

**Categorize campuses into tiers based on size**

**STEP 2**

**Map mobility indicators within campus footprint**

**STEP 3**

**Map entry points of major trip generators (Tier 1 campuses only)**

**STEP 4**

**Group mobility indicators and trip generator entry points into hub candidates**

# Mobility Hub Siting Methodology

- Major Bus or Campus Shuttle Stops
- Bicycle Cage and/or Racks
- Bike Share Stations
- Car Share Parking
- Pick-Up/Drop-Off/Kiss-and-Ride Locations
- Parking Garages and Lots

Others? – note them in Menti poll at end of this section

## On-Campus Hubs

**STEP 1**
**Categorize campuses into tiers based on size**

**STEP 2**
**Map mobility indicators within campus footprint**

**STEP 3**
**Map entry points of major trip generators (Tier 1 campuses only)**

**STEP 4**
**Group mobility indicators and trip generator entry points into hub candidates**

# Mobility Hub Siting Methodology

- Student Unions
- Activity/Recreation Centers
- Stadium/Sports Arenas
- Major Libraries
- Residence Halls (High Capacity)
- Primary Campus Entrance

Others? – note them in Menti poll at end of this section

## On-Campus Hubs

**STEP 1**
**Categorize campuses into tiers based on size**

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# Mobility Hub Siting Methodology

## On-Campus Hubs

**STEP 1**
**Categorize campuses into tiers based on size**

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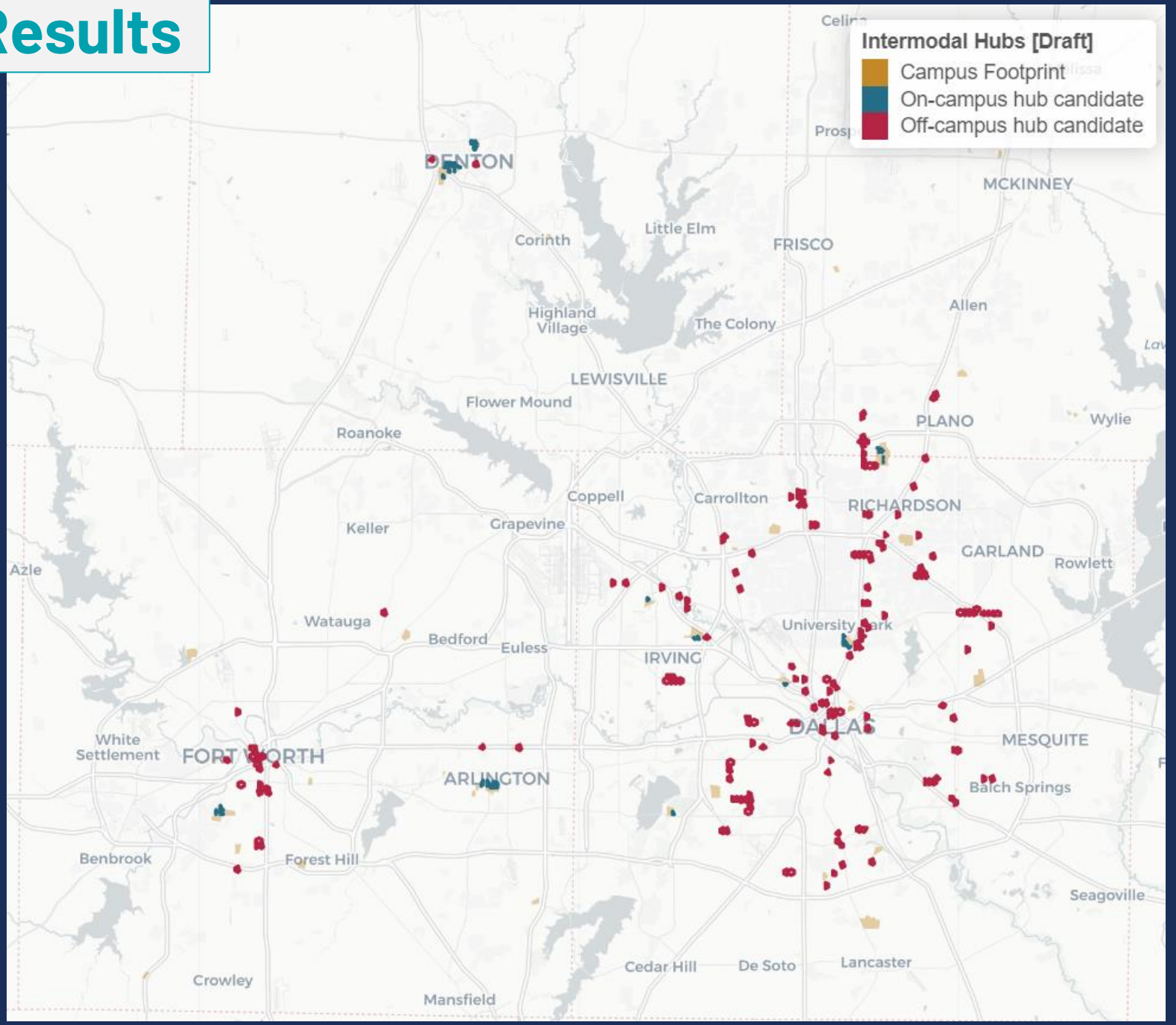
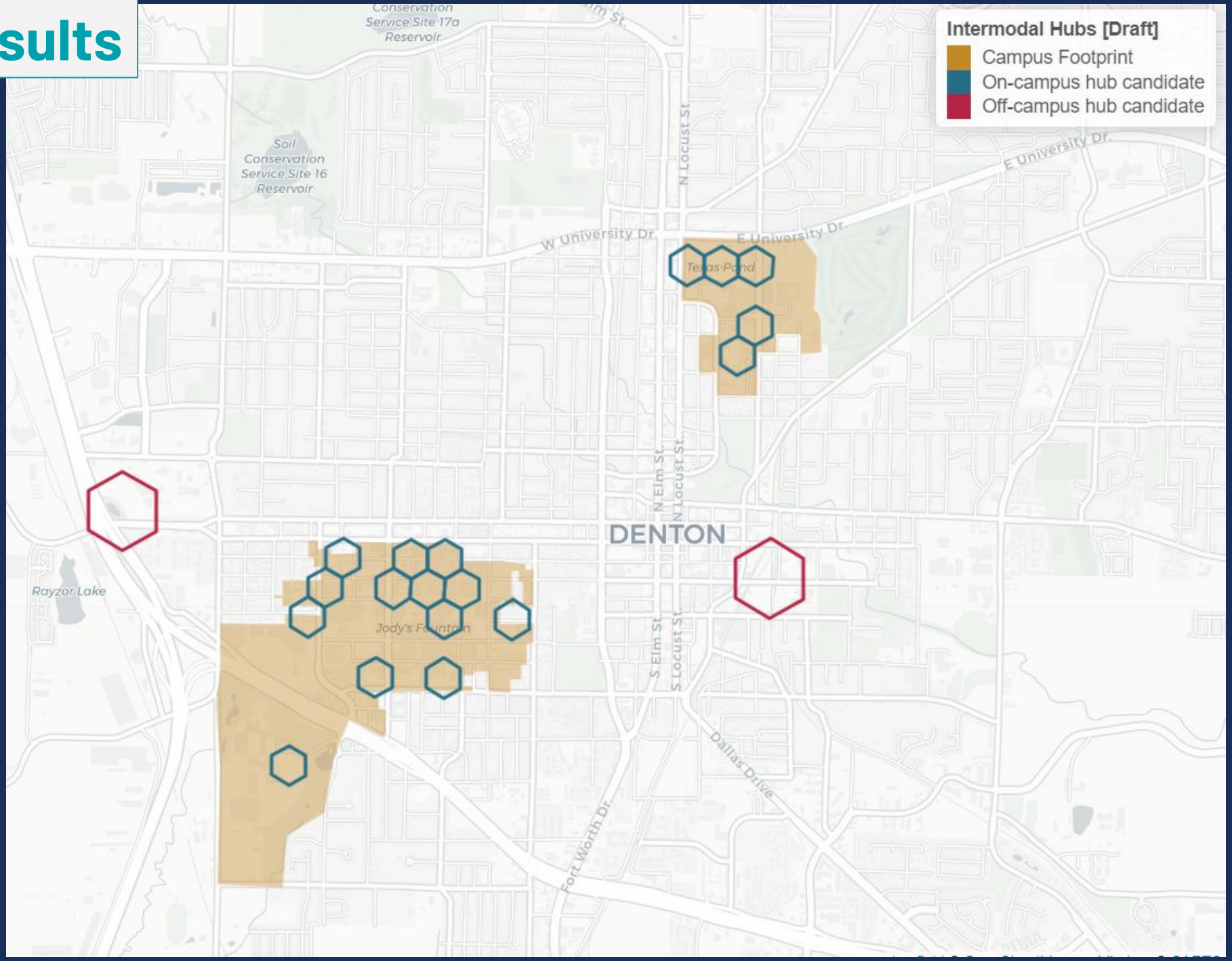
**Map entry points of major trip generators (Tier 1 campuses only)**

**STEP 4**
**Group mobility indicators and trip generator entry points into hub candidates**

# Regional Results



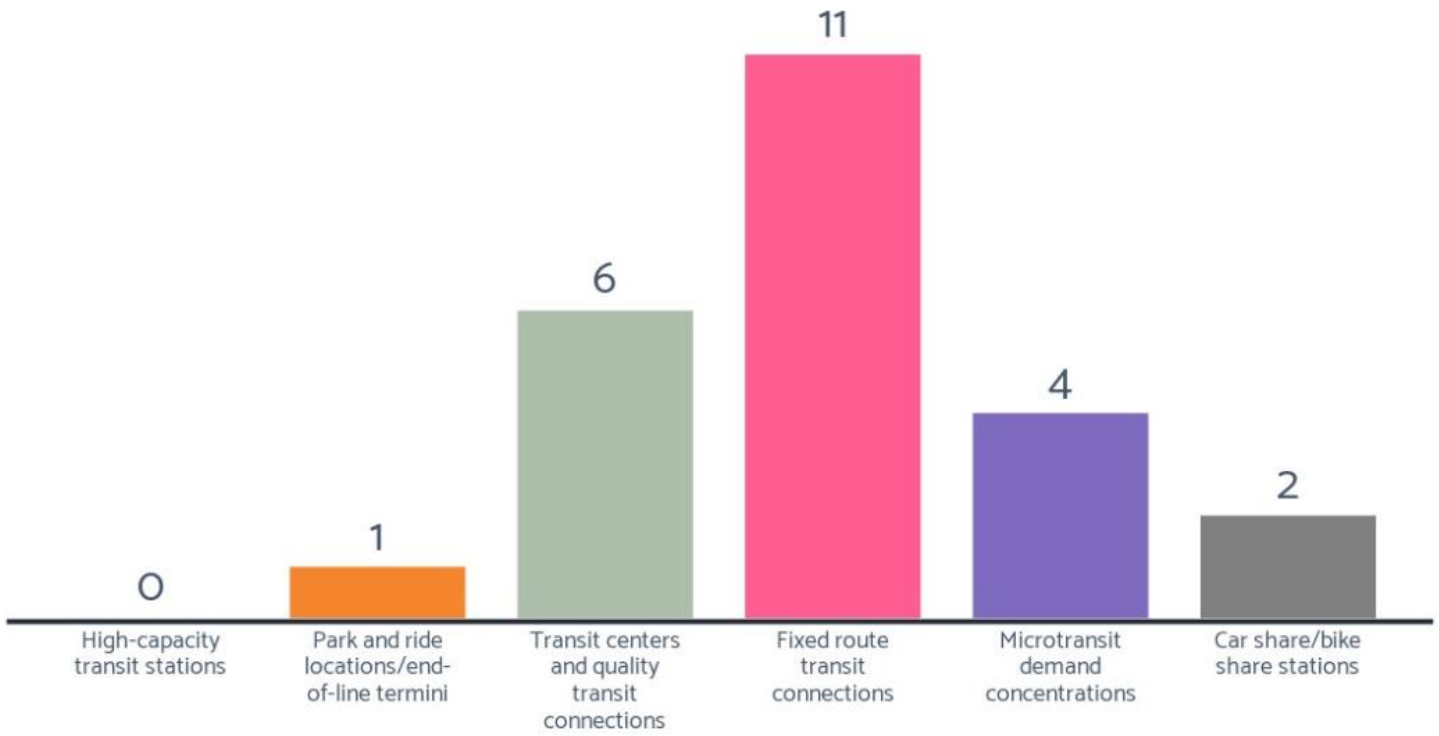
# UNT Results


Intermodal Hubs [Draft]
Campus Footprint
On-campus hub candidate
Off-campus hub candidate
Conservation Service Site 17a Reservoir
Soil Conservation Service Site 16 Reservoir
W University Dr.
E University Dr.
N Locust St.
N Elm St.
S Elm St.
S Locust St.
Texas Pond
Jody's Fountain
DENTON
Rayzor Lake
Dallas Drive
Fort Worth Dr.

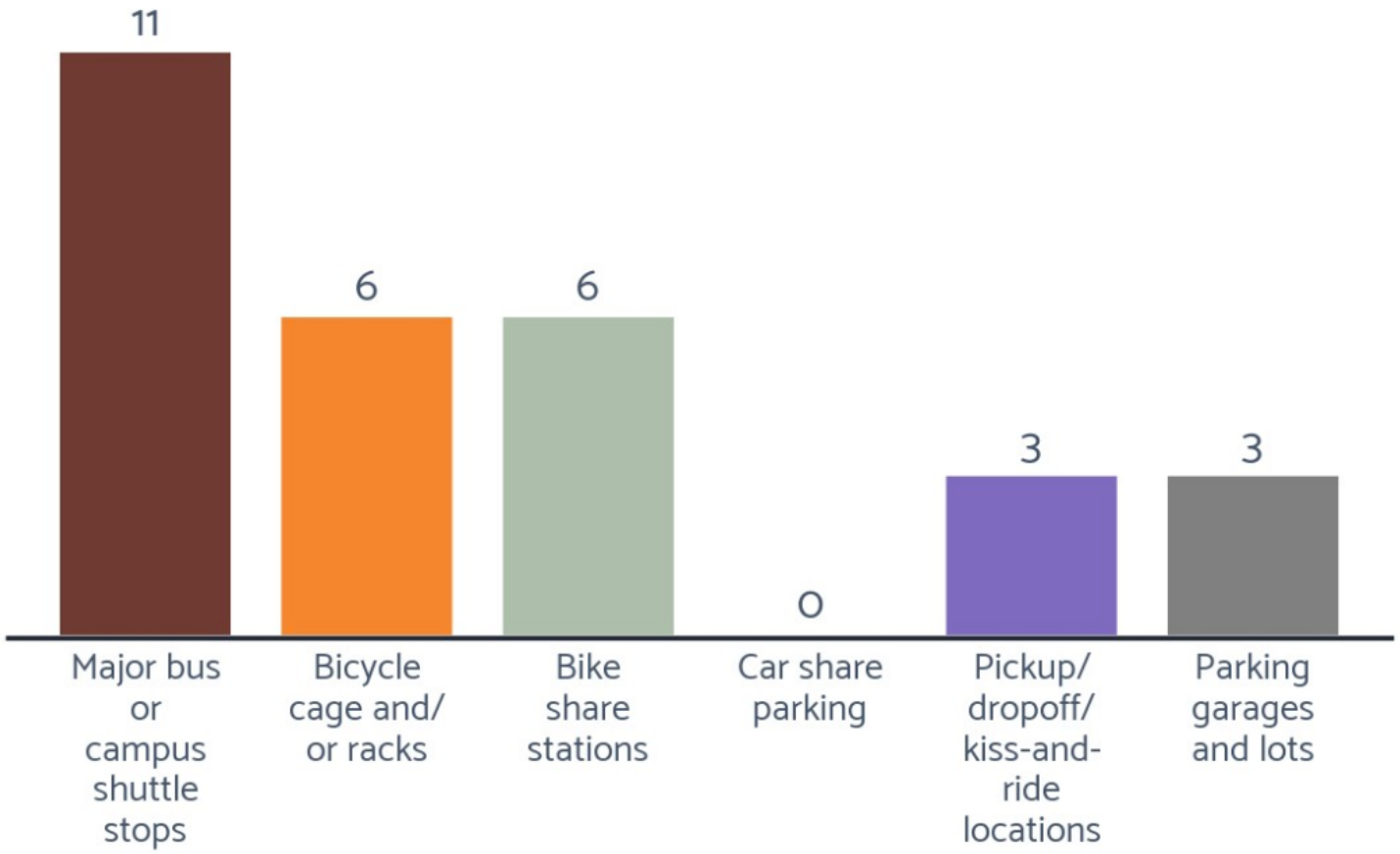
# Mobility Hub Siting – Next Steps

- Review and refine mobility hub site locations
- Cluster candidate locations
- Develop campus typology for mobility hubs
- Assign each hub location a campus hub type

# Which off-campus indicators are the highest priority for your campus/community?



# Which on-campus indicators are the highest priority for your campus/community?



# What are some campus mobility hub indicators we may have missed?

(re)development potential of adjacent land

Regional Shopping or Nightlife centers, Medical facilities

Largest lecture halls

Major pedestrian pathways (especially universally-accessible with controlled street crossings). Bike lanes (especially separated from pedestrians) are helpful as well.

Connectivity between campus areas and off-campus housing, especially large student housing complexes

Campus to campus connections, especially for TCC and DC.

Grocery and shopping destinations

Different student populations undergrad vs grad

# Next Steps

- Gather feedback on siting indicators
- Review, cluster, and refine mobility hub site locations
- Develop campus typology for mobility hubs and assign and define hub sites
- Begin work on developing scenario evaluation framework


# Any additional feedback or questions?

# THANK YOU!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