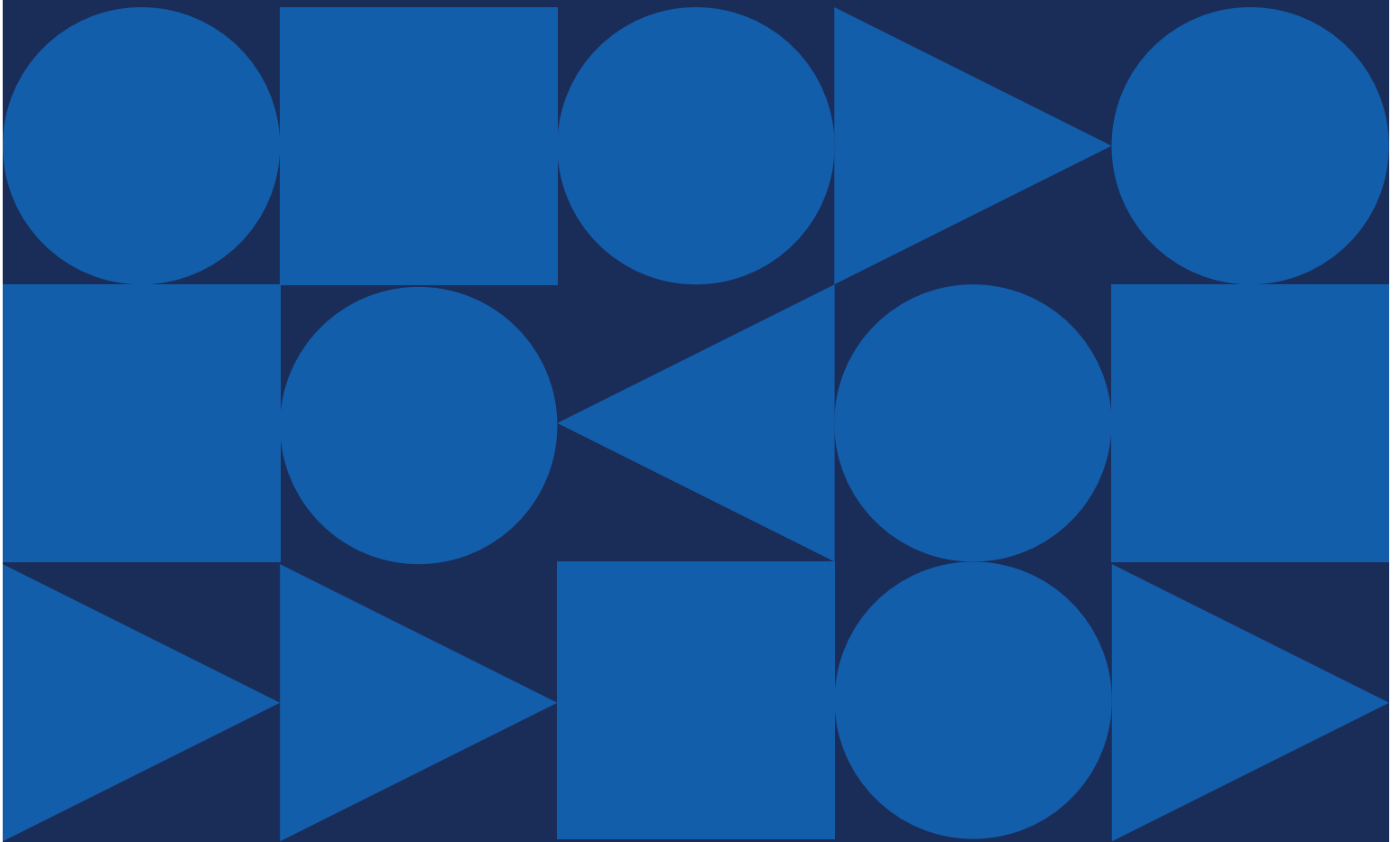


Twin Cities Congestion Analysis Handbook

October 2022



METROPOLITAN
COUNCIL

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1. Introduction

1.1 What is the Handbook?

The Twin Cities Congestion Analysis Handbook is intended to help stakeholder agencies and the Metropolitan Council (Council) collaboratively identify congestion problems and potential solutions within the context of the regional Congestion Management Process (CMP).



The CMP is a tool to manage and improve the region's transportation performance and reliability by reducing the adverse impacts of congestion. Metropolitan Planning Organizations (MPOs) with a population greater than 200,000 people are federally required to have a documented CMP. The Council and its regional partners, in cooperation with the Minnesota Department of Transportation (MnDOT) and the Federal Highway Administration (FHWA), implements the CMP by monitoring performance, identifying congested facilities, and developing congestion management strategies for roadways within the Council's CMP roadway network. This includes principal arterials and A-minor arterials within the seven-county area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties and the cities within them) and minor arterials in Wright and Sherburne County that lie within the federally designated urbanized area.

1.2 Purpose and Goals

The handbook is designed to simplify the process of assessing and managing congestion while promoting regional collaboration and consistency with the CMP. The handbook links regional congestion management policy and guidance to local community context and transportation needs. The goals of the handbook are:

- **Provide Guidance.** Provide guidance to stakeholder agencies to help implement the region's Congestion Management Process (CMP), specifically with respect to assessing congestion problems and needs.
- **Ensure Regional Consistency.** Provide a standardized process for assessing corridor congestion in the region.
- **Anticipate Multimodal Strategies.** Assess congestion using a methodology that prepares users to develop multimodal strategies and consider them sequentially, consistent with the CMP and the region's Transportation Policy Plan (TPP).
- **Emphasize People.** Understand who lives in the corridor and their transportation needs. Include traditionally underrepresented populations and those with limited access to cars and other motor vehicles.
- **Link to Funding.** Prepare handbook users to apply for Regional Solicitation and other competitive sources of funds by aligning data collection and potential congestion management strategies with the priorities of those funding sources and programs.

1.3 Who Should Use the Handbook?

Stakeholder agency staff or their consultants seeking to identify and address transportation corridor congestion issues on roadways within the Council's planning area (see page 1) are the primary intended users of the handbook.

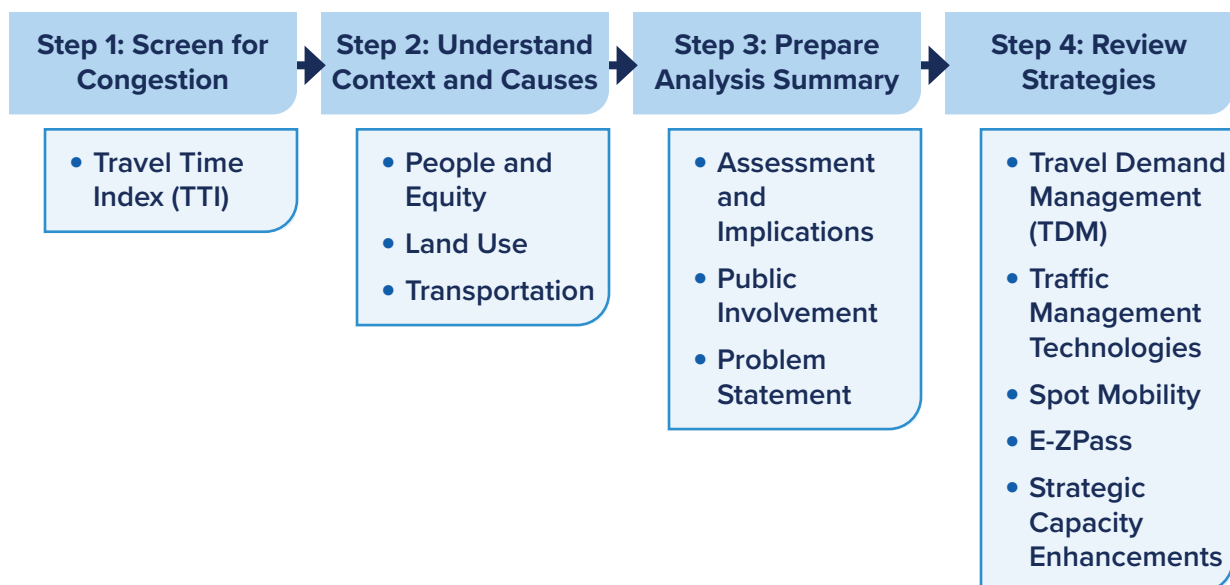
1.4 How Does it Work?

The handbook provides step-by-step guidance for assessing corridor congestion. This simplified stepwise approach is intended to be cost-effective, efficient, and scalable to the congestion problem, context, and resources of the agency.

The handbook has four steps (**Figure 1**):

1. **Screen for Congestion.** Step 1 addresses the question, "Is there a congestion problem?" using existing, readily available data. The handbook focuses on current (not future) congestion on the roadways in the CMP network.
2. **Understand Context and Causes.** Step 2 guides the user in the collection and analysis of data to understand the causes of congestion and the community context where the congestion is occurring. This includes developing an understanding of potential transportation equity issues and needs. Understanding the unique needs of the community helps to ensure the selection of congestion mitigation strategies that best meet these needs.
3. **Prepare Analysis Summary.** Step 3 asks users to summarize and interpret the information collected in the previous steps. This includes developing a corridor narrative, summarizing public involvement activities, and concluding with a brief problem statement.
4. **Review Congestion Management Strategies.** Using a hierarchical approach consistent with the TPP and prioritizing transportation demand management, Step 4 asks the user to conduct an initial screening for potential congestion management strategies to address the identified issues and meet the unique needs of the surrounding community.

Figure 1. The handbook uses a simplified four-step process to screen for, understand, and identify steps to address congestion.



2. Using the Handbook

This section describes the four steps in more detail and how to complete them. Users are encouraged to review the entirety of this section before beginning data collection. Where a step requires the user to collect data, the focus is on information that is relatively simple to acquire, analyze, and communicate. Instructions for how to access and process the requested information is provided in [Appendix A](#).

Handbook users are asked to collect all data detailed in this handbook, but they are not limited to just this data. Additional evidence of congestion or detail relating to the people, land use, and transportation characteristics may be included to provide additional context.

Handbook users are referred to online data sources whenever possible, emphasizing data that can be accessed and interpreted easily. In the future, as more online data becomes available, this handbook may be implemented only online using a single platform.

Handbook users will need access to and ability to use geographic information system (GIS) software for many of the data sources. However, alternative methods may be substituted in some cases.

2.1 Screen for Congestion (Step 1)

Before collecting data on a corridor, the first step is to understand the degree to which the corridor is congested. The measure used for the handbook is Travel Time Index (TTI), which provides a picture of congestion on a corridor or corridor segment. Guidance on how to access, analyze, document, and illustrate TTI is provided [Appendix A](#).

TTI provides a simple snapshot of congestion on metro area arterial roadways and is available through the Council's Twin Cities Metro Congestion Dashboard tool, linked [here](#). TTI is defined as the ratio of actual travel time to free-flow travel time and is calculated by roadway segment. The higher the TTI, the more congested a segment is. A TTI of 1.0 represents conditions where vehicle speeds are the same as speeds during off-peak times (reference speeds). TTI congestion thresholds for the purpose of the handbook are shown in [Table 1](#). These thresholds may be adjusted in the future.

Corridors that are "possibly congested" based on the TTI range likely warrant continued assessment using the handbook to understand more about corridor congestion, including its causes, specific locations (such as intersections), and whether congestion is growing. Additional metrics on the congestion dashboard that can be used to further understand corridor congestion include vehicle delay and duration of congestion.

Table 1. TTI Congestion Thresholds

Range	Category
Less than 1.0	Not Congested
Between 1.0 and 1.25	Possibly Congested
Greater than 1.25	Congested

If a corridor is not shown as congested through the TTI metric, there may be intersections within the corridor that warrant further study. Other measurement tools, such as an evaluation using modeling software, may help to better understand issues at an intersection or spot location. Handbook users may also choose to prepare a corridor analysis for other reasons.

2.2 Understand Context and Causes (Step 2)

This section itemizes the primary data used to document and understand the context and causes of congestion. The text below explains the purpose of each piece of information. Guidance on how to access, analyze, document, and illustrate each item is provided in [Appendix A](#).

This section also describes the anticipated level of effort and method of data collection for each piece of data or analysis. The levels of effort are defined as follows:

- Low = Typically a look-up of existing information. Minimal to no prior knowledge or expertise needed.
- Medium = Simple analysis or similar effort. Some experience with the suggested method (such as displaying a dataset in GIS) needed.
- High = More in-depth analysis and experience with the suggested method (such as conducting an analysis in GIS) needed.

Data collection methods are described in the guidance in [Appendix A](#).

2.2.1 LOCATION

The starting point for the corridor assessment is to understand and illustrate where in the Twin Cities region the project is located and its relation to the existing transportation network. Gathering this information also helps the handbook user prepare to collect the other requested information.

Table 2. Data Summary: Location

Data	What It Provides	Level of Effort	Method
Roadway Ownership	Likely lead agency, responsibility for funding, design standards	Low	Look-up
Functional Classification	Relation to transportation network; types of users and trips; applicability of strategies	Low	Look-up
Corridor Length	Gauge level of effort, extent of issues, potentially applicable solutions	Low	Measure on map/GIS

See [Appendix A](#) for data sources and instructions.

2.2.2 PEOPLE AND EQUITY

The purpose of this category is to develop an understanding of the community within and near the study corridor. While corridor users will include more than just those people working and living nearby, these people are likely to be most directly affected by a transportation improvement. This is especially true for people who walk, bike, and use transit. The data in this section emphasizes characteristics that are often indicators of transportation challenges, including limited or no access to a car and likelihood to travel by other means. Handbook users will be asked to seek the following information for the corridor area.

Table 3. Data Summary: People and Equity

Data	What it Provides	Level of Effort	Method
Percent BIPOC Population	Potential indicator of presence and/or density of historically underserved or underrepresented populations who may have limited access to vehicles or face other transportation challenges	Medium	GIS, Look-up
Percent of Residents with Limited English Skills	Indicator of presence and/or density of people with language barriers who may also face other challenges accessing transportation	Medium	GIS
Percent People with Disabilities	Potential indicator of presence and/or density of people with limited access to vehicles or who face disability-related transportation challenges	Medium	GIS
Concentrated Poverty and Affluence	Potential indicator of presence and/or density of people who may have income-based transportation challenges or opportunities	Low	Look-up
Transit Dependence	Potential indicator of presence and/or density of people who use transit, have limited access to vehicles and/or who face other transportation challenges	Medium	GIS
Affordable Housing	Potential indicator of presence and/or density of households with low incomes or constrained household economies	Low	Look-up
Low-Wage Worker Household/Job Density	Potential indicator of presence and density of households with low incomes or constrained household economies	Medium	GIS
Workers and Economy	Trip types; concentrations of origins and destinations that may be served by non-auto modes	Low	Look-up

See [Appendix A](#) for data sources and instructions.

2.2.3 LAND USE

In addition to the people, the physical setting of the corridor influences understanding of congestion challenges and potential solutions.

Table 4. Data Summary: Land Use

Data	What it Provides	Level of Effort	Method
Service Area Type (Urban/Rural)	General development context and opportunities/constraints for range of modal improvements	Low	Look-up
Community Designation	More specific development context and opportunities/constraints for range of modal improvements	Low	Look-up
Context Zone(s)	Local development context and opportunities/constraints for range of modal improvements	Medium	Land Use Analysis
Walk/Bike Origins and Destinations	Number/density/location of potential non-auto users; potential to shift trips	Medium-High	Site visit/map review
Transit Market Area	Degree or likelihood of existing or future transit access; potential to shift trips	Low	Look-up

See [Appendix A](#) for data sources and instructions.

2.2.4 TRANSPORTATION

The data in this section covers basic features of the existing transportation infrastructure and services, usage, and performance. Because of the large set of data included in this section, “data groups” are presented below rather than the individual elements. This section is intentionally positioned after the People and Land Use sections to prioritize the consideration of travel demand management (TDM) options and the people who are most impacted by potential improvements. Note that at the time of this publication, the Council has a TDM Study in progress and it is anticipated that results of that study will be incorporated into the handbook, such as modifying data sources and/or strategy recommendations.

Table 5. Data Summary: Transportation

Data Group	What it Provides	Effort	Method
Roadway Features	Types and locations of access points and crossings, typical section, speed, and other relevant roadway features needed to understand the existing infrastructure.	Medium-High	Lookups, some GIS
Transit, Bicycle and Pedestrian Features	The availability (or planned availability) and other characteristics of facilities to support travel by non-single-occupant vehicle modes, in particular public transit, bicycle, and pedestrians.	Medium	GIS, site visit
Traffic Volumes	Data to know how many vehicles use the corridor, how it changes along the corridor, and how many vehicles enter/ depart corridor from access points as data is available.	Low	Lookup
Crashes	May help the user understand congestion issues or whether congestion improvements could be prioritized to improve safety.	Medium	Lookups, some GIS

See [Appendix A](#) for data sources and instructions.

In addition to the data groups listed above, there is other transportation-related data that may be helpful to understand the full picture (but is not required for all projects). As these are optional data sets and it is not possible to capture all of them, it is up to the handbook user to find additional information and conduct any analysis on their own without detailed instructions in this handbook. The list below highlights some potentially common additions, which are also found in [Appendix A](#).

- Pedestrian volumes
- Bicycle volumes
- Transit ridership
- Person throughput
- Daily traffic volume profile
- Vehicle turning movements/ramp volumes
- Truck percentages
- Volume-to-capacity ratios
- Trip types, speeds, origins & length (time and distance)

Handbook users also may find traffic modeling or local agency knowledge helpful to understand current congestion issues and transportation characteristics.

2.3 Prepare Analysis Summary (Step 3)

The summary is divided into three parts, as discussed below: Corridor Narrative, Public Involvement, and Problem Statement.

2.3.1 CORRIDOR NARRATIVE

The corridor narrative is intended to be relatively brief, summarizing in words the most important features, results, and implications of Step 1 and Step 2. An example corridor narrative outline is shown in [Table 6](#). Sample narratives for the example corridors are provided in [Appendix B](#).

2.3.1.1 Data Summary

The narrative should briefly summarize what is shown in each of the figures produced in Steps 1 through 3, but otherwise reference the figure to reduce the writing effort.

2.3.1.2 Implications

Critical to the narrative is describing the implications of each data point. The questions below can be used to help think about implications.

PEOPLE AND EQUITY

- Are there populations who may be difficult to reach and require additional efforts during public involvement?
- Are there populations with transportation needs that are not well addressed by the current system?
- Are there populations more likely to rely on non-auto modes for their transportation needs?

LAND USE

- Does the surrounding land use appear to be stable or likely to change in the foreseeable future? What do local land use plans suggest about the potential for change to land use in the study area?
- Does context change significantly within the corridor such that transportation solutions may be different by location?
- Are there pedestrian and bicycle origins and destinations that could be better served by improved infrastructure? Could this reduce vehicle trips on this corridor?
- Based on the transit market level, is the area suitable for an increased level of transit service such that it should be considered when addressing congestion?

TRANSPORTATION

- Do congestion measures (TTI) mirror professional judgment of congestion or is additional information needed?
- Does pedestrian and bicycle infrastructure exist and how does it match what is understood about user needs (People and Equity)? What about transit infrastructure and service?
- Does the roadway capacity match current volumes (surplus of volume/deficit of capacity)?
- Does crash history suggest safety concerns for vehicle users? For bicycles and pedestrians? Do crashes appear related to congestion or resulting from other causes?

Table 6. Annotated Outline: Corridor Narrative

Section	Purpose and Guidance		
Introduction	<p>Brief description and summary of corridor, reasons for conducting the assessment, and nature of the findings.</p> <p>Location</p> <ul style="list-style-type: none"> Summarizes project location features <p>Congestion Screening</p> <ul style="list-style-type: none"> Summarizes results of Step 1. If corridor is Possibly Congested or Not Congested according to TTI measure, describe rationale for continuing with assessment. 		
Corridor Analysis	<p>Summarizes the results of Step 2, highlighting the significance of each data type collected.</p> <table border="0"> <tr> <td> <p>People and Equity</p> <ul style="list-style-type: none"> Percent BIPOC Population Percent of Residents with Limited English Skills Percent People with Disabilities Concentrated Poverty and Affluence Transit Dependence Affordable Housing Low-Wage Worker Household/Job Density Workers and Economy </td> <td> <p>Land Use</p> <ul style="list-style-type: none"> Service Area Type (Urban/Rural) Community Designation Context Zone Walk/Bike Origins and Destinations Transit Market Area <p>Transportation</p> <ul style="list-style-type: none"> Roadway Features Transit, Bicycle and Pedestrian Features Traffic Volumes Crash History </td> </tr> </table>	<p>People and Equity</p> <ul style="list-style-type: none"> Percent BIPOC Population Percent of Residents with Limited English Skills Percent People with Disabilities Concentrated Poverty and Affluence Transit Dependence Affordable Housing Low-Wage Worker Household/Job Density Workers and Economy 	<p>Land Use</p> <ul style="list-style-type: none"> Service Area Type (Urban/Rural) Community Designation Context Zone Walk/Bike Origins and Destinations Transit Market Area <p>Transportation</p> <ul style="list-style-type: none"> Roadway Features Transit, Bicycle and Pedestrian Features Traffic Volumes Crash History
<p>People and Equity</p> <ul style="list-style-type: none"> Percent BIPOC Population Percent of Residents with Limited English Skills Percent People with Disabilities Concentrated Poverty and Affluence Transit Dependence Affordable Housing Low-Wage Worker Household/Job Density Workers and Economy 	<p>Land Use</p> <ul style="list-style-type: none"> Service Area Type (Urban/Rural) Community Designation Context Zone Walk/Bike Origins and Destinations Transit Market Area <p>Transportation</p> <ul style="list-style-type: none"> Roadway Features Transit, Bicycle and Pedestrian Features Traffic Volumes Crash History 		

2.3.2 OTHER PLANS AND STUDIES

This is an optional section in which the handbook user can summarize or reference results of relevant studies, plans or other documents that provide evidence of a congestion problem or proposed strategy not otherwise surfaced in the handbook data. While this information would not supersede the handbook process, it may provide additional context or understanding.

2.3.3 PUBLIC INVOLVEMENT

Describe any recent public involvement activities conducted for the corridor area and relevance to the findings above. Describe suggested future public involvement activities based on the understanding of people and equity developed as part of this assessment. This may include targeted outreach to underrepresented communities or those with transportation or communications challenges.

2.3.4 SUMMARY: CONTEXT AND PROBLEM STATEMENT

Provide a concise statement summarizing the evidence of corridor congestion, other transportation needs, and potential causes or contributing factors. By definition, the problem statement does not describe a proposed project or solution.

2.4 Review Strategies (Step 4)

The purpose of this section is to guide the user through a screening of potential congestion management strategies, based on the context and understanding developed in Steps 1-3. The intended outcome is an initial consideration of all potential strategies, with a priority on Travel Demand Management (TDM) and other strategies that are lower in cost or do not require significant infrastructure investments. The complete process to identify, select, and design congestion management strategies goes beyond the scope of this handbook.

Appendix C is drawn from a comprehensive list of strategies previously developed for the Council's 2020 Congestion Management Process Policies and Procedures document. Handbook users should see especially **Appendix D** of that document (Congestion Management Strategies Matrix) for more detail on each strategy.

For this handbook, the strategies have been regrouped to more closely reflect the priorities of the 2040 Transportation Policy Plan (TPP) and the Regional Solicitation funding program, using the following categories:

- **Priority 1:** Travel Demand Management (TDM)
- **Priority 2:** Traffic Management Technologies (TMT)
- **Priority 3:** Spot Mobility
- **Priority 4:** E-ZPass
- **Priority 5:** Strategic Capacity Enhancements

The categories are listed in order of cost, from lowest to highest. Handbook users are encouraged to consider strategies in this order to align with TPP priorities and ensure TDM and TMT solutions are considered before capacity enhancements. Users are asked to review each strategy and preliminarily indicate its potential to address the identified problem or problems by assigning a low, medium, high, or n/a rating and providing brief notes as to the reason for the rating. It is assumed the results of the rating process will be used in the next steps of congestion management strategy development.

A hypothetical example is provided below (**Table 7**). The corridor summaries in **Appendix B** show how the screening process was applied to the example corridors. Users should consider that a "low" rating may still indicate a valid strategy and a series of "low" ratings in a given category may indicate the category has value for additional consideration, especially for lower cost strategies.

Table 7. Example Strategy Screening Summary: Travel Demand Management

Strategy	Rating	Reasoning
Alternative Work Hours	Medium	Several large employers in study area
Telecommuting	High	Shifts to remote work during COVID has reduced peak hour trips
Guaranteed Ride Home Programs	Low	Minimal transit service available
Etc.		

Appendices

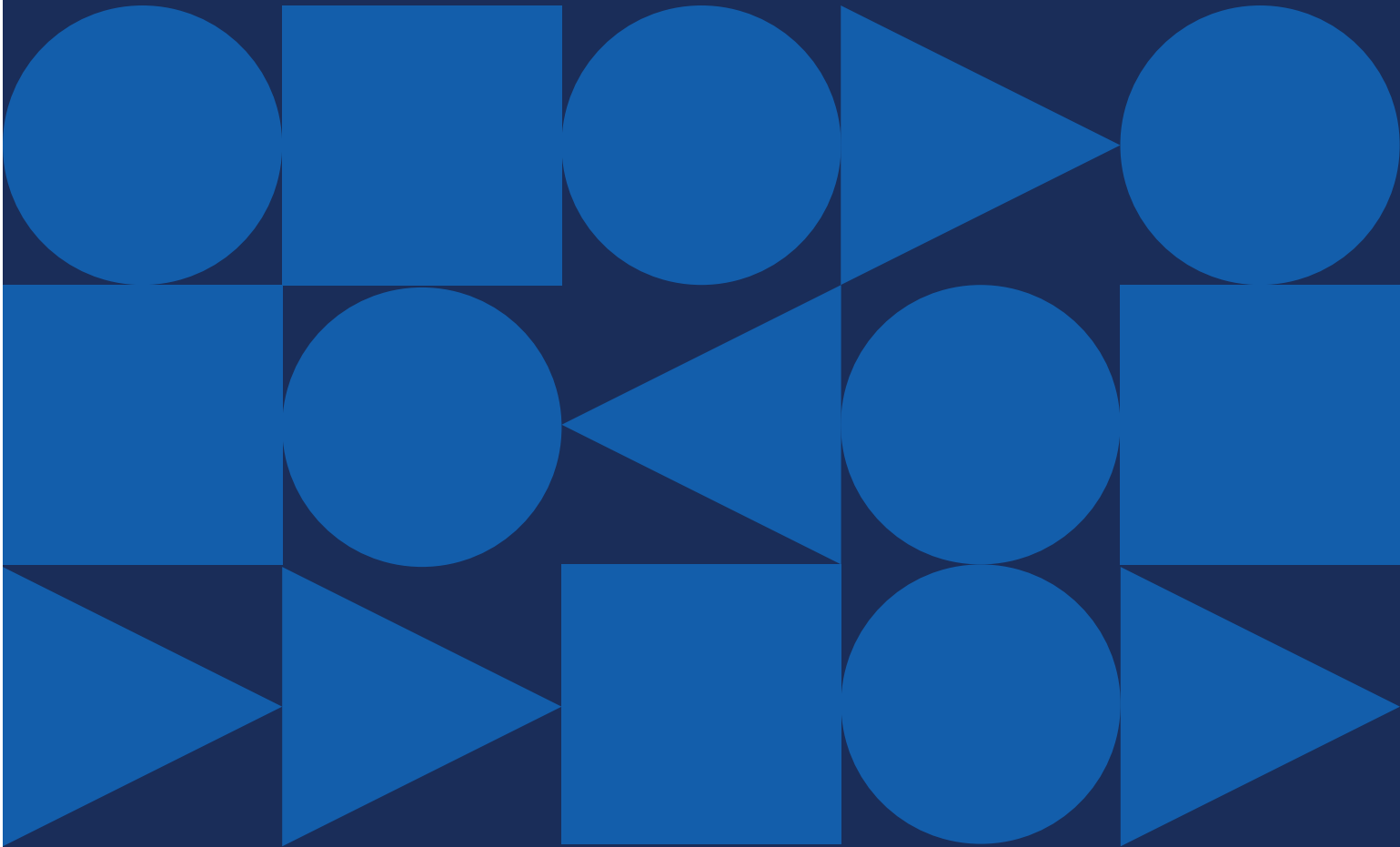
A: Data Instruction Sheets

B: Corridor Analysis Examples

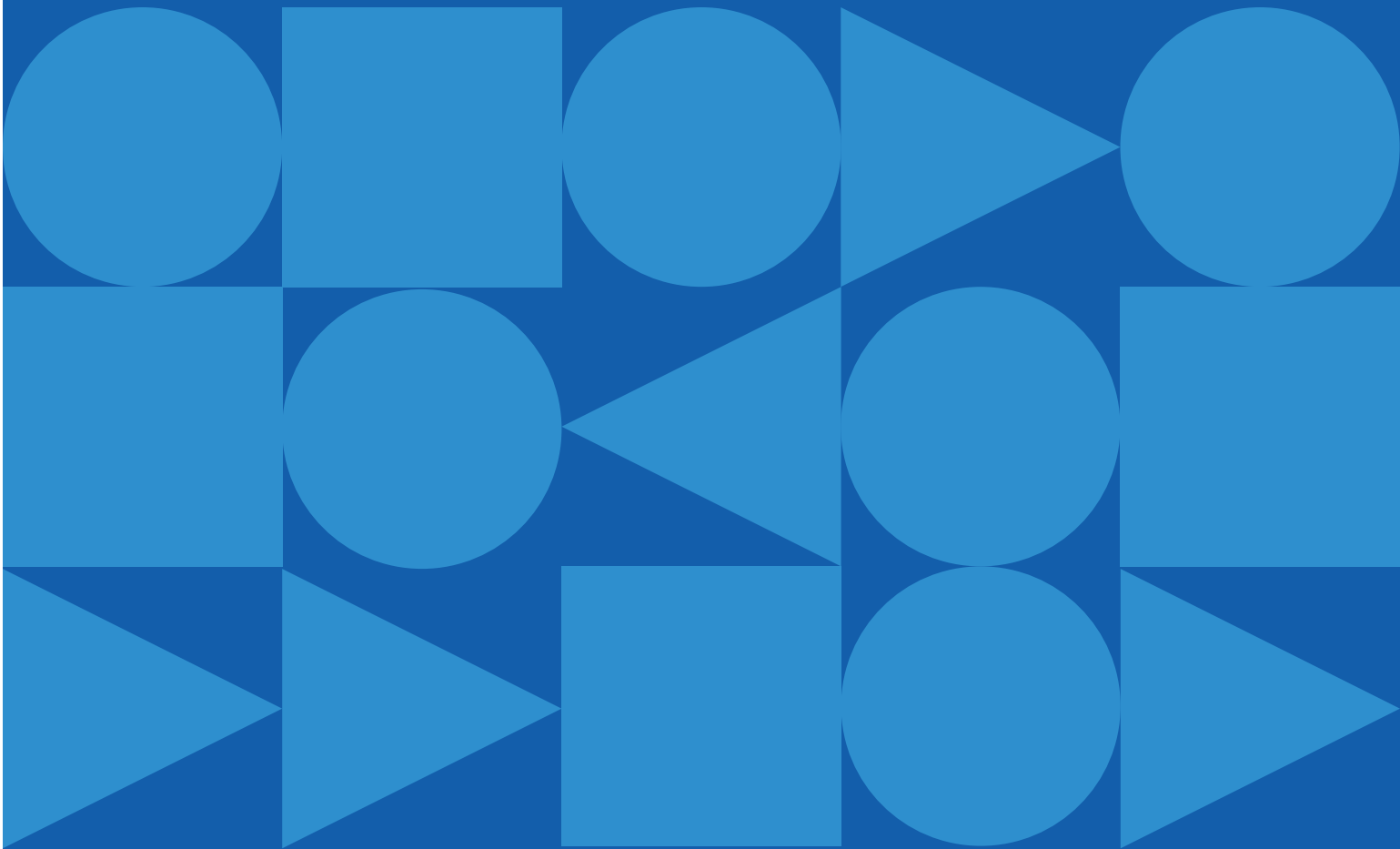
- Trunk Highway 77 (Bloomington/Eagan/Apple Valley)
- Dakota County State Aid Highway 46 (Hastings)
- West Broadway Avenue (Minneapolis)

C: Strategy Screening Tool

Appendices



Data Instruction Sheets



Location and Congestion Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 1: Project Location	<input type="checkbox"/> Roadway ownership <input type="checkbox"/> Functional classification <input type="checkbox"/> Corridor length
Exhibit 2: Congestion Screening	<input type="checkbox"/> Existing AM + PM travel time indices (TTI) <input type="checkbox"/> Duration of congestion (hours per day TTI>1.25) <input type="checkbox"/> Average AM + PM vehicle delay

People Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 3: Percent BIPOC Population	<input type="checkbox"/> Percent non-white/BIPOC population
Exhibit 4: Percent of Residents with Limited English Skills	<input type="checkbox"/> Percent of residents with limited English proficiency
Exhibit 5: Percent People with Disabilities	<input type="checkbox"/> Percent of residents with any disability
Exhibit 6: Concentrated Poverty and Affluence	<input type="checkbox"/> Concentrated poverty <input type="checkbox"/> Concentrated affluence (optional) <input type="checkbox"/> Regional environmental justice Areas
Exhibit 7: Transit Dependence	<input type="checkbox"/> American Community Survey 5-Year summary file
Exhibit 8: Affordable Housing	<input type="checkbox"/> Number of subsidized housing units
Exhibit 9: Low-Wage Workers	<input type="checkbox"/> Low-wage worker household density <input type="checkbox"/> Low-wage worker job density
Exhibit 10: Workers and the Regional Economy	<input type="checkbox"/> Population and employment totals <input type="checkbox"/> Postsecondary education centers

Land Use Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 11: Service Area Type (Urban/Rural)	<input type="checkbox"/> Service area type as designated by Met Council
Exhibit 12: Community Designation	<input type="checkbox"/> Community designation
Exhibit 13: Context Zone	<input type="checkbox"/> Aerial photography <input type="checkbox"/> MnDOT land use context: types, identification, and use
Exhibit 14: Walk/Bike Origins and Destinations	<input type="checkbox"/> Regional bicycle transportation network destinations
Exhibit 15: Transit Market Area	<input type="checkbox"/> Transit market areas

Transportation Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 16: Roadway Features	<input type="checkbox"/> Interchange locations and types <input type="checkbox"/> Intersection access locations and types + control type <input type="checkbox"/> Rail crossings <input type="checkbox"/> Typical section <input type="checkbox"/> Posted speed <input type="checkbox"/> Access spacing <input type="checkbox"/> Frontage roads (if applicable)
Exhibit 17: Transit, Bicycle and Features	<input type="checkbox"/> Existing and planned pedestrian features <input type="checkbox"/> Existing and planned bicycle features <input type="checkbox"/> Transit characteristics (type, routes, stops) <input type="checkbox"/> Transit frequency/volumes
Exhibit 18: Traffic Volumes	<input type="checkbox"/> AADT <input type="checkbox"/> Historical trends
Exhibit 19: Crashes	<input type="checkbox"/> Number/location of crashes <input type="checkbox"/> Crash types <input type="checkbox"/> Crash severity
Optional	<input type="checkbox"/> Pedestrian volumes <input type="checkbox"/> Bicycle volumes <input type="checkbox"/> Transit ridership <input type="checkbox"/> Person throughput <input type="checkbox"/> Daily traffic volume profile <input type="checkbox"/> Vehicle turning movements/ramp volumes <input type="checkbox"/> Truck percentages <input type="checkbox"/> Forecast volumes <input type="checkbox"/> Forecast capacity <input type="checkbox"/> Trip types, speeds, origins & length (time and distance)

Project Location

SUMMARY

- Prepare a map highlighting corridor of concern and surrounding roadway network. Also illustrate location of corridor in relation to the Met Council region, or alternatively could highlight relationship to city/county boundaries, preferably as an inset.
- Provide text box identifying the corridor location (city/county), ownership, functional classification, and length. Additional relevant details can be included in the text box or inset if helpful.

DATA ELEMENTS

- Roadway Ownership**
- Roadway ownership will likely be known by the agency using this handbook. If unknown, roadway ownership can be identified using online maps or plans.
- Functional Classification**
- **Agency Providing:** Metropolitan Council
 - **Location:** This piece of data is openly available on Minnesota Geospatial Commons (<https://gisdata.mn.gov/>)
 - Search “Functional Class Roads – Existing” or;
 - Visit this link: <https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-functnl-cls-rds>
 - Data Interface: Shapefile
- Corridor Length**
- The length of the corridor can be obtained by measuring in Google Earth or other mapping software.

PROCESSING AND ANALYSIS

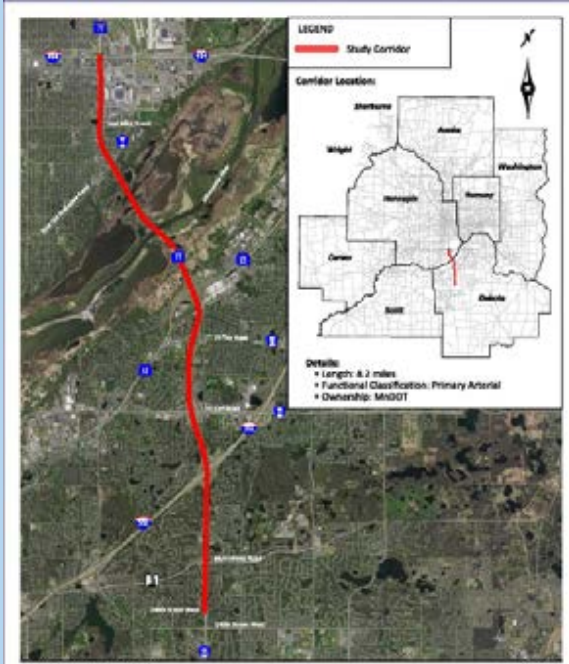
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DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

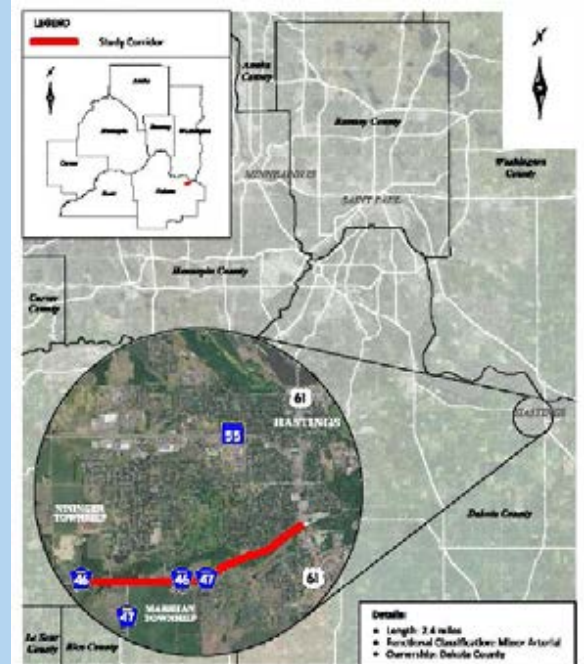
Project Location Example Figures

CORRIDOR 1 – TH 77



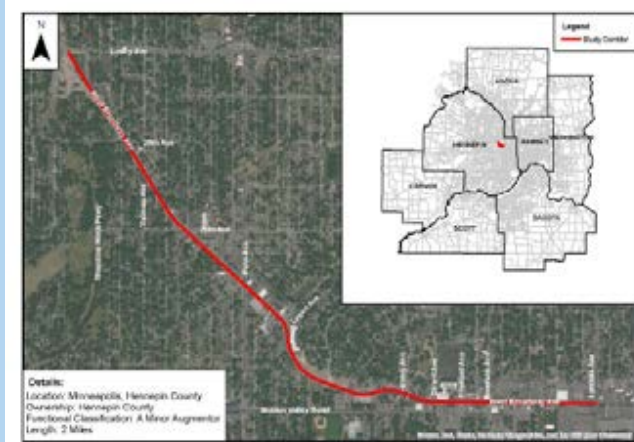
Congestion Analysis Handbook Example Corridor: TH 77 Figure 1
Project Location

CORRIDOR 2 – CSAH 46



Congestion Analysis Handbook Example Corridor: CSAH 46 Figure 1
Project Location

CORRIDOR 3 – WEST BROADWAY



Congestion Analysis Handbook Example Corridor: West Broadway Avenue Figure 1
Project Location

Congestion Screening

SUMMARY

- Prepare a map highlighting congestion along the corridor as measured by Travel Time Indices (TTI)
- Provide text boxes along the corridor identifying more specific measures of congestion (travel time indices, duration of congestion, vehicle delay, etc.)

DATA ELEMENTS

Existing AM + PM Travel Time Indices (TTI)	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Twin Cities Metro Congestion Dashboard (https://metrotransitm.nshinyapps.io/regional-road-performance/) • Data interface: Interactive map
Duration of Congestion (Hours per day TTI>1.25)	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Twin Cities Metro Congestion Dashboard (link above) • Data Interface: Interactive map
Average AM + PM vehicle Delay	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Twin Cities Metro Congestion Dashboard (link above) • Data Interface: Interactive map

PROCESSING AND ANALYSIS

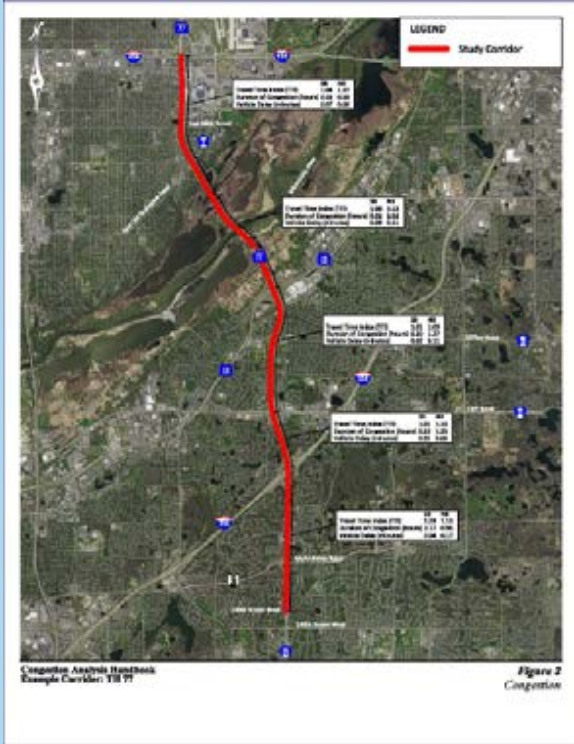
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DOCUMENTATION

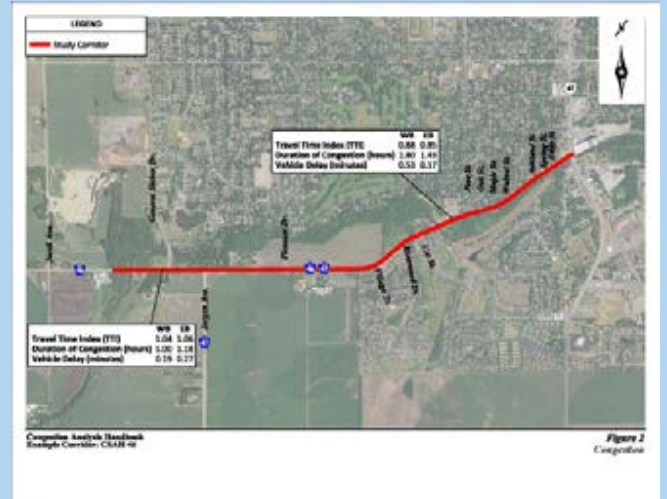
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

Congestion Screening Example Figures

CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Percent BIPOC Population

SUMMARY

- Prepare a map showing the percent of Non-White / BIPOC population residing near the study corridor.

DATA ELEMENTS

- | | |
|---------------------------------|--|
| Percent BIPOC Population | <ul style="list-style-type: none">• Agency Providing: Metropolitan Council• Location: “Equity Considerations for Place-Based Advocacy and Decisions in the Twin Cities Region” (data file can be downloaded from the Minnesota Geospatial Commons - https://gisdata.mn.gov/dataset/us-mn-state-metc-society-equity-considerations)• Data Interface: Shapefile |
|---------------------------------|--|

PROCESSING AND ANALYSIS

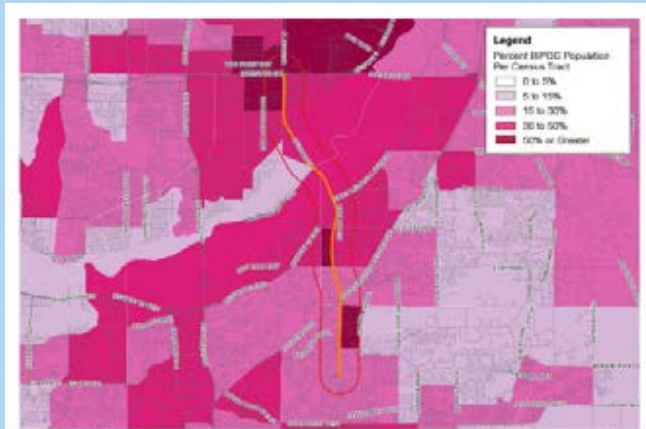
Sort and categorize the data included in the shapefile by the “PBIPOC” variable.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Percent BIPOC Population Example Figures

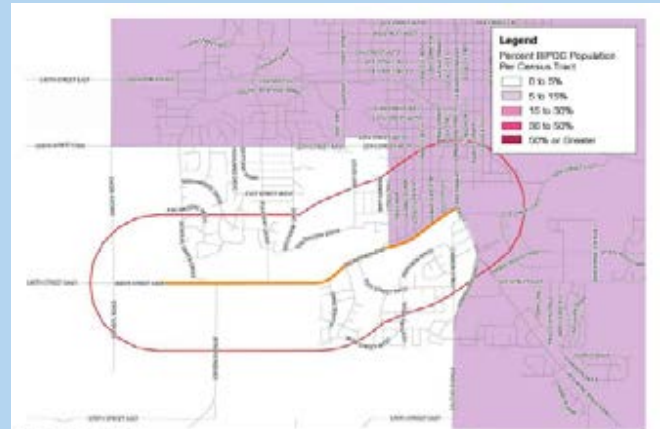
CORRIDOR 1 – TH 77



Congestion Analysis Handbook
Example Corridor: TH 77

Figure 2
Percent BIPOC Population

CORRIDOR 2 – CSAH 46



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 2
Percent BIPOC Population

CORRIDOR 3 – WEST BROADWAY



Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 2
Percent BIPOC Population

Percent of Residents with Limited English Skills

SUMMARY

- Prepare a map showing the percent of residents with Limited English Language Proficiency for the populations residing near the study corridor

DATA ELEMENTS

- Percent of Residents with Limited English Language Proficiency**
- **Agency Providing:** Metropolitan Council
 - **Location:** “Equity Considerations for Place-Based Advocacy and Decisions in the Twin Cities Region” (data file can be downloaded from the Minnesota Geospatial Commons - <https://gisdata.mn.gov/dataset/us-mn-state-metc-society-equity-considerations>)
 - **Data Interface:** PDF or Shapefil

PROCESSING AND ANALYSIS

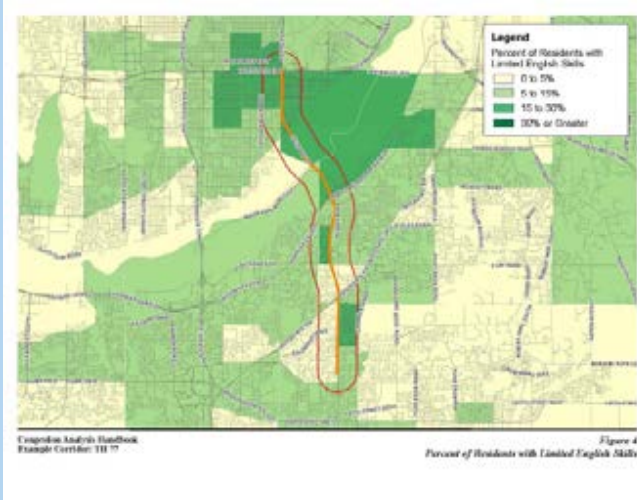
Sort and categorize the data included in the shapefile by the “P_ENGLIMIT” variable.

DOCUMENTATION

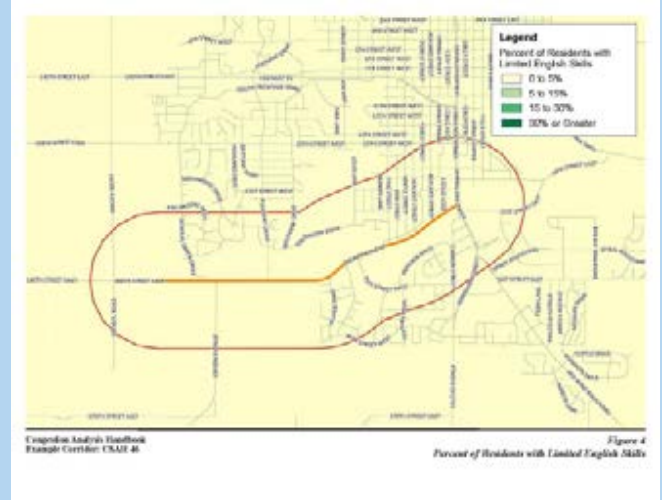
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Percent of Residents with Limited English Skills Example Figures

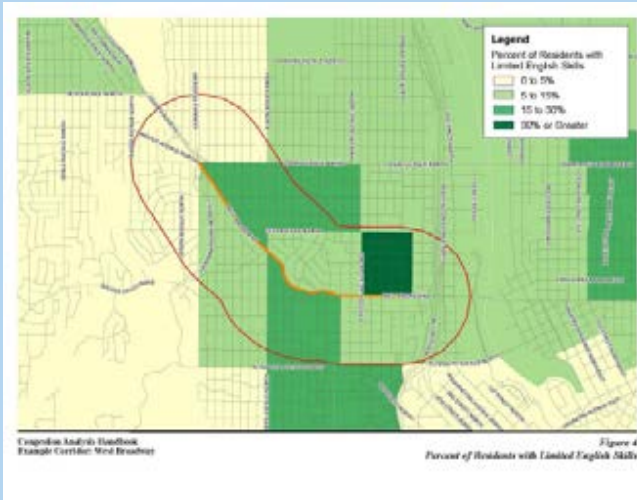
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Percent People with Disabilities

SUMMARY

- Prepare a map showing the percent of people living with a disability for the populations residing near the study corridor

DATA ELEMENTS

- Percent People with Disabilities**
- **Agency Providing:** Metropolitan Council
 - **Location:** “Equity Considerations for Place-Based Advocacy and Decisions in the Twin Cities Region” (data file can be downloaded from the Minnesota Geospatial Commons - <https://gisdata.mn.gov/dataset/us-mn-state-metc-society-equity-considerations>)
 - **Data Interface:** PDF or Shapefile

PROCESSING AND ANALYSIS

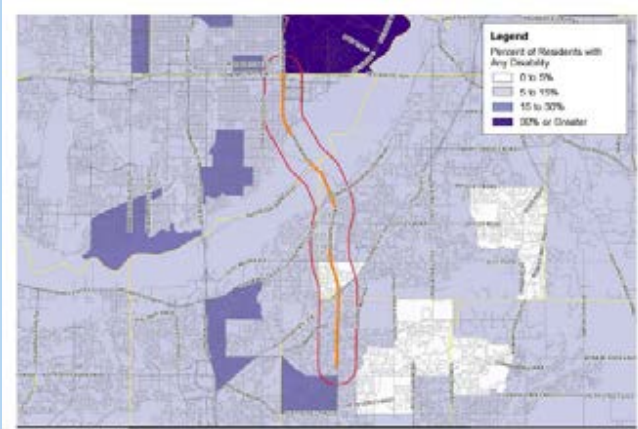
Sort and categorize the data included in the shapefile by the "PD_ANY" variable.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Percent People with Disabilities Example Figures

CORRIDOR 1 – TH 77



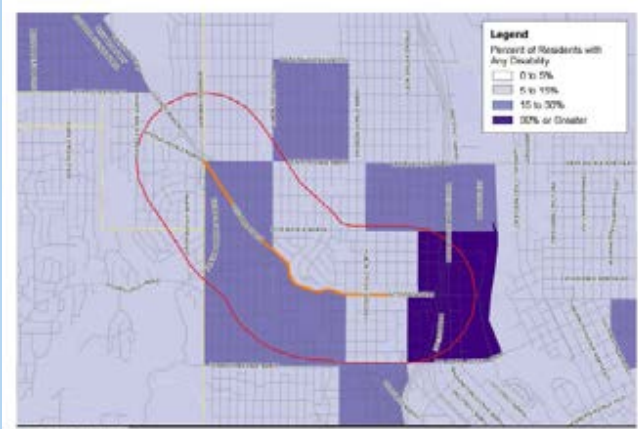
Example Analysis Handbook Example Corridor: TH 77 Figure 1
Percent of Residents with Any Disability

CORRIDOR 2 – CSAH 46



Example Analysis Handbook Example Corridor: CSAH 46 Figure 1
Percent of Residents with Any Disability

CORRIDOR 3 – WEST BROADWAY



Example Analysis Handbook Example Corridor: West Broadway Figure 1
Percent of Residents with Any Disability

Concentrated Poverty and Affluence

SUMMARY

- Prepare a map highlighting any areas of concentrated poverty and/or affluence near the study corridor, as well as regional environmental justice areas as determined by Metropolitan Council.

DATA ELEMENTS

Concentrated Poverty	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: There are two ways to obtain this data: <ul style="list-style-type: none"> ■ Metropolitan Council Make A Map tool (https://giswebsite.metc.state.mn.us/publicMaps/rsa/) or; ■ “Equity Considerations for Place-Based Advocacy and Decisions in the Twin Cities Region” (data file can be downloaded from the Minnesota Geospatial Commons - https://gisdata.mn.gov/dataset/us-mn-state-metc-society-equity-considerations) • Data Interface: Interactive Map or Shapefile
Concentrated Affluence (OPTIONAL)	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: “Equity Considerations for Place-Based Advocacy and Decisions in the Twin Cities Region” (linked above) • Data Interface: Shapefile
Regional Environmental Justice Area	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Metropolitan Council Make A Map tool (linked above) • Data Interface: PDF

PROCESSING AND ANALYSIS

If using Make A Map tool, none. Output for this analysis is automatically generated in the “Socio-Economic Conditions” output map.

If using GIS, sort and categorize the data included in the shapefile by the “ACP” variable.

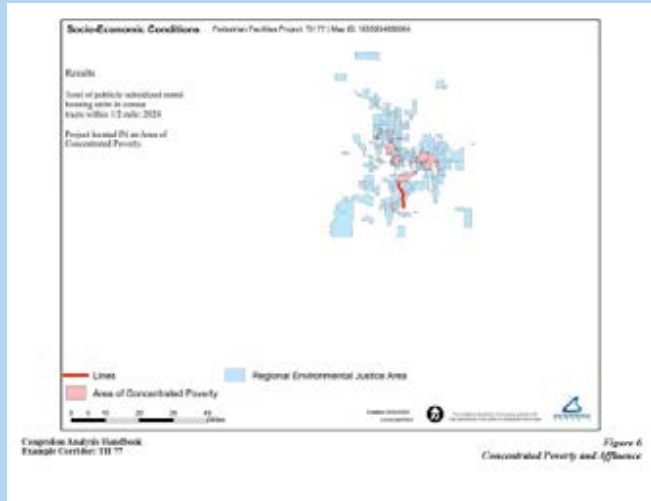
Definitions for areas of concentrated poverty and affluence can be found in this spreadsheet, which contains the full list of fields and data sources included in the Equity Considerations database: [https://metro council.org/Data-and-Maps/Research-and-Data/Place-based-Equity-Research/Equity-Considerations-Dataset-Fields-\(February-202.aspx\)](https://metro council.org/Data-and-Maps/Research-and-Data/Place-based-Equity-Research/Equity-Considerations-Dataset-Fields-(February-202.aspx)). Additional information and context can be found on the Council’s Place-Based Equity Research webpage: <https://metro council.org/Data-and-Maps/Research-and-Data/Place-based-Equity-Research.aspx>

DOCUMENTATION

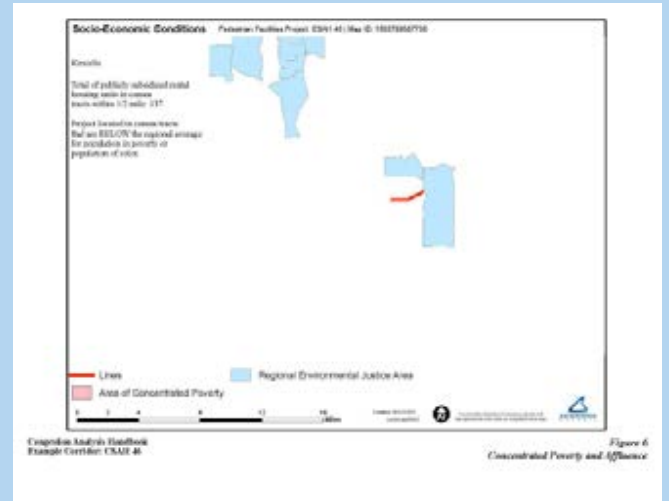
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Concentrated Poverty Example Figures

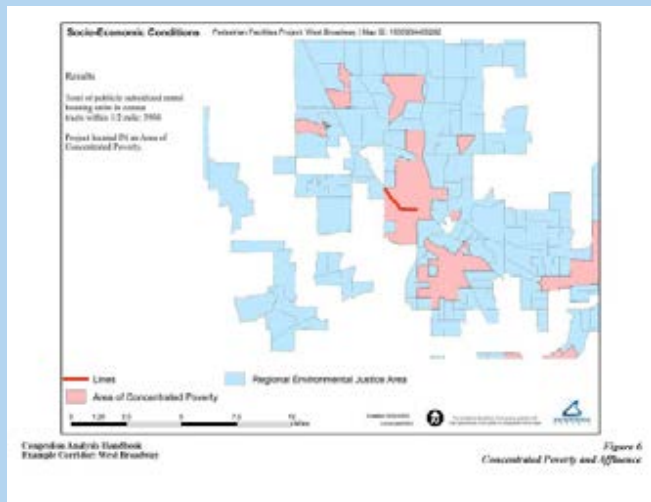
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Transit Dependence

SUMMARY

- Prepare a map showing households who lack regular access to a motor vehicle - also known as “transit-dependent households” for meeting their travel needs (please note these households may also rely on walking or biking for their travel)

DATA ELEMENTS

- American Community Survey 5-Year Summary File**
- **Agency Providing:** Metropolitan Council
 - **Location:** Latest ACS 5 Year Summary File (currently the 2016 to 2020 file) available from the Minnesota Geospatial Commons (<https://gisdata.mn.gov/dataset/us-mn-state-metc-society-census-acs>)
 - **Data Interface:** Shapefile

PROCESSING AND ANALYSIS

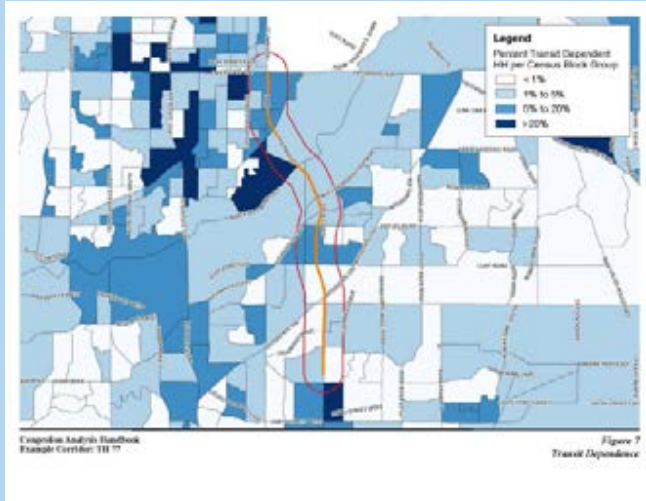
- Transit-Dependent Households Per Census Block Group
- Step 1: Number of Transit-Dependent Households Per Block Group**
- Use the variables included in the shapefile to develop this information layer
 - “HH_NOVEH” (households with no vehicles)
- Step 2: Percent of Transit-Dependent Households Per Block Group**
- Use the variables included in the shapefile to develop this information layer
 - “HH_NOVEH” (households with no vehicles) and
 - “HHTOTAL (total number of households)
 - The equation is “HH_NOVEH” / “HHTOTAL”

DOCUMENTATION

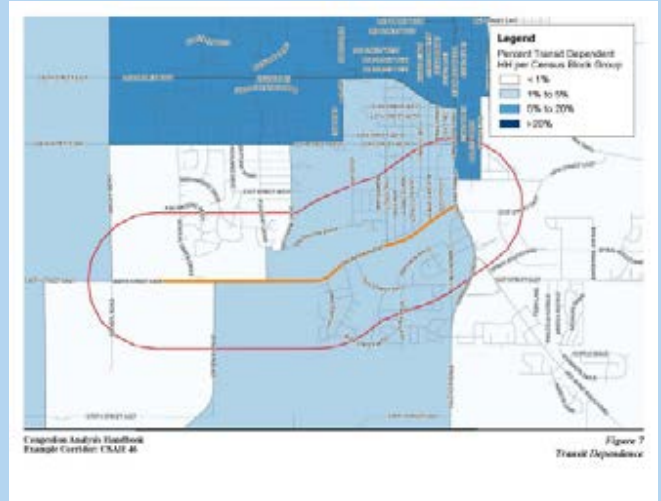
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Transit Dependence Example Figures

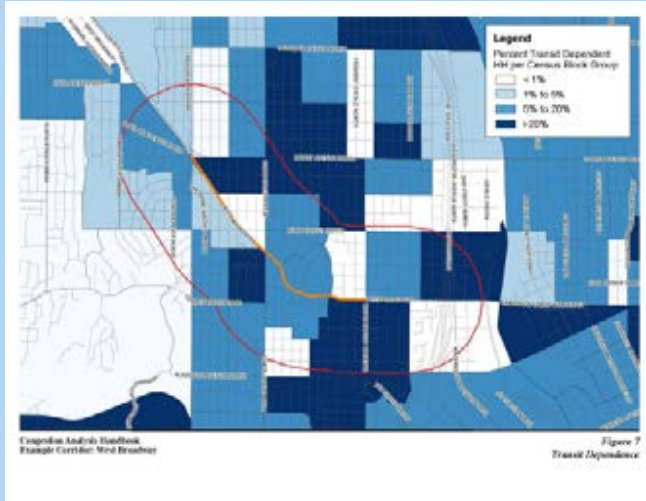
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Affordable Housing

SUMMARY

- Prepare a map showing the total number of publicly subsidized rental housing units in all census tracts within a one-half mile radius of the study corridor.

DATA ELEMENTS

- | | |
|---|--|
| Number of Subsidized Housing Units | <ul style="list-style-type: none">• Agency Providing: Metropolitan Council• Location: Metropolitan Council Make A Map tool (https://giswebsite.metc.state.mn.us/publicMaps/rsa/)• Data Interface: Interactive Map |
|---|--|

PROCESSING AND ANALYSIS

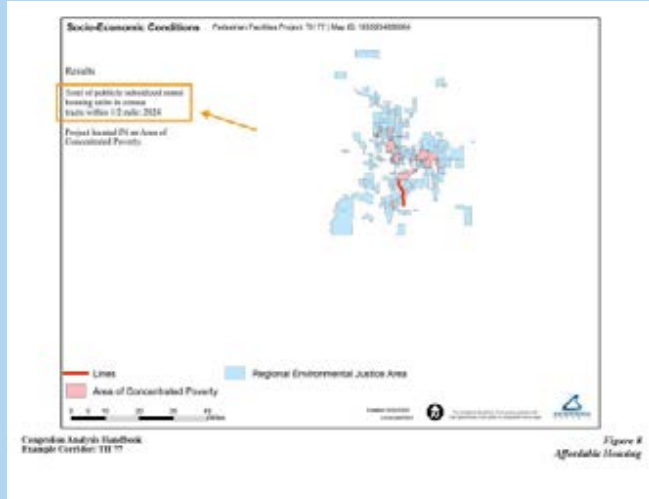
- Under “Sketch the Project” select a grant type of “Pedestrian Facilities” or “Multiuse Trails and Bicycle Facilities”
- The map is produced as the output for “Socio-Economic Conditions”
- Please note that the output for this analysis is also generated as part of the “Concentration of Poverty” analysis detailed earlier.

DOCUMENTATION

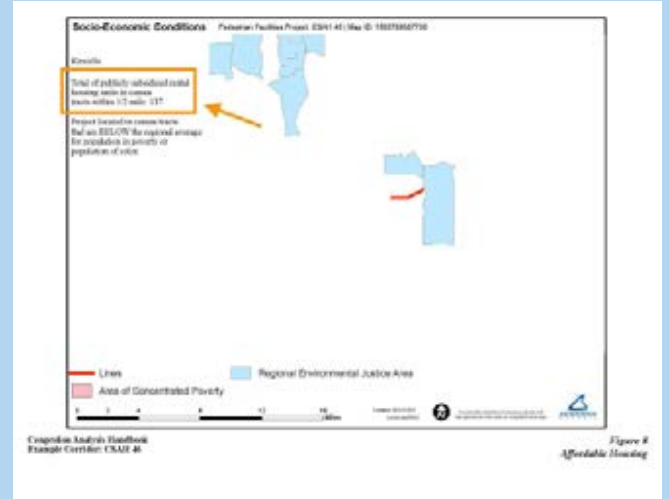
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Affordable Housing Example Figures

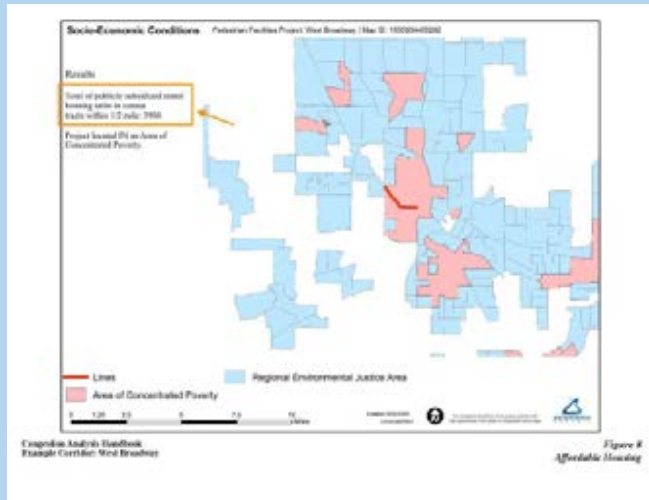
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Low-Wage Workers

SUMMARY

- Prepare a map showing the location of the study corridor in relation to concentrations of low-wage worker *households* and low-wage worker *jobs*.

DATA ELEMENTS

Low-Wage Worker Household Density	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Minnesota Geospatial Commons (https://gisdata.mn.gov/dataset/us-mn-state-metc-society-househd-worker-low-wage) • Data Interface: ESRI File Geodatabase
Low-Wage Worker Job Density	<ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Minnesota Geospatial Commons (linked above) • Data Interface: ESRI File Geodatabase

PROCESSING AND ANALYSIS

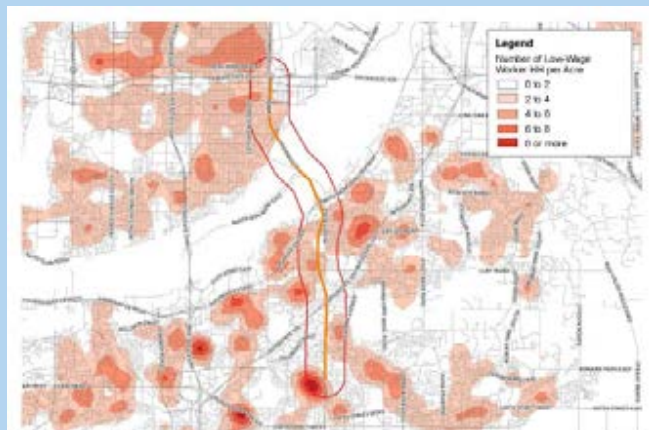
Low-Wage Worker Household Density	<p>The file provides visual representation of the density of low-wage worker households, arranged by color intensity into these classes:</p> <ul style="list-style-type: none"> • Less than 2 worker households per acre • 2 to 3.9 worker households per acre • 4 to 5.9 worker households per acre • 6 to 7.9 worker households per acre • 8 or more worker households per acre
-----------------------------------	--

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Low-Wage Workers Example Figures

CORRIDOR 1 – TH 77



Example Corridor TH 77

Figure 9
Low-Wage Workers

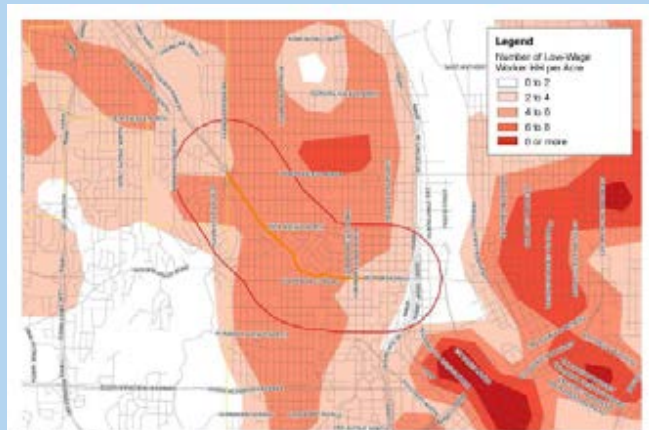
CORRIDOR 2 – CSAH 46



Example Corridor CSAH 46

Figure 9
Low-Wage Workers

CORRIDOR 3 – WEST BROADWAY



Example Corridor West Broadway

Figure 9
Low-Wage Workers

Workers and the Regional Economy

SUMMARY

- Obtain a summary of population and employment within a one-half mile radius of the corridor, including:
 - Total population
 - Total employment
 - Employment in Manufacturing and Distribution sectors
- Prepare a map highlighting the location of Postsecondary Education Centers near the study corridor.

DATA ELEMENTS

- | | |
|---|--|
| Population and Employment Totals | <ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Metropolitan Council Make A Map tool (https://giswebsite.metc.state.mn.us/publicMaps/rsa/) • Data Interface: Interactive Map |
| Postsecondary Education Centers | <ul style="list-style-type: none"> • Agency Providing: Metropolitan Council • Location: Metropolitan Council Make A Map tool (https://giswebsite.metc.state.mn.us/publicMaps/rsa/) • Data Interface: Interactive Map |

PROCESSING AND ANALYSIS

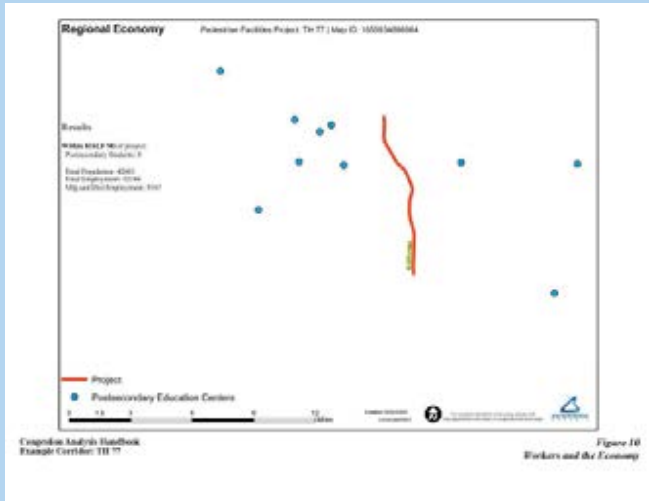
None. Output for this analysis is automatically generated in the "Regional Economy" output map.

DOCUMENTATION

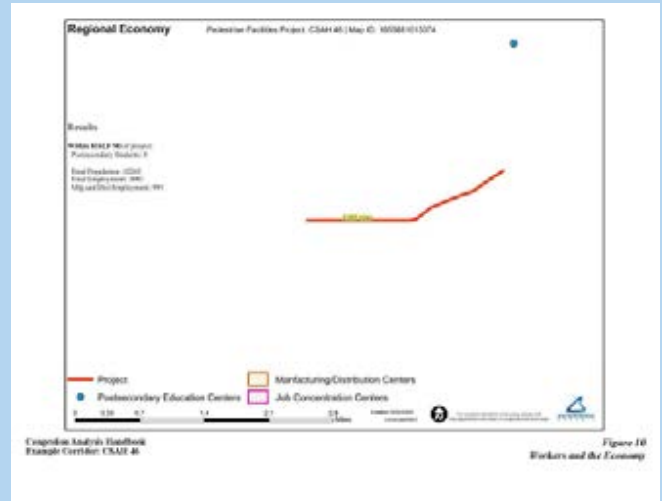
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Workers and the Regional Economy Example Figures

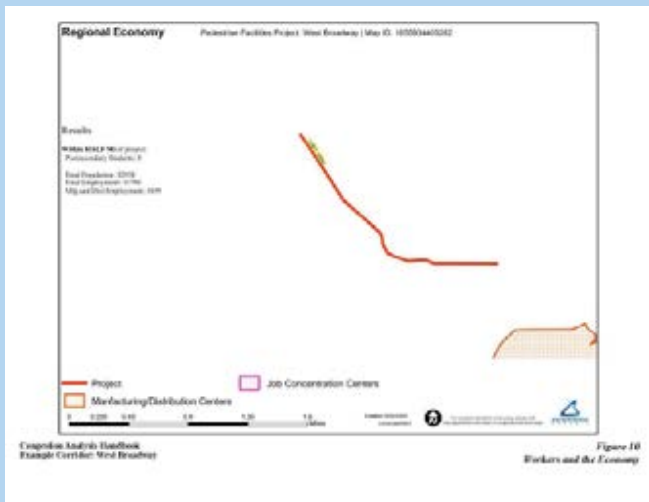
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Service Area Type

SUMMARY

- Prepare a map showing the location of the corridor in relation to the Metropolitan Urban Service Areas (MUSA) as defined by Metropolitan Council. The MUSA is the area within which wastewater services are provided/allowed to be provided, or are planned to be provided, to support urban development.

DATA ELEMENTS

- Service Area Type (Urban/Rural)**
- **Agency Providing:** Metropolitan Council
 - **Location:** Minnesota Geospatial Commons (<https://gisdata.mn.gov/dataset/us-mn-state-metc-society-thrive-msp2040-com-des>)
 - **Data Interface:** Shapefile

PROCESSING AND ANALYSIS

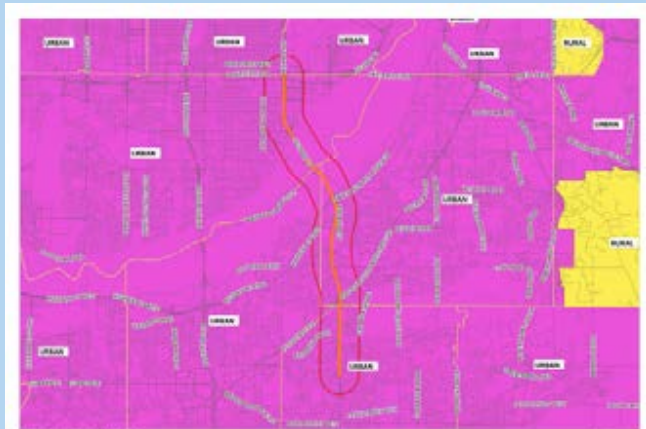
Sort the data included in the shapefile by the "URB_RURAL" variable.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Service Area Type Example Figures

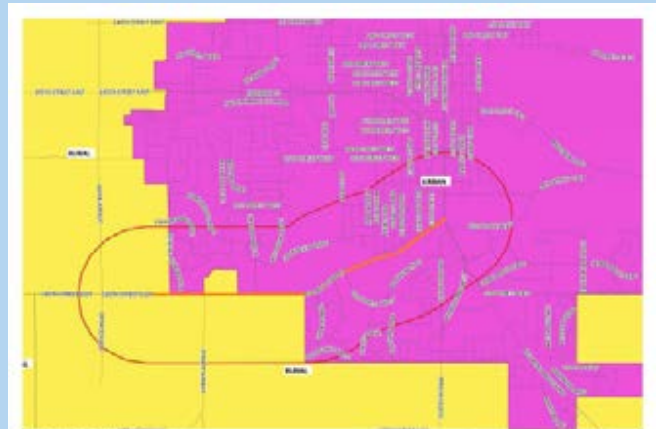
CORRIDOR 1 – TH 77



Congestion Analysis Handbook
Example Corridor: TH 77

Figure 11
Service Area Type

CORRIDOR 2 – CSAH 46



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 11
Service Area Type

CORRIDOR 3 – WEST BROADWAY



Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 11
Service Area Type

Community Designation

SUMMARY

- Prepare a map showing the location of the corridor in relation to the Metropolitan Council Community Designations as described in Thrive 2020, which help guide the type of transportation investments that are appropriate in specific locations in the region and are related to land use and activity thresholds.

DATA ELEMENTS

- | | |
|------------------------------|--|
| Community Designation | <ul style="list-style-type: none">• Agency Providing: Metropolitan Council• Location: Minnesota Geospatial Commons (https://gisdata.mn.gov/dataset/us-mn-state-metc-society-thrive-msp2040-com-des)• Data Interface: Shapefile |
|------------------------------|--|

PROCESSING AND ANALYSIS

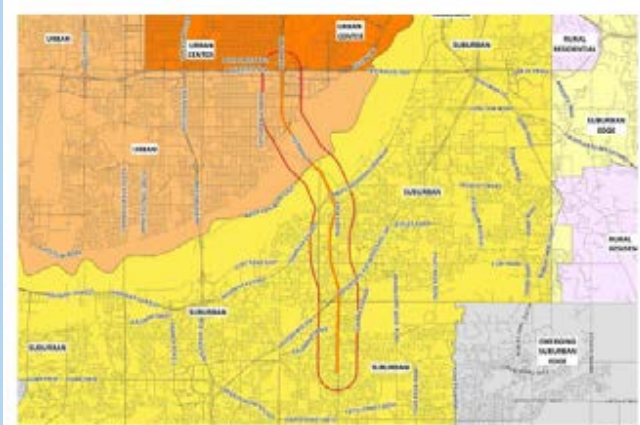
Sort the data included in the shapefile by the "COMDESNAME" variable.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Community Designation Example Figures

CORRIDOR 1 – TH 77



Congestion Analysis Handbook
Example Corridor: TH 77

Figure 12
Community Designation

CORRIDOR 2 – CSAH 46



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 12
Community Designation

CORRIDOR 3 – WEST BROADWAY



Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 12
Community Designation

Context Zone

SUMMARY

- Develop a map showing the corridor in relation to the land use contexts surrounding it, as described in MnDOT methodology. Nine potential land use contexts are described in MnDOT's Technical Memorandum No. 18-07-TS-05. These land use "Context Zones" can be used to identify locations where different types of transportation investments are expected to function more effectively.

DATA ELEMENTS

- | | |
|---|--|
| Aerial Photography | <ul style="list-style-type: none"> • Agency Providing: Freely available from public sources • Location: Google Earth, Bing, WMS Composite Image Service from Minnesota Geospatial Commons (https://gisdata.mn.gov/dataset/base-mn-composite-image-service) • Data Interface: Not applicable |
| MnDOT Land Use Context: Types, Identification, and Use | <ul style="list-style-type: none"> • Agency Providing: MnDOT • Location: MnDOT Land Use Context: Types, Identification, and Use - Technical Memorandum No. 18-07-TS-05 (https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=2056227) • Data Interface: PDF |

PROCESSING AND ANALYSIS

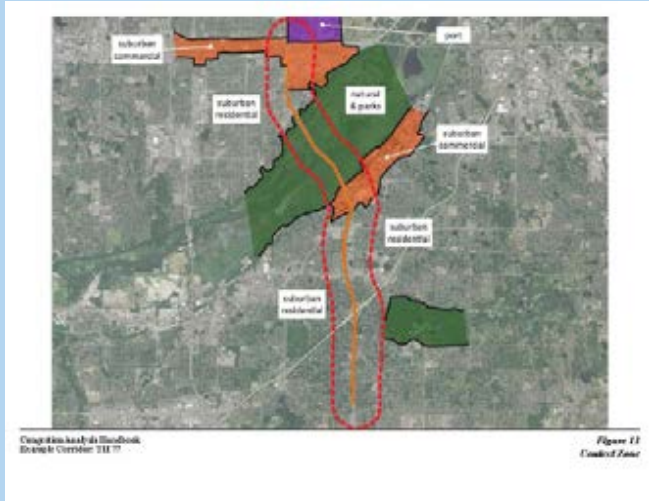
Use the methodology described in the memo to identify and draw in the specific land use contexts surrounding the corridor.

DOCUMENTATION

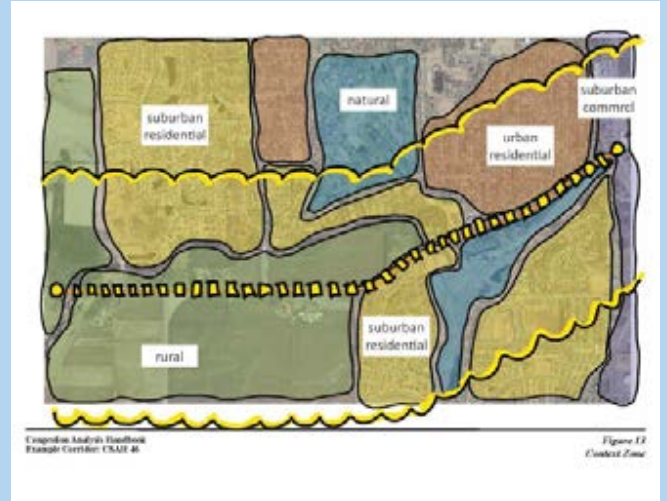
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Context Zone Example Figures

CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Walk/Bike Origins and Destinations

SUMMARY

- Develop a map highlighting the corridor in relation to Regional Bicycle Transportation Network Destinations where people work, shop, recreate, or are entertained.

DATA ELEMENTS

- | | |
|---|---|
| Regional Bicycle Transportation Network Destinations | <ul style="list-style-type: none">• Agency Providing: Metropolitan Council• Location: Minnesota Geospatial Commons (https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-regional-bike-trans-destin)• Data Interface: Shapefile |
|---|---|

PROCESSING AND ANALYSIS

Following the link above, use GIS to display the locations provided in the shapefile. You may sort the locations by the “RDGDesc” variable to identify the type of origin/destination.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Walk/Bike Origins and Destinations Example Figures

CORRIDOR 1 – TH 77



Congestion Analysis Handbook
Example Corridor TH 77

Figure 11
Walk/Bike Origins and Destinations

CORRIDOR 2 – CSAH 46



Congestion Analysis Handbook
Example Corridor CSAH 46

Figure 11
Walk/Bike Origins and Destinations

CORRIDOR 3 – WEST BROADWAY



Congestion Analysis Handbook
Example Corridor West Broadway

Figure 11
Walk/Bike Origins and Destinations

Transit Market Area

SUMMARY

- Prepare a map of the corridor in relation to Transit Market Areas, which provide general guidelines on the mix of transit services that may be appropriate for a given area.

DATA ELEMENTS

- Transit Market Areas**
- **Agency Providing:** Metropolitan Council
 - **Location:** Minnesota Geospatial Commons
(<https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-transit-market-areas>)
 - **Data Interface:** Shapefile

PROCESSING AND ANALYSIS

Following the link above, determine the Transit Market descriptor for the areas through which the corridor travels. Use the variable “MarketArea” provided in the file. Descriptors for the numerical values there are:

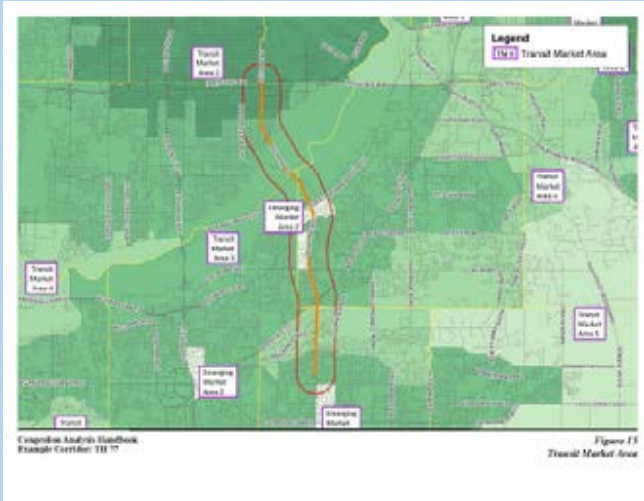
- 1: Transit Market Area I
- 2: Transit Market Area II
- 3: Transit Market Area III
- 4: Transit Market Area IV
- 5: Transit Market Area V
- 8: Emerging Market Area II
- 9: Emerging Market Area III

DOCUMENTATION

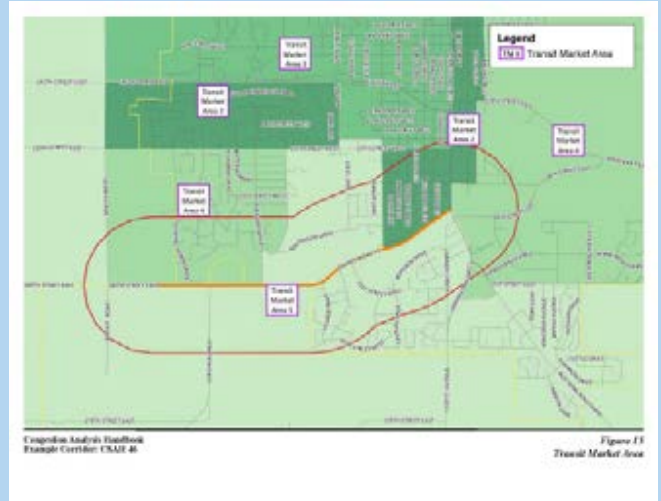
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix A**.

Transit Market Area Example Figures

CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Roadway Features

SUMMARY

- Prepare a map highlighting key features of the roadway, including all access locations and types, typical section, and posted speed.
- The data included in Roadway Features may or may not be available in a format that can be easily processed in GIS. Users may use GIS, Google Earth, or any other program that suits their data format for this map.

DATA ELEMENTS

Interchange Locations and Types	<ul style="list-style-type: none"> • Interchange locations and type (cloverleaf, diamond, etc.) can be identified using Google Earth and verified with a field check.
Intersection Access Locations and Types, Plus Control Type	<ul style="list-style-type: none"> • Intersection locations and type (primary vs secondary, full movement vs partial movement, etc.) can be identified using Google Earth and verified with a field check. The intersection type characterization should match the access spacing guidelines that will be utilized. Traffic control (signalized, through-stop, all-way stop, etc.) can be identified using Google Earth and verified with a field check.
Rail Crossings	<ul style="list-style-type: none"> • Rail crossings can be found using Google Earth or Enterprise MnDOT Mapping Application (EMMA) tool (https://dotapp9.dot.state.mn.us/emma/) and verified with a field check.
Typical Section	<ul style="list-style-type: none"> • The number of through lanes and turn lanes can be identified using Google Earth and verified with a field check.
Posted Speed	<ul style="list-style-type: none"> • Posted speeds can be identified using Google Earth and verified with a field check.
Access Spacing	<ul style="list-style-type: none"> • Choose a metric to describe the number and proximity of access points. Access spacing would be preferred and can be shown on a map. If a density measurement is preferred for simplicity, split up the corridor into sub-segments to show any variation.
Frontage Roads (If Applicable)	<ul style="list-style-type: none"> • Any frontage roads can be found using Google Earth and verified with a field check.

PROCESSING AND ANALYSIS

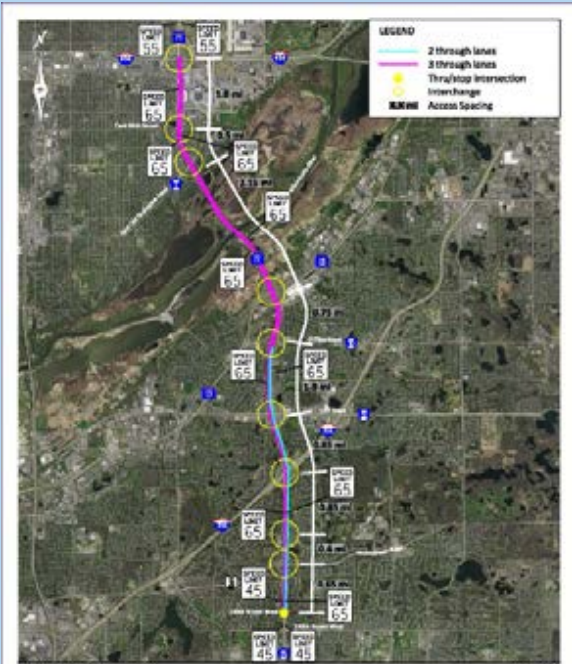
Access Spacing Compliance	<p>For arterials, review applicable access spacing guidance to determine if existing access spacing is in compliance. MnDOT guidelines can be found at the MnDOT “Access Management” webpage here: (https://www.dot.state.mn.us/accessmanagement/resources.html). Specific counties and municipalities may have their own guidance as well.</p>
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DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

Roadway Features Example Figures

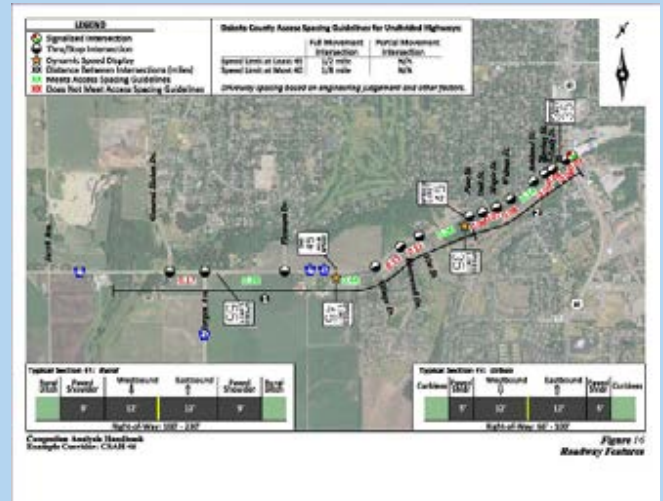
CORRIDOR 1 – TH 77



Competition Analysis Handbook
Example Corridor: TH 77

Figure 15
Roadway Features

CORRIDOR 2 – CSAH 46



Competition Analysis Handbook
Example Corridor: CSAH 46

Figure 16
Roadway Features

CORRIDOR 3 – WEST BROADWAY



Competition Analysis Handbook
Example Corridor: West Broadway

Figure 17
Roadway Features

Transit, Bicycle and Pedestrian Features

SUMMARY

- This map shows the availability and characteristics of facilities to support travel by non-auto modes, in particular public transit, bicycles, and pedestrians.
- The level of detail included on this graphic depends on the project. For example, in a very urban area you may choose to not show sidewalks and could instead show where there is a lack of sidewalks.

DATA ELEMENTS

Existing and Planned Pedestrian Features (Along & Crossing Corridor)

- **Agency Providing:** Metro Park and Trail Data Collaborative, Local Municipality
- **Location:**
 - This piece of data is openly available on Minnesota Geospatial Commons (<https://gisdata.mn.gov/>)
 - Search “Metro Collaborative Trails and Bikeways” or;
 - Visit this link: <https://gisdata.mn.gov/dataset/us-mn-state-metrogis-trans-metro-colabtiv-trails-bike>
 - Verify existing features with a field observation and verify planned features with local plans
- **Data Interface:** Shapefile

Existing and Planned Bicycle Features (Along & Crossing Corridor)

- **Agency Providing:** Metro Park and Trail Data Collaborative, Local Municipality
- **Location:** This piece of data is openly available on Minnesota Geospatial Commons (link and search term above). Verify existing features with a field observation and verify planned features with local plans
- **Data Interface:** Shapefile

Transit Characteristics (Type, Routes, Stops)

- **Agency Providing:** Metropolitan Council
- **Location:** There are multiple shapefiles on Geospatial Commons with this data
 - Routes: <https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-transit-routes>
 - Stops: <https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-transit-stops>
 - Transit Right-of-Way/Advantages Segments: <https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-transit-row-segments>
 - Transitway (LRT, Commuter Rail, BRT) Alignments and Stations: <https://gisdata.mn.gov/dataset/us-mn-state-metc-trans-transitways-generalized>
- **Data Interface:** Shapefile

Transit Frequency/Volumes

- Trip frequency can be found using the transit route shapefile linked above. Alternatively, schedules located on transit agency websites can be used to determine route frequency and volumes.

PROCESSING AND ANALYSIS

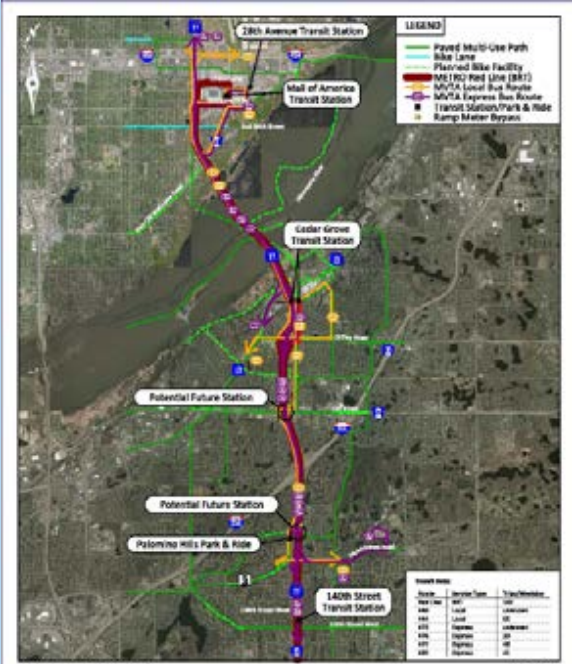
None. Users should interpret planned facilities with caution, understanding they may or may not be constructed in an appropriate time horizon.

DOCUMENTATION

Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

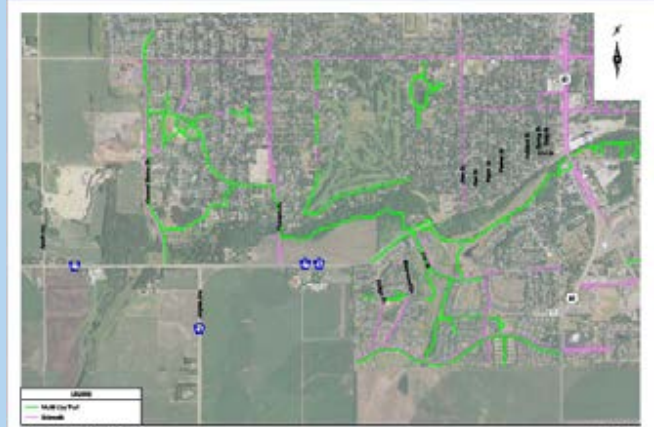
Transit, Bicycle and Pedestrian Example Figures

CORRIDOR 1 – TH 77



Competition Analysis Handbook Example Corridor: TH 77 Figure 17 Transit, Bicycle and Pedestrian Features

CORRIDOR 2 – CSAH 46



Competition Analysis Handbook Example Corridor: CSAH 46 Figure 17 Transit, Bicycle, and Pedestrian Features

CORRIDOR 3 – WEST BROADWAY



Competition Analysis Handbook Example Corridor: West Broadway Figure 17 Transit, Bicycle and Pedestrian Features

Traffic Volumes

SUMMARY

- Prepare a map of the corridor with average annual daily traffic (AADT) and any turning movement or ramp volumes available. Historical trend charts can be placed on the map or kept separate if space is not available

DATA ELEMENTS

- Annual Average Daily Traffic (AADT)**
- **Agency Providing:** MnDOT
 - **Location:** AADTs can be found on MnDOT's Traffic Mapping Application: <https://mndot.maps.arcgis.com/apps/webappviewer/index.html?id=7b3be07daed84e7fa170a91059ce63bb>
 - Alternatively, if the study corridor is a trunk highway, US highway, or interstate, MnDOT's Data Extract tool may be used: <http://data.dot.state.mn.us/datatools/dataextract.html>
 - **Data Interface:** Interactive map
 - Note: if the agency has a more recent AADT that is not reflected in the application, that data may be used instead.
- Historical Trends**
- **Agency Providing:** MnDOT
 - **Location:** AADTs can be found on MnDOT's Traffic Mapping Application (linked above).
 - Alternatively, if the study corridor is a trunk highway, US highway, or interstate, MnDOT's Data Extract tool may be used (linked above)
 - **Data Interface:** Interactive map

PROCESSING AND ANALYSIS

None

DOCUMENTATION

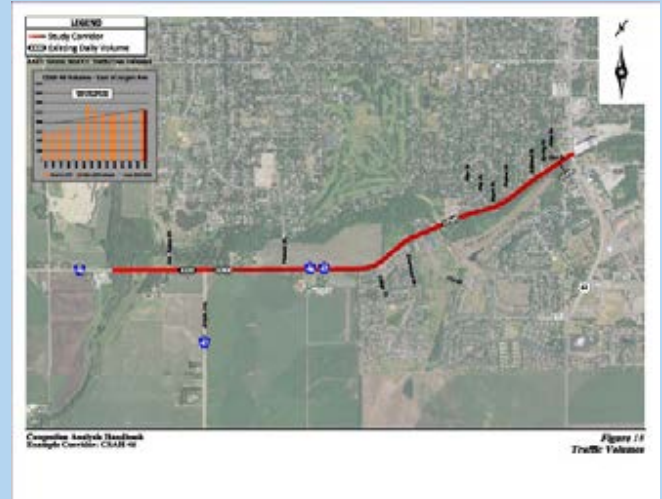
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

Traffic Volumes Example Figures

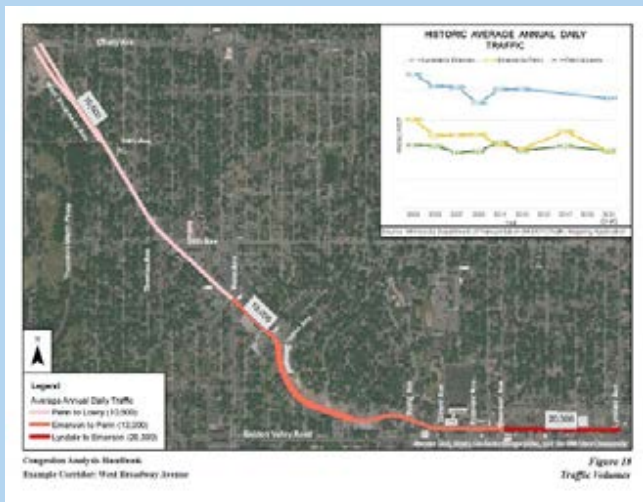
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Crashes

SUMMARY

- Prepare a map that at a minimum includes the number and location of crashes and charts showing crash types and severity.

DATA ELEMENTS

- | | |
|-----------------------------------|---|
| Number/Location of Crashes | • This can be obtained using MnDOT's MnCMAT or CrashMART Tools. It is assumed that any agency will have access to and knowledge of how to obtain this data. |
| Crash Types | • This can be obtained using MnDOT's MnCMAT or CrashMART Tools. It is assumed that any agency will have access to and knowledge of how to obtain this data. |
| Crash Severity | • This can be obtained using MnDOT's MnCMAT or CrashMART Tools. It is assumed that any agency will have access to and knowledge of how to obtain this data. |

PROCESSING AND ANALYSIS

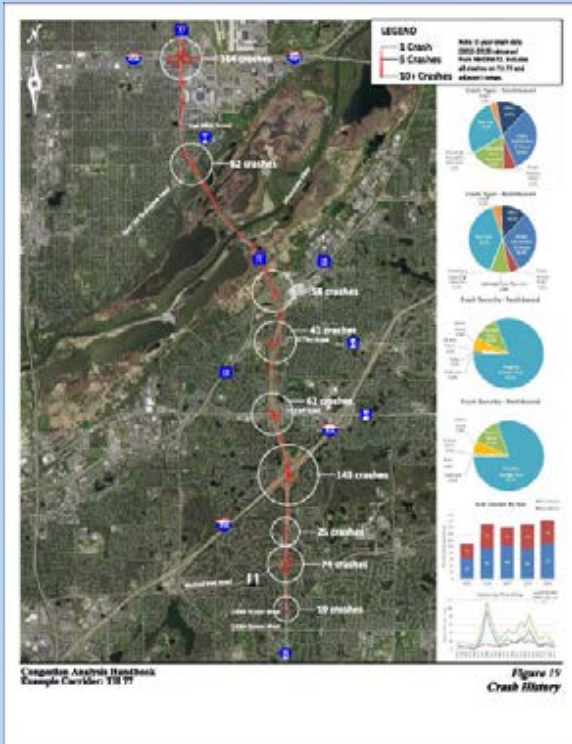
None

DOCUMENTATION

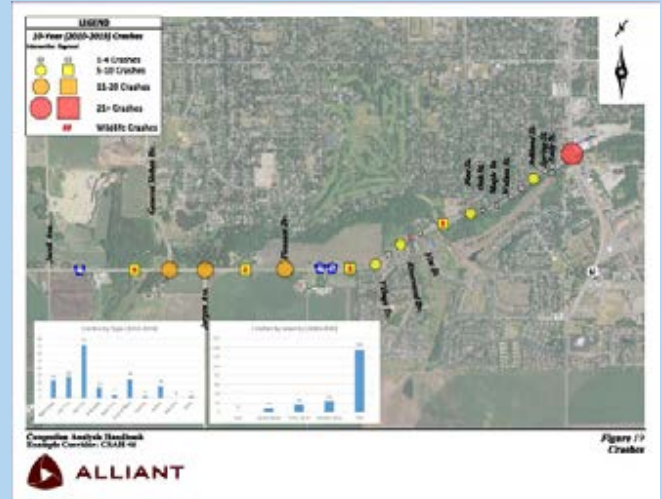
Some example figures are shown on the next page. These can be viewed in more detail, along with accompanying text, in **Appendix B**.

Crashes Example Figures

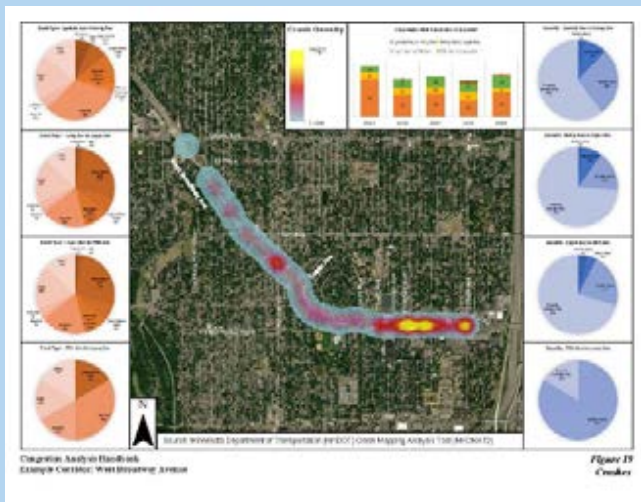
CORRIDOR 1 – TH 77



CORRIDOR 2 – CSAH 46

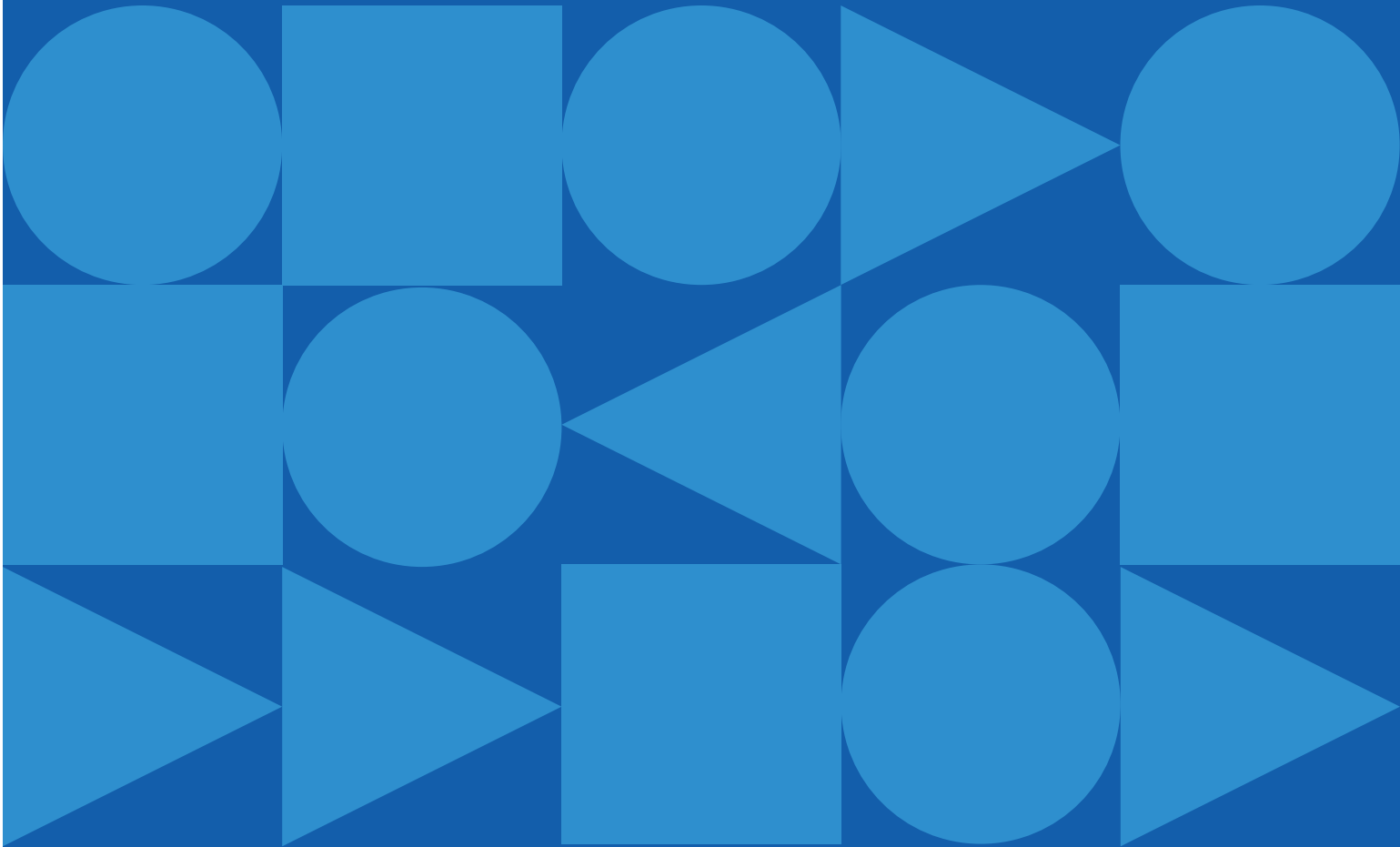


CORRIDOR 3 – WEST BROADWAY



Corridor Analysis Examples

The following corridor analysis summaries were prepared based on the data collected for each corridor. They are provided as examples of what the handbook users would produce as part of completing the handbook process.



Corridor Analysis Summary

TRUNK HIGHWAY 77: INTERSTATE 494 TO 138TH STREET

Introduction

This document contains the results of the congestion and characteristics analysis produced following the Congestion Analysis Handbook. The assessment results are summarized in text below in three sections: People and Equity, Land Use, and Transportation. The text is supported by maps and other graphics illustrating each primary data item collected.

LOCATION

Minnesota Trunk Highway 77 (TH 77) between I-494 and 138th Street is owned and maintained by the Minnesota Department of Transportation (MnDOT). The corridor is 8.2 miles long and runs through Hennepin County (Bloomington) and Dakota County (Burnsville, Apple Valley, Eagan). It is classified as a Primary Arterial. (Figure 1)

CONGESTION

The TTI congestion screening result places the TH 77 corridor in the “Possibly Congested” category (TTI between 1.0 and 1.25). (Figure 2)

Assessment

PEOPLE AND EQUITY

Race and Ethnicity

According to Metropolitan Council data, a large portion of the corridor includes census tracts with 30-50% Black, Indigenous, or People of Color (BIPOC) population, with several areas that are over 50% BIPOC and one area that is 5-10% BIPOC. (Figure 3)

Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include the hiring or participation of community organizers or representatives from specific BIPOC communities. Consideration of specific culturally-appropriate approaches will be important for successful development of a project along this corridor.

Language Spoken

According to Metropolitan Council data, about half of the corridor includes areas where 15-30% of residents have limited English skills and smaller areas of 5-15% or 0-5% residents with limited English skills. (Figure 4)

Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include development of written and spoken materials in languages other than English, participation of interpreters, and other culture- and language-specific approaches.

People with Disabilities

According to Metropolitan Council data, in most of the corridor, 5-15% of residents have a disability, with two very small areas where this percentage is higher. (Figure 5)

Implications: Accommodations should be provided to facilitate participation in corridor engagement from residents with disabilities. Additionally, local knowledge should be used to determine specific accommodations needed. During project development, consider the needs of people with disabilities when developing the configuration of the design options.

Concentrated Poverty and Affluence

According to Metropolitan Council data, the corridor is in a Regional Environmental Justice Area. In addition, its northern terminus is in an Area of Concentrated Poverty. (Figure 6) The corridor is not in an area of Concentrated Affluence.

Implications: Investigate potential issues regarding Environmental Justice along the corridor's extent. People residing in areas of Concentrated Poverty face challenging circumstances affecting their quality of life and life prospects, including employment, health, and educational outcomes. Prioritize the well-being of residents in areas of Concentrated Poverty by selecting corridor options and design choices that improve residents' safe and convenient access to Active Living options (walk, bike and transit), support local economic development, support access to employment and educational opportunities, and foster social connectivity and connection, including through placemaking activities.

Transit Dependence

According to US Census data, there are census block groups in the corridor where 5-20% and more than 20% of people are transit-dependent. (Figure 7)

Implications: Some area residents may rely on walking, biking, and transit to a much greater extent than residents of other areas of the region for their daily travel. Prioritize considerations for users of these modes over other options when selecting options for addressing congestion concerns.

Affordable Housing

According to Metropolitan Council data, there are 2,024 units of publicly subsidized rental housing units in census tracts within 1/2 mile of the corridor, an average of 247 subsidized units per corridor mile. (Figure 8)

Implications: The number of publicly subsidized rental housing units in proximity (within a ten-minute walk) to this corridor appears to be relatively high. Public housing residents include a higher proportion of children, seniors, and people with mobility impairments who rely on wheelchairs and other mobility aids, and who do not have access to automobiles. Prioritize considerations for users of walk, bike, and transit modes over other options when selecting options for addressing congestion.

Low-Wage Worker Household/Job Density

According to US Census 2010 LEHD Origin-Destination Employment Statistics (LODES), the majority of the corridor is not proximate to high concentrations of low-wage worker households. However, there are some concentrations of these households near the project's southern end. (Figure 9)

Implications: The needs of low-wage worker households may not be a determining factor when selecting potential congestion mitigation measures for this corridor.

Workers and Economy

According to Metropolitan Council data, the total employment within 1/2 mile of the corridor is 42,166 jobs, an average of 5,138 jobs per corridor mile. Of the total number of jobs, 5,167 jobs are in Manufacturing and Distribution sectors. (Figure 10)

Implications: There is a very high average concentration of jobs along and near (within a ten-minute walk) of the corridor. Consider facilitating access for workers (including lower-wage workers) by improving transit along the corridor and developing and providing bicycle access along alternate routes.

LAND USE

Service Area Type (Urban/Rural)

The corridor is located entirely within the Metropolitan Urban Service Area (MUSA). (Figure 11)

Implications: Addressing congestion concerns through improving access to and operation of regional services, including transit, is appropriate given the corridor's location within the Metropolitan Urban Service Area.

Community Designation

The corridor travels through three different Thrive 2040 Community Designations, from "Urban Center" at its northern end, to "Urban" as it approaches its middle, to "Suburban" from its middle to its southern terminus. (Figure 12)

Implications: "Urban" and "Urban Center" communities are larger, centrally located, and economically diverse cities in the region. Because of their physical configuration, including interconnected street network, population and activity density, and mix of land uses, they are well suited for congestion approaches that include development and improvement of transit, TDM, and walk and bike options. "Suburban" communities are often located along freeways and are more likely to include larger "single use" zoning districts. Transit can also work well along main corridors in Suburban communities, while bicycle accommodations are often provided along alternate routes. Connecting bicycle facilities with transit hubs at suburban communities can be part of a successful approach.

Context Zone

According to the land use contexts described in MnDOT's Technical Memorandum No. 18-07-TS-05, and starting from its northern end, the corridor travels through a "Port" context near MSP airport, quickly moving into a "Suburban Commercial" context that continues south along its eastern edge while on its west it turns into a moderate "Urban Residential" context. A "Natural" context predominates as the corridor approaches the Minnesota River. South of the river, "Suburban Commercial" and "Suburban Residential" contexts continue until approximately Diffley Road, where "Suburban Residential" predominates on both sides of the corridor and continues until the corridor's southern terminus. (Figure 13)

Implications: Facilitating access to "Port" and "Suburban Commercial" destinations along the corridor's northern end is one of its important current functions. Addressing congestion concerns near this area by improving transit service (consistent with its transit market 2 designation) could be productive. A significant portion of the corridor (about one-quarter) passes through the Minnesota River Valley and wetlands. Destinations south of the river, except for a "Suburban Commercial" district, are of a "Suburban Residential" type and may be suited for only limited transit service or improvements. Leveraging current and future potential transit

investments along the corridor's entire length through TDM approaches and improving walk and bike connectivity and access to transit hubs could be productive.

Walk/Bike Origins and Destinations

According to Metropolitan Council data, there are several regionally-significant bicycle transportation network destinations where people work, shop, recreate, or are entertained within 2 miles of the corridor. Within a 1/2 mile of the corridor, there is one such destination, the South Loop job center in Bloomington. (Figure 14)

Implications: Improving transit and bicycle connectivity to the South Loop job center could be a helpful contribution toward mitigating congestion concerns. In addition, improving access to and from the Minnesota River Valley Trail could facilitate some travel to and from the corridor.

Transit Market Area

The corridor travels through several transit markets, including 2, 3, 4, and "8 / emerging market area 2." (Figure 15)

Implications: Transit market 2 is a cost-effective location for offering a high level of service. Transit markets 3 and 4 are better suited to express, commuter service and park and ride to make transit service investments. Emerging transit market area 2 (noted as "8" on the maps) could be included as part of potential transit improvements for the corridor.

TRANSPORTATION

Roadway Features

TH 77 is a divided interstate highway with three travel lanes in each direction, except for northbound between 138th Street and Diffley Road, which has only travel lanes. The speed limit is 65 miles per hour throughout the corridor. The corridor has nine interchanges and a signalized intersection at 140th street, just south of the study corridor. Spacing between the centers of each interchange varies from 0.4 to 2.15 miles. (Figure 16)

Implications: As an interstate highway with regular access points (interchanges), TH 77 serves both regional and local trips. The two-lane segment at the south end is often seen as a bottleneck to northbound travel at peak hours.

Transit, Bicycle and Pedestrian Features

Pedestrians and bicyclists are not permitted to travel on TH 77, but there are several bridges across TH 77 that pedestrians and bicyclists can utilize. The non-motorized network around TH 77 includes sidewalks, multi-use paths, and bike lanes. There are also several planned facilities nearby.

MVTA operates two local bus routes and four express bus routes that travel along TH 77. Metro Transit operates the METRO Red Line along TH 77. The Cedar Grove Transit Station is located just north of Diffley Road and has both an online and offline station that transit may utilize. Red Line buses do not exit the highway and stop at the part of the station in the middle of TH 77, and some MVTA routes exit the highway and stop at the part of the station located just off the highway on Nicols Road. (Figure 17)

Implications: TH 77 is a barrier to non-motorized transportation, especially if there are not adequate facilities across it. Additional information is needed to understand potential crossing barriers and opportunities. TH 77 is an active transit corridor but service is relatively limited. Additional transit service on and adjacent to the corridor could serve some of the vehicle trips.

Traffic Volumes

Traffic volumes range from 44,500 to 99,600 AADT, as of 2019. Volumes are highest over the Minnesota River bridge, and lowest at the northern and southern ends of the corridor. Data from 2015-2019 shows that there has been relatively flat growth throughout the study area. There was a slight increase from 2015-2017, followed by a minor decrease in 2018, then an increase in 2019 back to the same level as 2017. (Figure 18)

Implications: Traffic growth before the pandemic was low, despite growth on other metro highways. This may be due to the constraint presented by congestion on this and other corridors (such as I-494). There is likely latent demand that is capped by current congestion. Future forecasts are needed to better understand traffic growth. Changes due to COVID-19 are difficult to predict at this time.

Crash History

Most concentrated crash locations occur at merge, diverge, or weaving sections within the corridor. Most crashes were either single vehicle crashes (run off road or other), rear end, or sideswipe, as is typical for freeway crashes. The northbound direction experiences the greatest volume of crashes on the corridor (approximately 63% of TH 77 crashes). The peak time for crashes was during the AM peak hour, when northbound TH 77 experiences congestion, indicating that congestion is a primary factor for crashes. (Figure 19)

Implications: This basic analysis did not identify locations with a critical crash concern. Congestion appears to be a primary factor for crashes in the corridor.

Public Involvement

The public involvement effort featured an online open house, stakeholder listening sessions, and focused outreach regarding transportation equity. Participants provided input on existing conditions and needs. Common themes from the public were congestion on the highway (particularly in the two-lane segment northbound) and near I-494.

Summary: Context and Problem Statement

Segments of the TH 77 corridor are possibly congested, based on the TTI data (TTI between 1.0 and 1.10). Congestion appears to affect all vehicles, including buses, which travel in mixed traffic as well as on dedicated bus shoulders. There are elevated crash levels in the corridor but they are not above action (critical) levels.

TH 77 is an active transit corridor but service is relatively limited. Bicycle and pedestrians are not allowed on TH 77 but there are bicycle and pedestrian facilities on most of the roadway crossings. Additional analysis would be needed to identify specific gaps in the pedestrian/bicycle system.

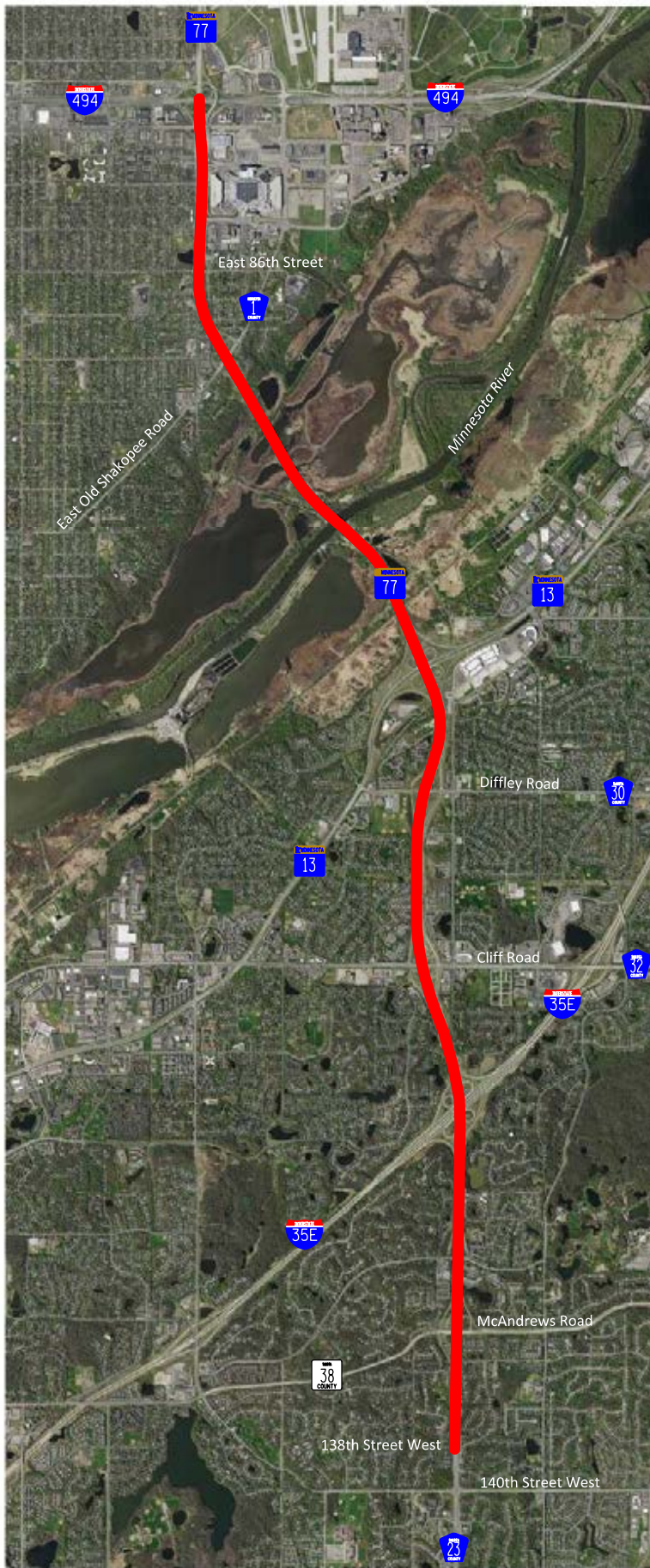
The corridor includes significant populations who rely on transit, walking and bicycling and/or face other transportation challenges due to poverty and language barriers. While the largely suburban corridor context makes it more challenging and less-cost effective to serve these needs, simply addressing vehicle mobility on the highway will not address the transportation needs of the wide range of populations in the corridor.

Strategy Review


The list of potentially applicable congestion management strategies was reviewed and each strategy rated for its ability to address the corridor needs to the extent data were available. A summary rating of each category is provided below. The complete assessment is provided in [Appendix C](#).

TH 77 Strategy Rating Summary

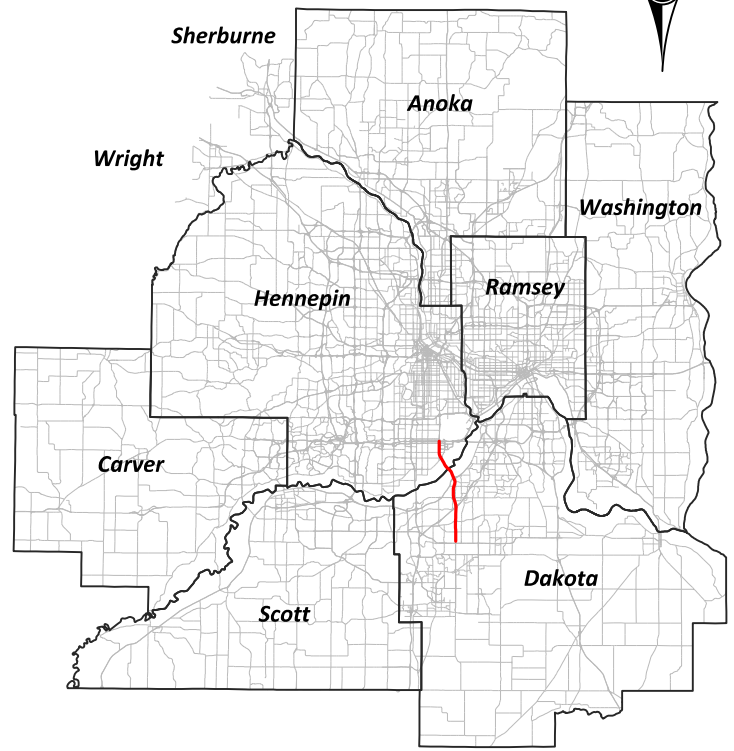
Category	Summary Rating	Notes
Travel Demand Management	Low/Medium	Many of the TDM strategies are potentially applicable and would theoretically remove some trips from the highway. Changes in travel patterns due to COVID have demonstrated value of peak-spreading and remove work.
Traffic Management Technologies	n/a	It is not apparent that additional traffic management technologies are applicable or would provide substantial benefit.
Spot Mobility	Medium	Bottleneck relief and/or addition of auxiliary lanes are consistent with understanding of congestion on this corridor
E-ZPass	High	TH 77 has been previously identified as a MnPASS (E-ZPass) corridor. Prior studies have shown potential but need further information.
Strategic Capacity Enhancements	Medium	Long congested segments suggest the benefit of additional lanes; however, general purpose lanes are not preferred by policy.



LEGEND

 Study Corridor

Corridor Location:

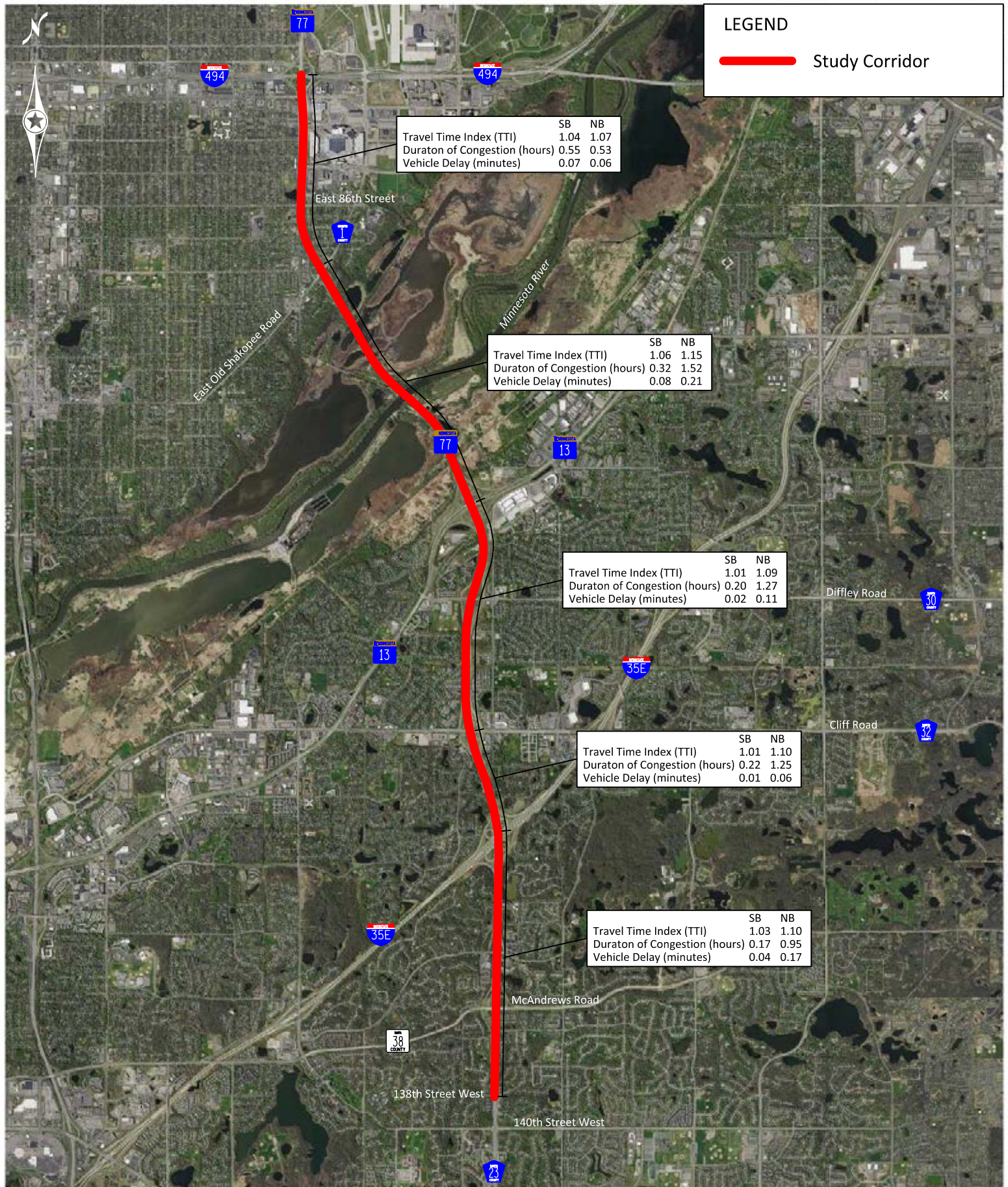


Details:

- Length: 8.2 miles
- Functional Classification: Primary Arterial
- Ownership: MnDOT

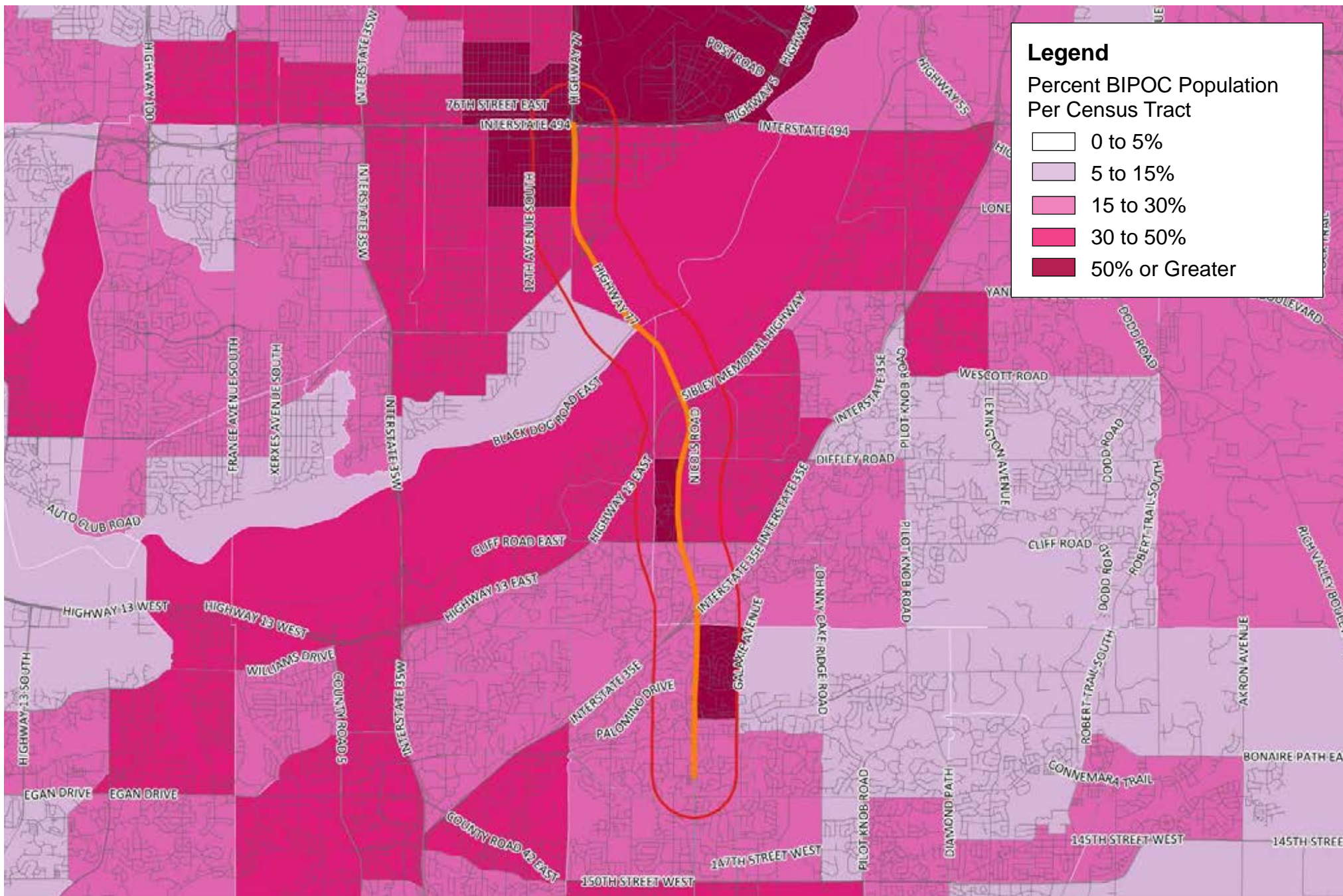
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 1
Project Location



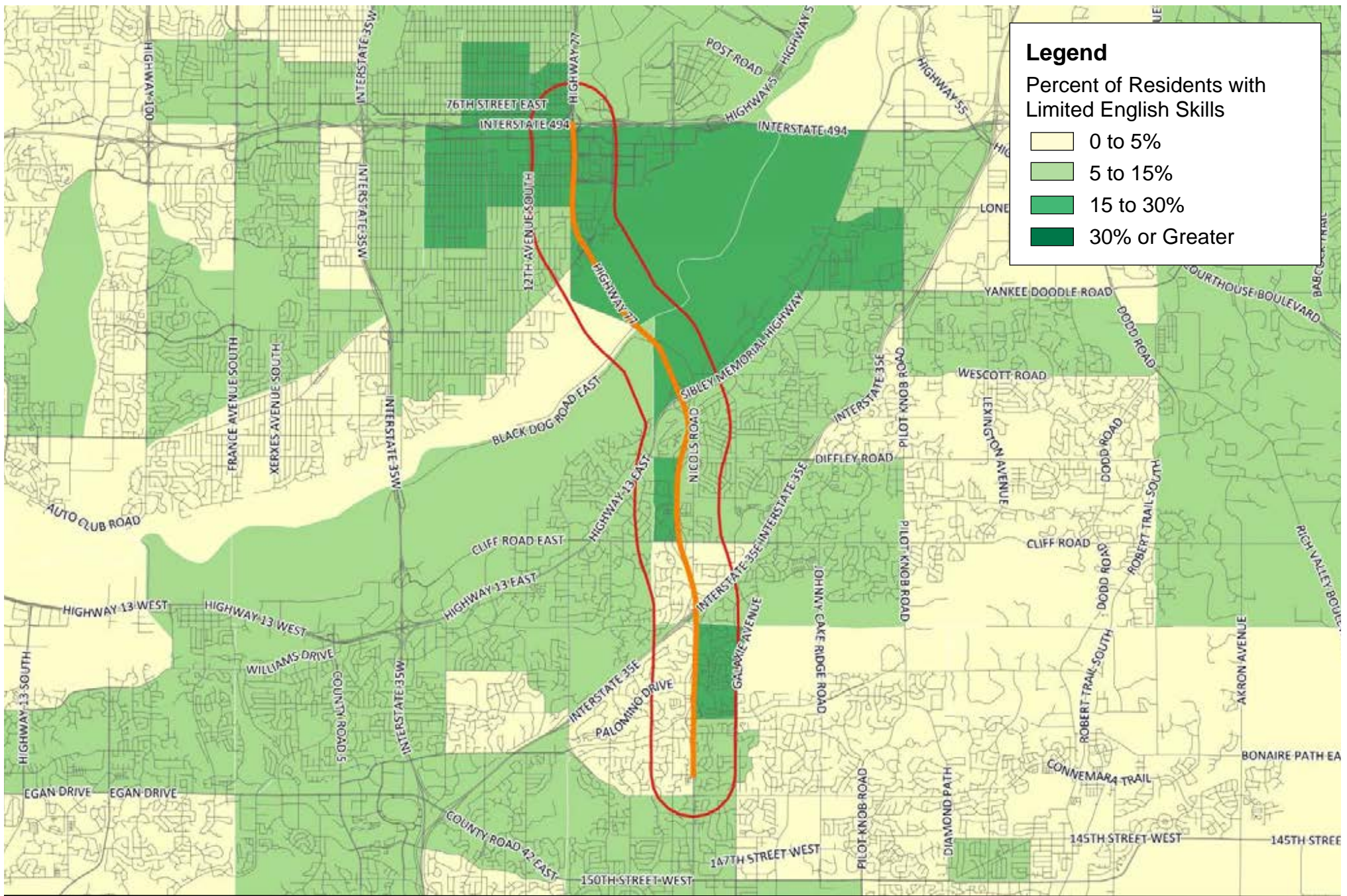
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 2
Congestion



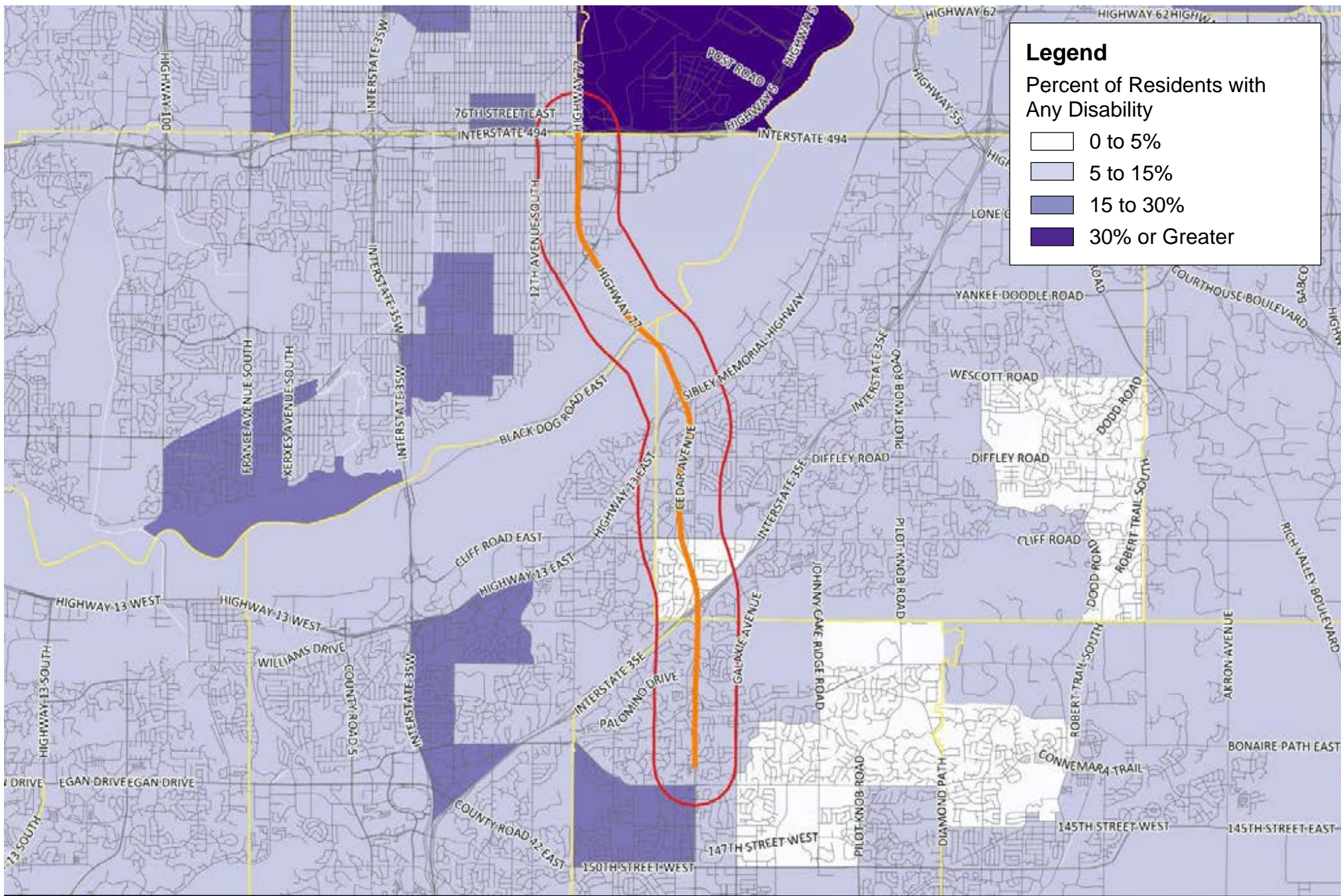
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 3
Percent BIPOC Population



Congestion Analysis Handbook
Example Corridor: TH 77

Figure 4
Percent of Residents with Limited English Skills



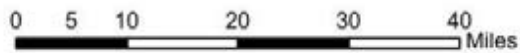
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 5
Percent of Residents with Any Disability

Results

Total of publicly subsidized rental housing units in census tracts within 1/2 mile: 2024

Project located IN an Area of Concentrated Poverty.

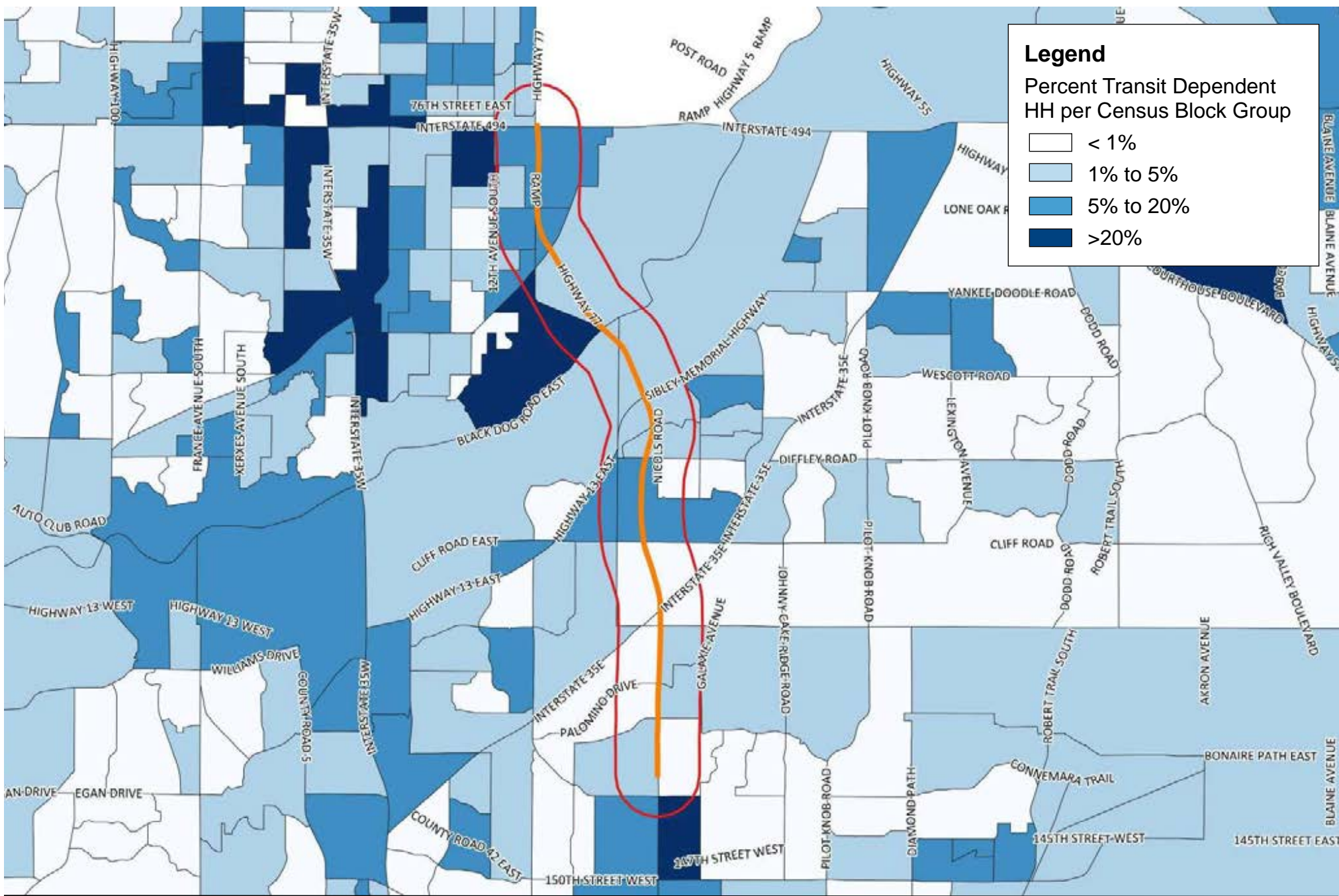


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LandscapeRSA2



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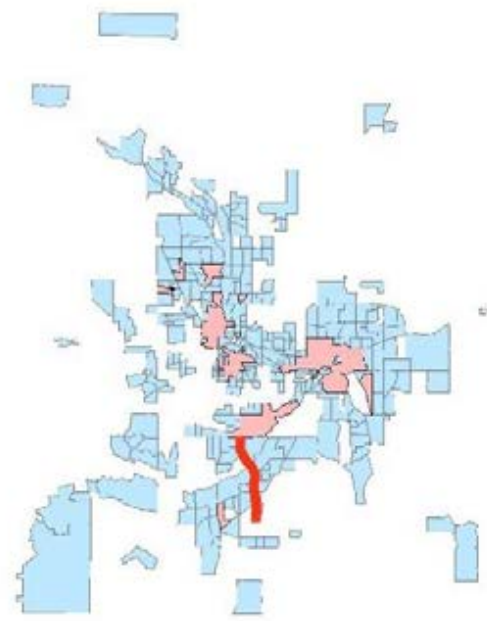
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 7
Transit Dependence

Results

Total of publicly subsidized rental housing units in census tracts within 1/2 mile: 2024

Project located IN an Area of Concentrated Poverty.

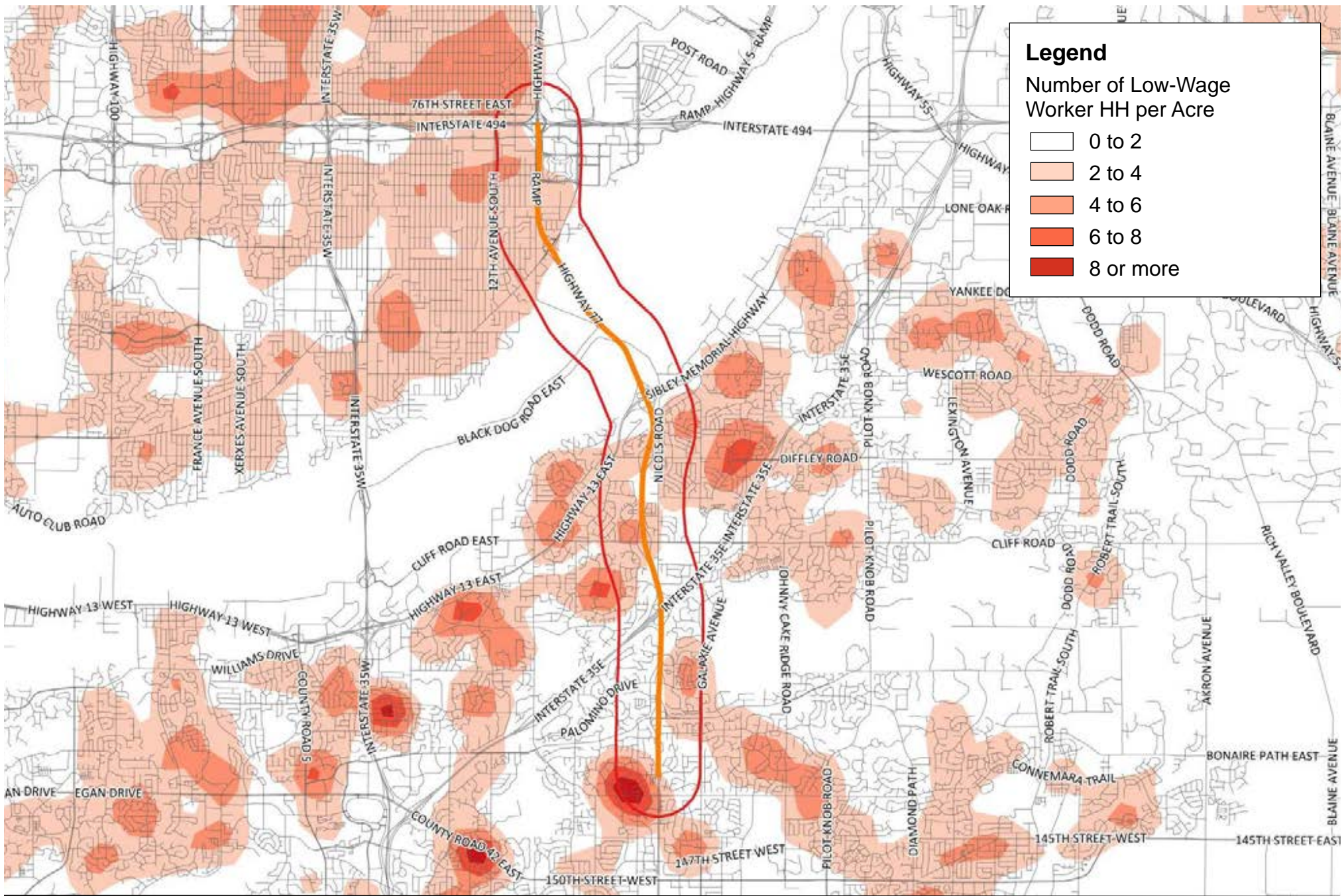


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LandscapeRSA2



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<http://gisweb site.metc.state.mn.us/gis/site/notice.aspx>





Congestion Analysis Handbook
Example Corridor: TH 77

Figure 9
Low-Wage Workers

Regional Economy

Pedestrian Facilities Project: TH 77 | Map ID: 1655934886064

Results

Within HALF Mi of project:
Postsecondary Students: 0

Total Population: 42081
Total Employment: 42166
Mfg and Dist Employment: 5167

- Project
- Postsecondary Education Centers

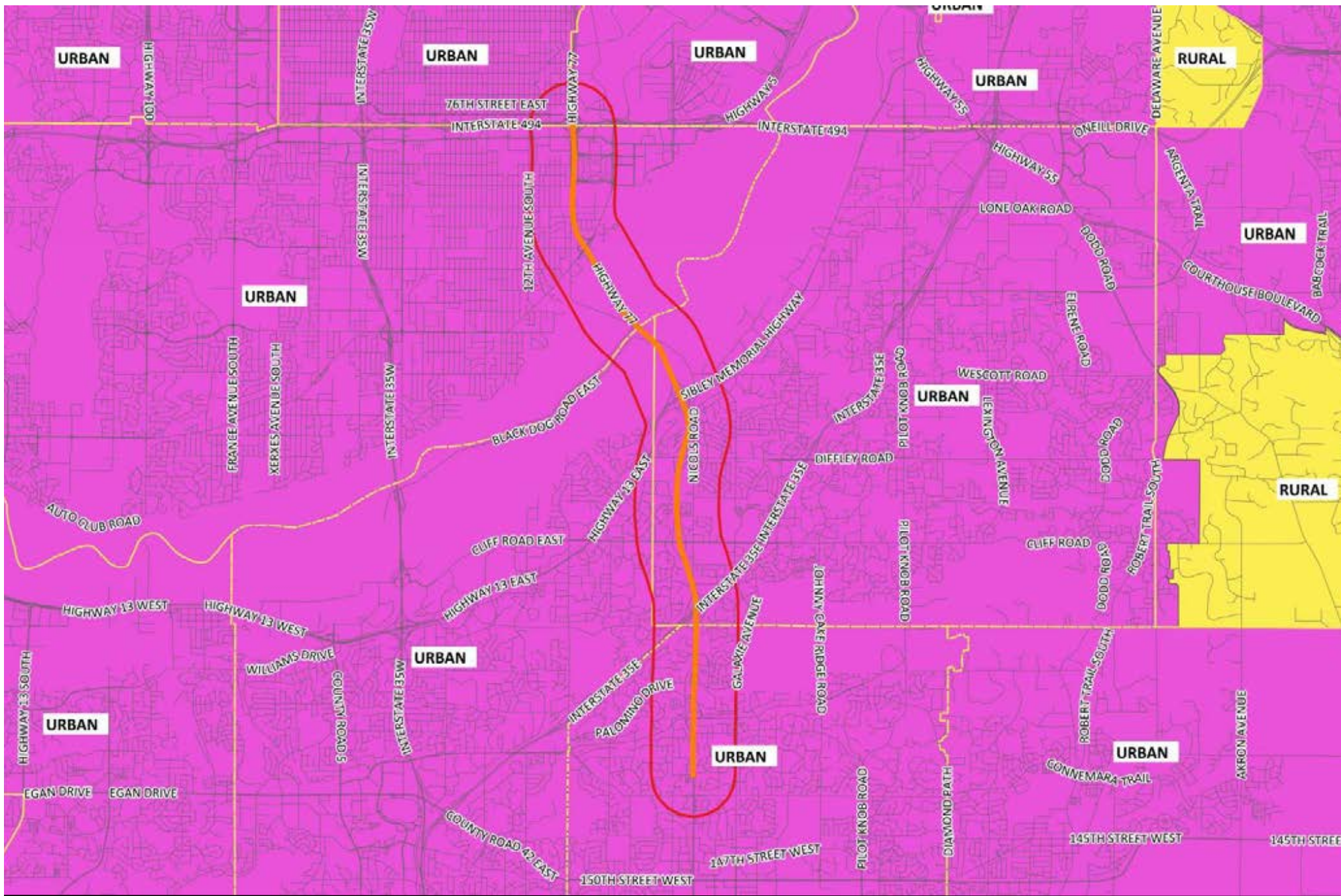


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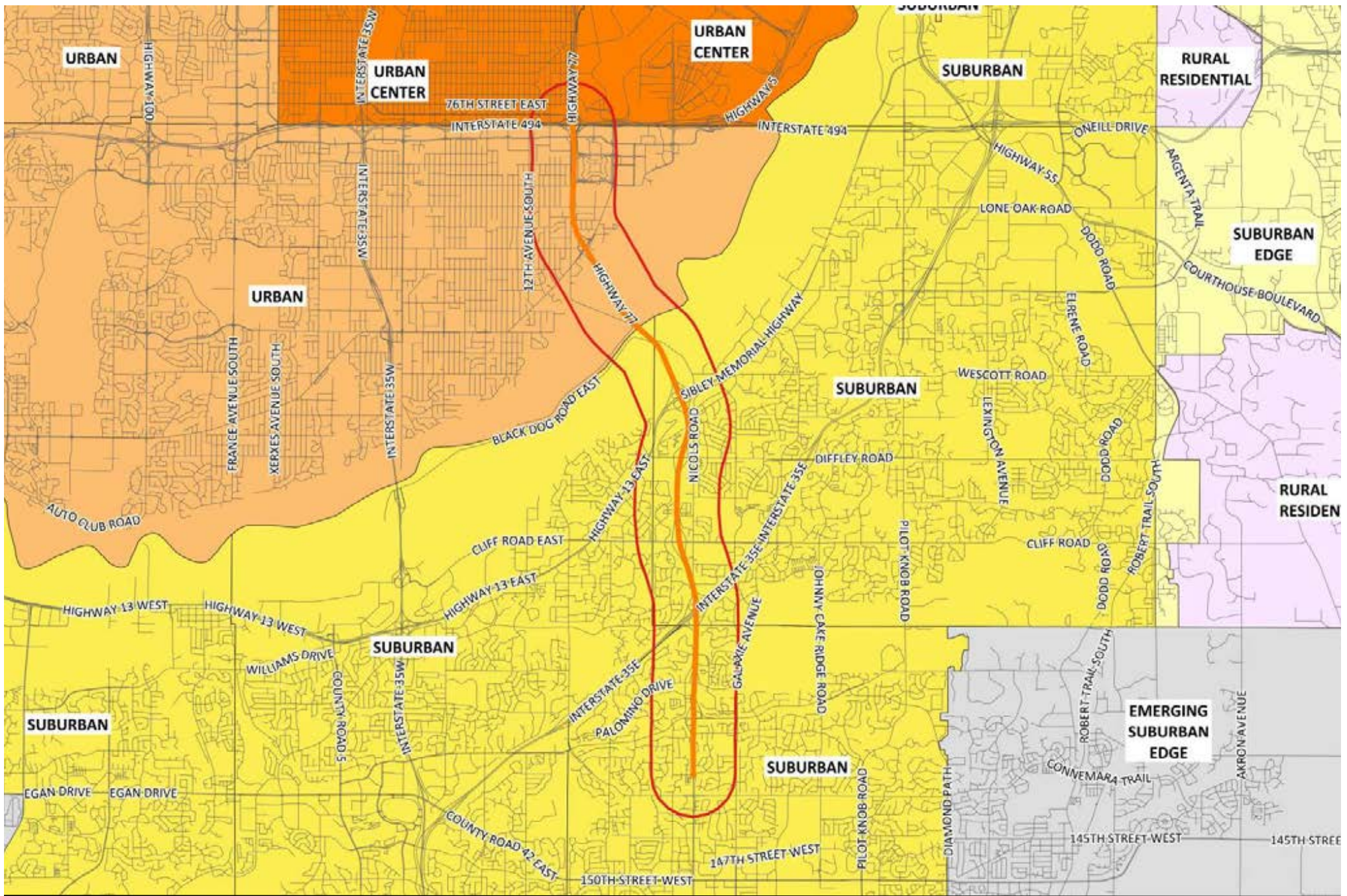
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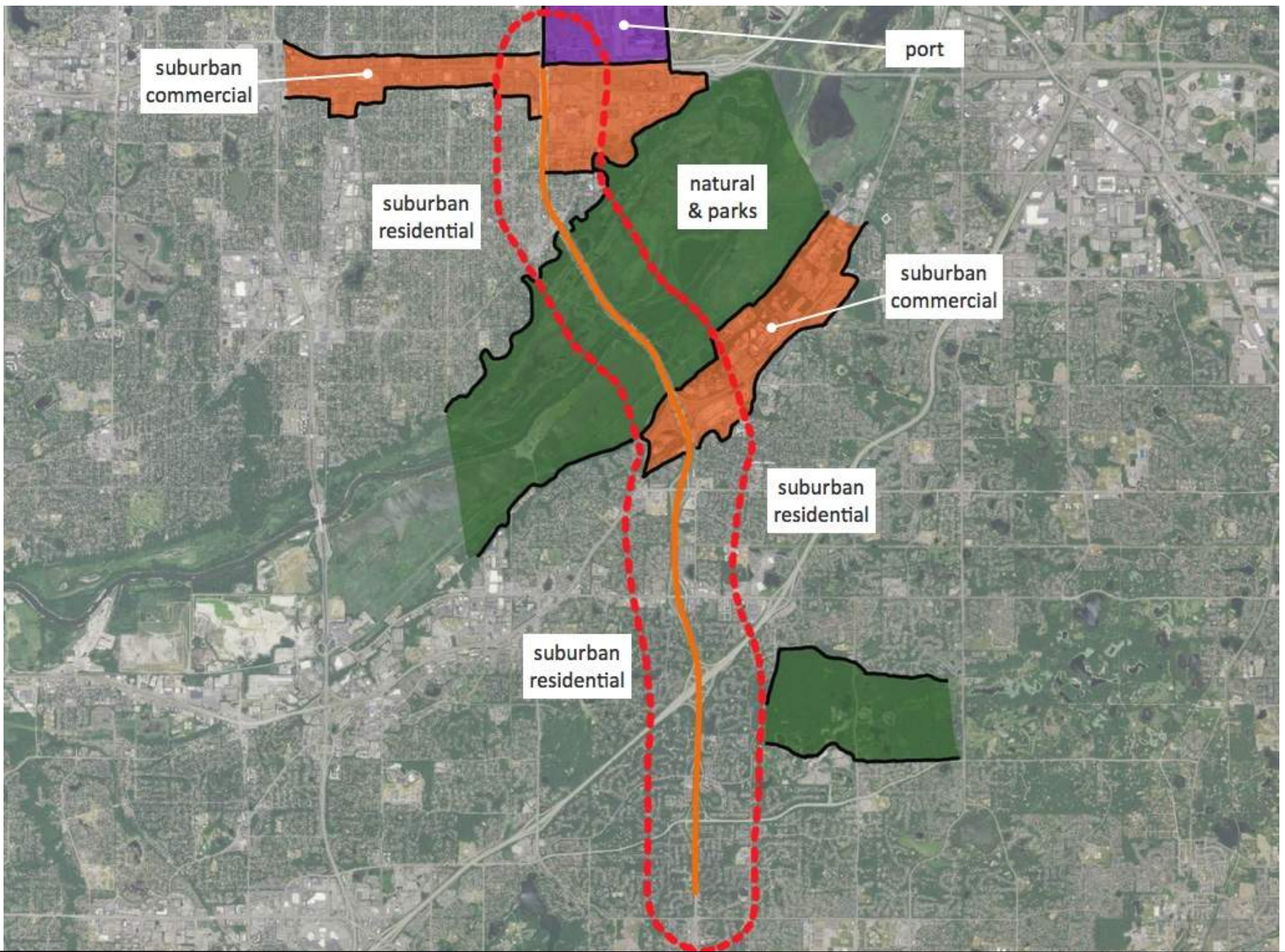
Congestion Analysis Handbook
 Example Corridor: TH 77

Figure 11
 Service Area Type



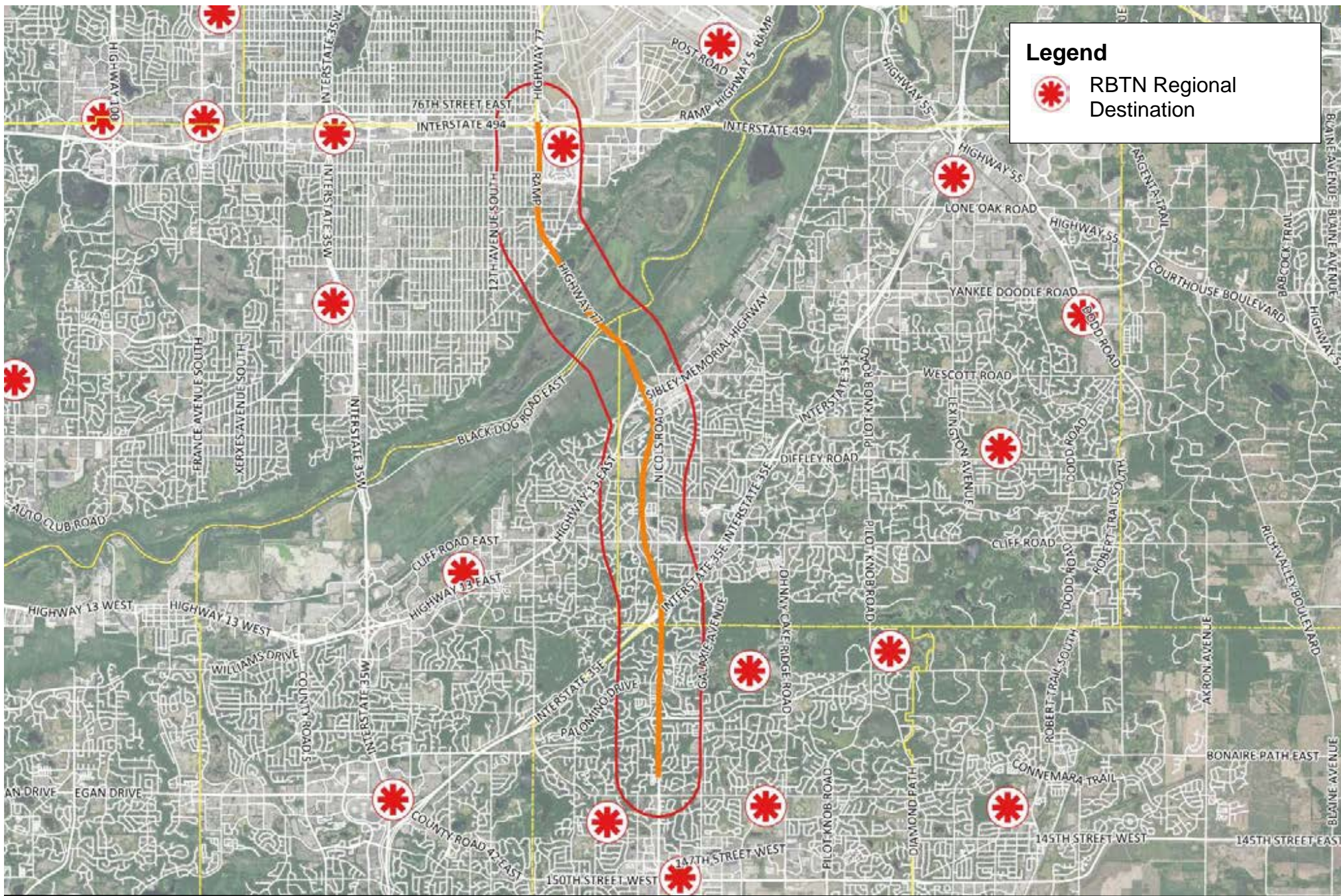
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 12
Community Designation



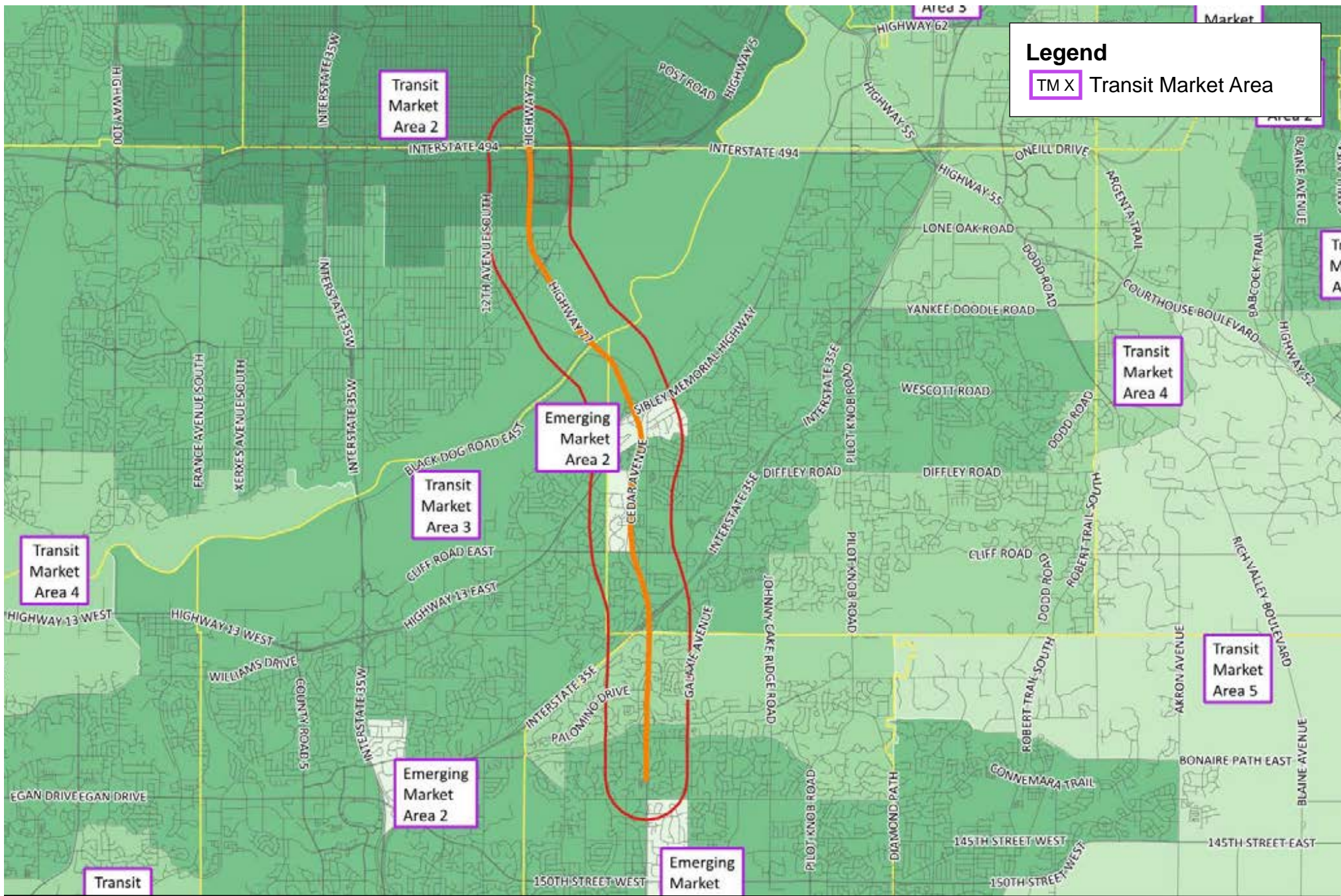
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 13
Context Zone



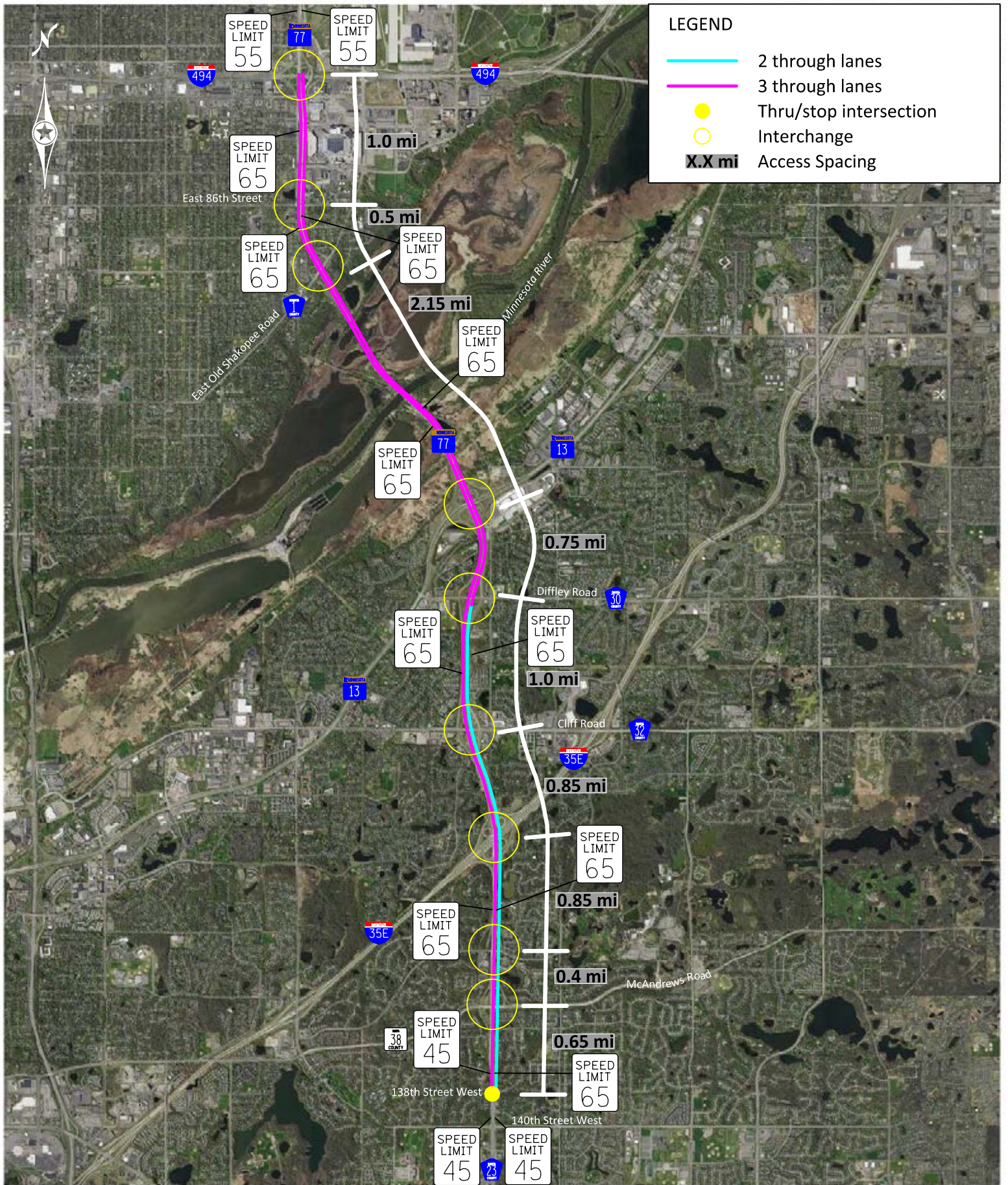
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 14
Walk/Bike Origins and Destinations



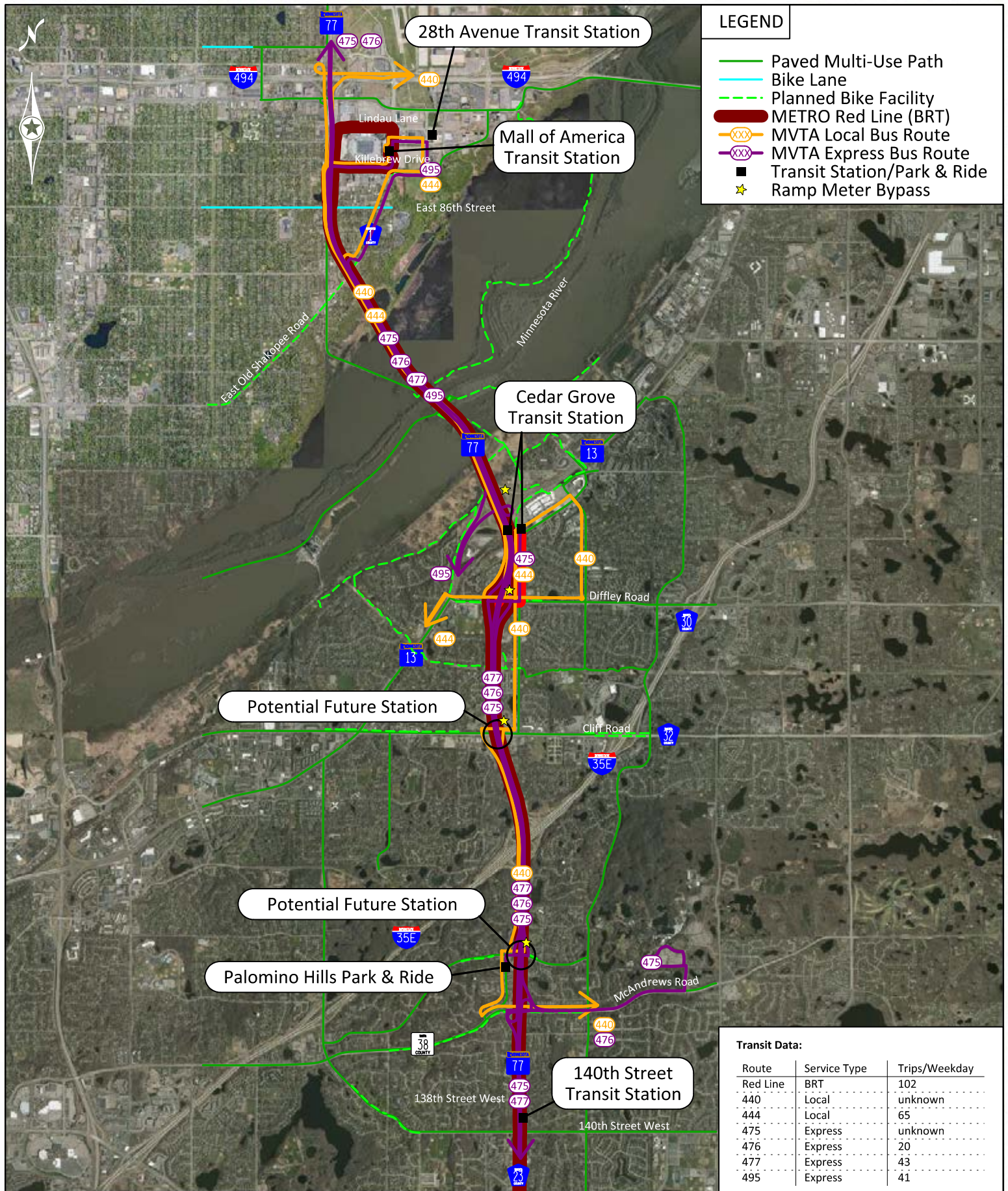
Congestion Analysis Handbook
 Example Corridor: TH 77

Figure 15
 Transit Market Area



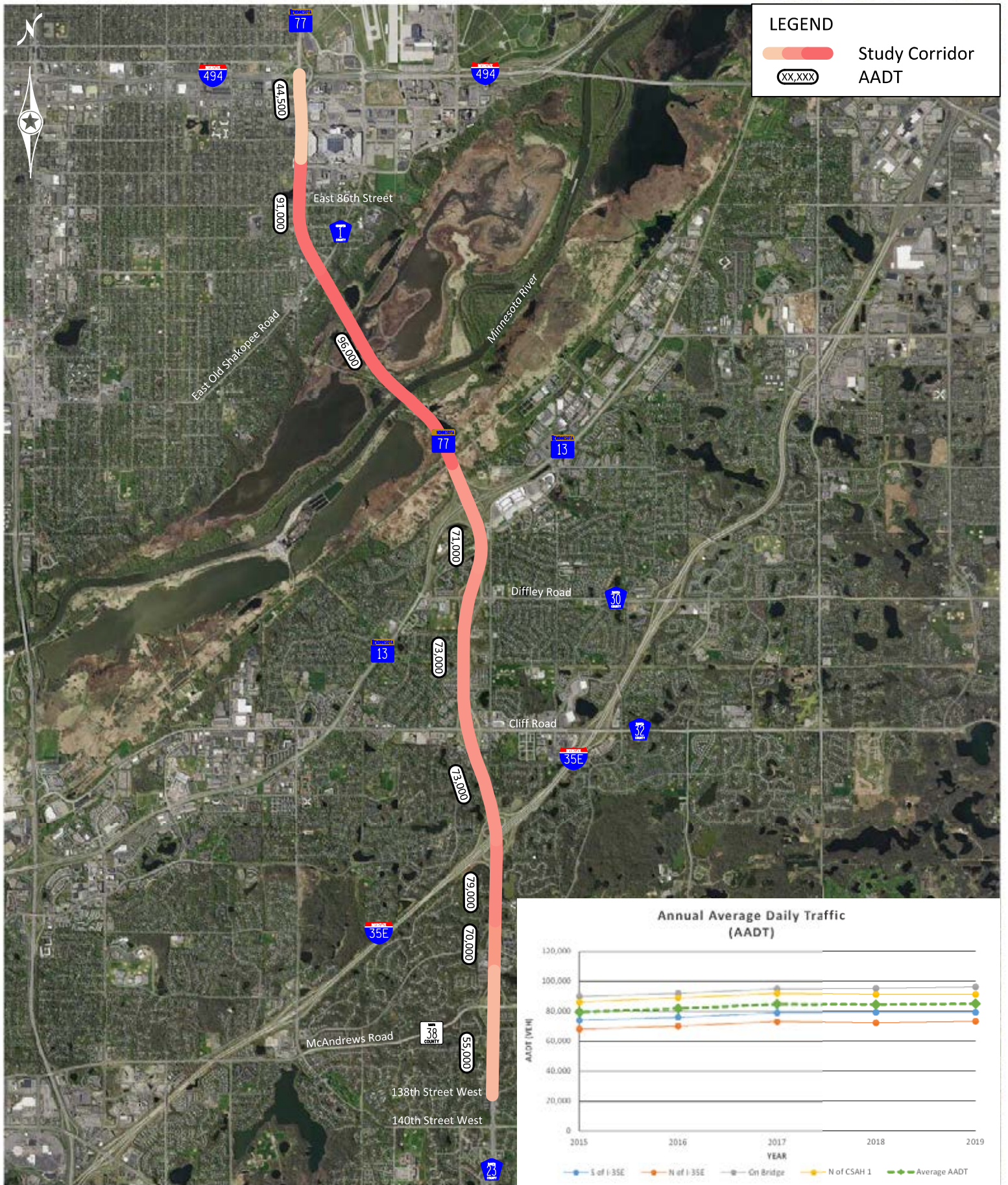
Congestion Analysis Handbook
Example Corridor: TH 77

Figure 16
Roadway Features



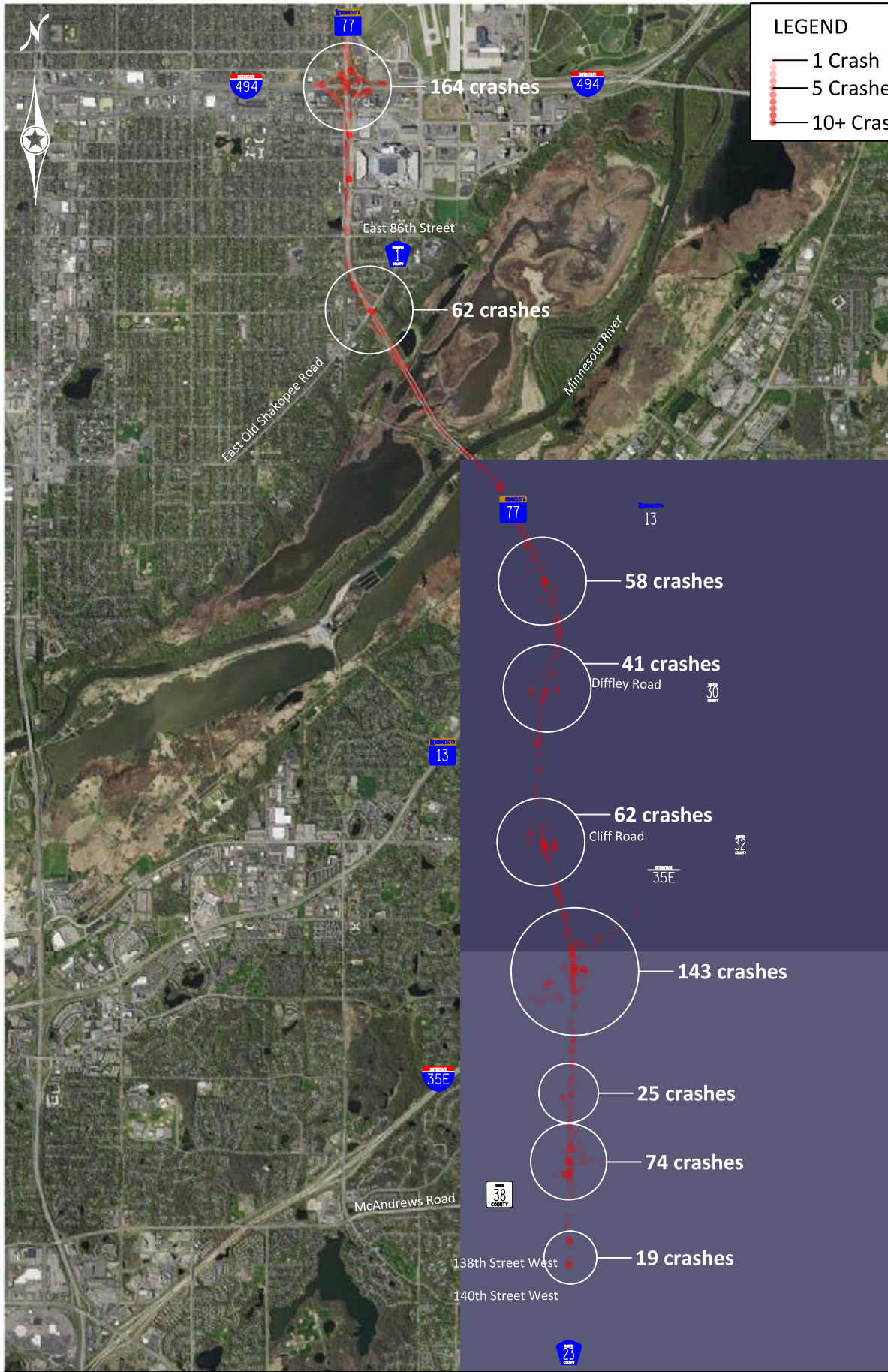
Congestion Analysis Handbook
 Example Corridor: TH 77

Figure 17
 Transit, Bicycle and Pedestrian Features



Congestion Analysis Handbook
 Example Corridor: TH 77

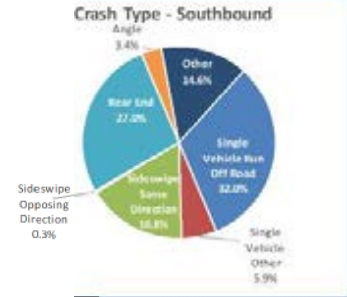
Figure 18
Traffic Volumes



LEGEND

- 1 Crash
- 5 Crashes
- 10+ Crashes

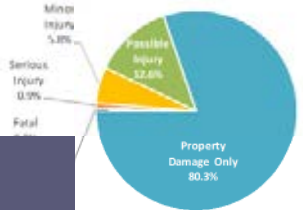
Note: 5-year crash data (2015-2019) obtained from MnCMAT2. Includes all crashes on TH 77 and adjacent ramps.



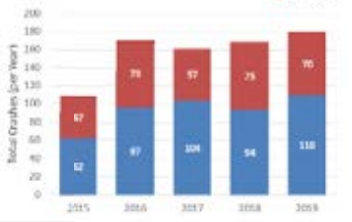
Sideswipe Opposing Direction 0.4%

Minor Injury 5.3%
 Serious Injury 0.6%
 Fatal 0.0%
 Uninjured 0.0%

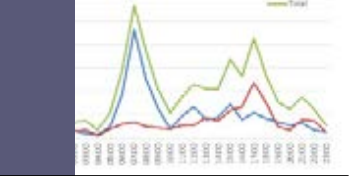
Crash Severity - Northbound



Total Crashes By Year



Crashes by Time of Day



Congestion Analysis Handbook
Example Corridor: TH 77

Figure 19
Crash History

Corridor Analysis Summary

DAKOTA COUNTY STATE AID HIGHWAY 46 (CSAH 46): 1,300 FEET WEST OF GENERAL SIEBEN DRIVE TO TRUNK HIGHWAY 61

Introduction

This document contains the results of the congestion and characteristics analysis produced following the Congestion Analysis Handbook. The assessment results are summarized in text below in three sections: People and Equity, Land Use, and Transportation. The text is supported by maps and other graphics illustrating each primary data item collected.

Location

County State Aid Highway 46 (CSAH 46) between 1,300 feet west of General Sieben Drive and Trunk Highway 61 (TH 61) is owned and maintained by Dakota County in the City of Hastings. The corridor is 2.4 miles long and is classified as a Minor Arterial. (Figure 1)

Assessment/Analysis

CONGESTION

The travel time index (TTI) ranges from 0.75 to 0.90 depending on the segment and direction. Duration of congestion ranges from 0.3 to 1.1 hours. Based on these measures, the corridor is not congested. However, there have been reports by the public of insufficient gaps to enter traffic and related safety concerns in addition to interest in improved pedestrian and bicycle facilities. For these and other reasons, we have chosen to proceed with this corridor analysis. (Figure 2)

PEOPLE AND EQUITY

Race and Ethnicity

According to Metropolitan Council data, census tracts in most of the corridor have 0-5% Black, Indigenous, or People of Color (BIPOC) populations and a small area at the east/northeast end of the corridor has 5-15% BIPOC populations. (Figure 3)

Implications: Local knowledge should be used to determine whether additional focused techniques and/or culturally-tailored approaches are needed to reach BIPOC populations in the corridor. Given the relatively low presence of BIPOC populations, development of additional or specific culturally-appropriate approaches may not be cost-effective for increasing engagement along this corridor.

Language Spoken

According to Metropolitan Council data, the corridor is in an area with 0-5% of residents with limited English language skills. (Figure 4)

Implications: Local knowledge should be used to determine whether additional focused techniques and/or culturally-tailored approaches are needed to reach BIPOC populations in the corridor. Given the relatively low presence of residents with limited English language skills, development of translations or other similar approaches may not be cost-effective for increasing engagement along this corridor. However, services should be made available upon request.

People with Disabilities

According to Metropolitan Council data, the corridor is in an area with 5-15% of residents with disabilities. (Figure 5)

Implications: Accommodations should be provided to facilitate participation in corridor engagement from residents with disabilities. Additionally, local knowledge should be used to determine specific accommodations needed. During project development, consider the needs of people with disabilities when developing the configuration of the design options.

Concentrated Poverty and Affluence

According to Metropolitan Council data, the corridor is adjacent to, but is not located in a Regional Environmental Justice Area. The corridor is not in an Area of Concentrated Poverty. (Figure 6) The corridor is not in an area of Concentrated Affluence.

Implications: Further investigate potential issues regarding Environmental Justice near the corridor's eastern terminus.

Transit Dependence

According to US Census data, the corridor travels through Census Block Groups where transit-dependence in census block groups is either less than 1% or between 1% and 5%. (Figure 7)

Implications: Use of walking, biking and transit for transportation for residents along the corridor may be low. Investigate potential usefulness or interest in these options through community surveys and coordination with local planning initiatives (like the City's Comprehensive Plan, its Bicycle and Pedestrian Plan, and study for Vermillion Street (TH 61).

Affordable Housing

According to Metropolitan Council data, there are 137 units of publicly subsidized rental housing units in census tracts within 1/2 mile of the corridor, an average of 60 subsidized units per corridor mile. (Figure 8)

Implications: The number of publicly subsidized rental housing units in close proximity (within a ten-minute walk) of this corridor appears to be low. While potentially important on an individual basis, the needs of public housing residents may not be a determining factor when selecting potential congestion mitigation measures.

Low-Wage Worker Household/Job Density

According to US Census 2010 LEHD Origin-Destination Employment Statistics (LODES), most of the corridor is not proximate to high concentrations of low-wage worker households. (Figure 9)

Implications: The concentration of low-wage worker households in close proximity (within a ten-minute walk) of this corridor is in the lowest or second to lowest category (0-2 or 2-4 worker households per acre) in the data provided. The needs of low-wage worker households may not be a determining factor when selecting potential congestion mitigation measures.

Workers and Economy

According to Metropolitan Council data, the total employment within 1/2 mile of the corridor is 3,092 jobs, an average of 1,346 jobs per corridor mile. Of the total number of jobs, 993 jobs are in Manufacturing and Distribution sectors. (Figure 10)

Implications: The concentration of jobs along and near (within a ten-minute walk) the corridor is low. Accommodating and facilitating access for workers (including lower-wage workers) within this corridor may not be a determining factor when selecting potential congestion mitigation measures.

LAND USE

Service Area Type (Urban/Rural)

The eastern end of the corridor is located within the Metropolitan Urban Service Area (MUSA). The western portion of the corridor is located within the Rural Service Area. (Figure 11)

Implications: Addressing congestion concerns through improving access to and operation of regional services, including transit and roadway investments, may not be appropriate given that one half of the corridor is located outside the Metropolitan Urban Service Area.

Community Designation

The eastern end of the corridor is in an “Emerging Suburban Edge” community. The western end of the corridor is within an “Agricultural” land use. (Figure 12)

Implications: Emerging Suburban Edge communities include cities and townships in the early stages of transition from rural to urban levels of development. Agricultural communities consist of areas with prime agricultural soils that are planned and zoned for long-term agricultural use. Metropolitan Council’s guidance for Emerging Suburban Edge communities is to “consider all users ... right from the start” and “include a more deliberate approach of designing infrastructure to the scale of people instead of the automobile.” Addressing congestion concerns at the eastern portion of the corridor should therefore first focus on non-roadway expansion approaches. Providing multimodal access for future development in the more westerly (“agricultural”) segment also should be considered.

Context Zone

According to the land use contexts described in MnDOT’s Technical Memorandum No. 18-07-TS-05, and starting from its western edge, the corridor travels through a “Rural” context for its first half, and then travels through a “Natural” context on its southern edge while a “Suburban Residential” context on its northern edge changes into an “Urban Residential.” Its eastern end is located in a “Suburban Commercial” context. (Figure 13)

Implications: The lack of destinations along the corridor’s extent (and a significant extent of agricultural uses) work against cost-effective transit service as a congestion mitigation option. However, walk/bike trails would help connect residents of the “Suburban Residential” zones to TH 61 / Vermillion Street where commercial activities are located and to the Vermillion River trail and adjacent areas for recreation. Most residents of the “Urban Residential” zone adjacent to TH 61 / Vermillion Street can already connect to it through the existing grid of streets.

Walk/Bike Origins and Destinations

According to Metropolitan Council data, there are no regionally significant bicycle transportation network destinations where people work, shop, recreate, or are entertained near the corridor. (Figure 14) Vermillion Linear Park is located along the eastern third of the project.

Implications: Observation of the corridor area indicates that shopping, employment, and transit destinations are located at its eastern end (at TH 61 / Vermillion Street). Vermillion Linear Park, an important local destination, is located adjacent and along the eastern third of the project. To mitigate congestion concerns and support access to these assets, consider improving access to walk and bike options along (and across) the corridor and connecting to TH 61 / Vermillion Street.

Transit Market Area

The corridor travels through transit markets 2, 4, and 5. (Figure 15)

Implications: Given the corridor's low orientation toward transit (transit markets 4 and 5), making transit investments along the corridor would not be cost-effective at this time. Its eastern terminus, however, located along TH 61 / Vermillion Street (transit market 2) could be a location where transit connections are facilitated. Walk / bike trails along the corridor could help transit users connect to service at TH 61 / Vermillion Street.

TRANSPORTATION

Roadway Features

CSAH 46 is 2-lane roadway with shoulder width between 5 and 9 feet. The speed limit varies from 55 miles per hour on the west end to 35 miles per hour on the east end. All intersections are through-stop controlled except for a signal at TH 61. The roadway does not meet Dakota County access spacing guidelines on the following segments: General Sieben Dr – Jorgen Ave, Village Trail – 31st St, Pine St – Walnut St, and Ashland St – TH 61. (Figure 16)

Implications: The change in roadway design from rural to urban reflects similar in changes in land use. However, it may result in inconsistent driver expectation, particularly eastbound as land use intensifies and the posted speed decreases. Intersection-level information would be needed to understand whether current stop-controls are adequate traffic control or if other options should be considered. Close access spacing may lead to congestion and safety issues.

Transit, Bicycle and Pedestrian Features

There is no sidewalk or trail on most of CSAH 46, except for the multi-use trail (generally on the south side) between Village Trail and the Vermillion River Bridge. A trail runs parallel to CSAH 46 between Pleasant Dr and TH 61, crossing the roadway beneath the Vermillion River Bridge. Sidewalks existing on some connecting roads. There is no transit along CSAH 46. (Figure 17)

Implications: There would appear to be demand for to complete the trail system along CSAH 46 to provide safe walking facilities between the river and the neighborhoods to the northeast and possibly connecting neighborhoods west of the river with the core area of Hastings.

Traffic Volumes

Traffic volumes range from 8,100 to 10,900 AADT. Over the last 10 years, traffic has been growing at a rate of 0.91%. (Figure 18)

Implications: Traffic volumes are within an acceptable range for the two-lane roadway design. Past growth does not immediately suggest the need for additional mainline capacity.

Crash History

The intersections at TH 61, General Sieben Dr, Jorgen Ave, and Pleasant Dr have had the highest number of crashes over the last 10 years, with rear end crashes being common (85% of all intersection crashes). right angle and left turn crashes are the next most common intersection crash types. Along segments, run off road and wildlife crashes have been common. (Figure 19)

Implications: The common rear end crashes are likely due to the close access spacing and lack of turn lanes and may also be impacted by congestion. As mentioned below, a common theme heard from the public was that motorists sometimes have difficulty finding gaps in traffic to turn onto CSAH 46, which may contribute to the right angle and left turn crash types. More specific review may be warranted to understand causes and implications of intersection and segment crashes.

PUBLIC INVOLVEMENT

The public involvement effort for CSAH 46 featured an online open house and comment map that allowed users to identify concerns with existing conditions. Common themes from this phase of involvement were a focus on safety as a top priority and traffic flow next. A lack of gaps in traffic, poor sightlines, lack of turn lanes or bypass lanes, traffic control, access management, and variation of road type were also common themes.

SUMMARY: CONTEXT AND PROBLEM STATEMENT

CSAH 46 is not congested by the segment-level TTI and LOS measures described above, but feedback from the public and local agency staff has shown a local concern about congestion, especially as it relates to speeds and finding gaps in traffic. Congestion at intersections is not included in this analysis but may indicate other needs and potential solutions. The change in speed and character of the road and multiple accesses and intersections suggests the need for a more uniform cross-section and potential improved access and intersection control. Crash history also is a concern.

Review of population characteristics and public involvement activities did not reveal large numbers of people who are transit dependent or have other transportation challenges related to poverty or other social challenges.

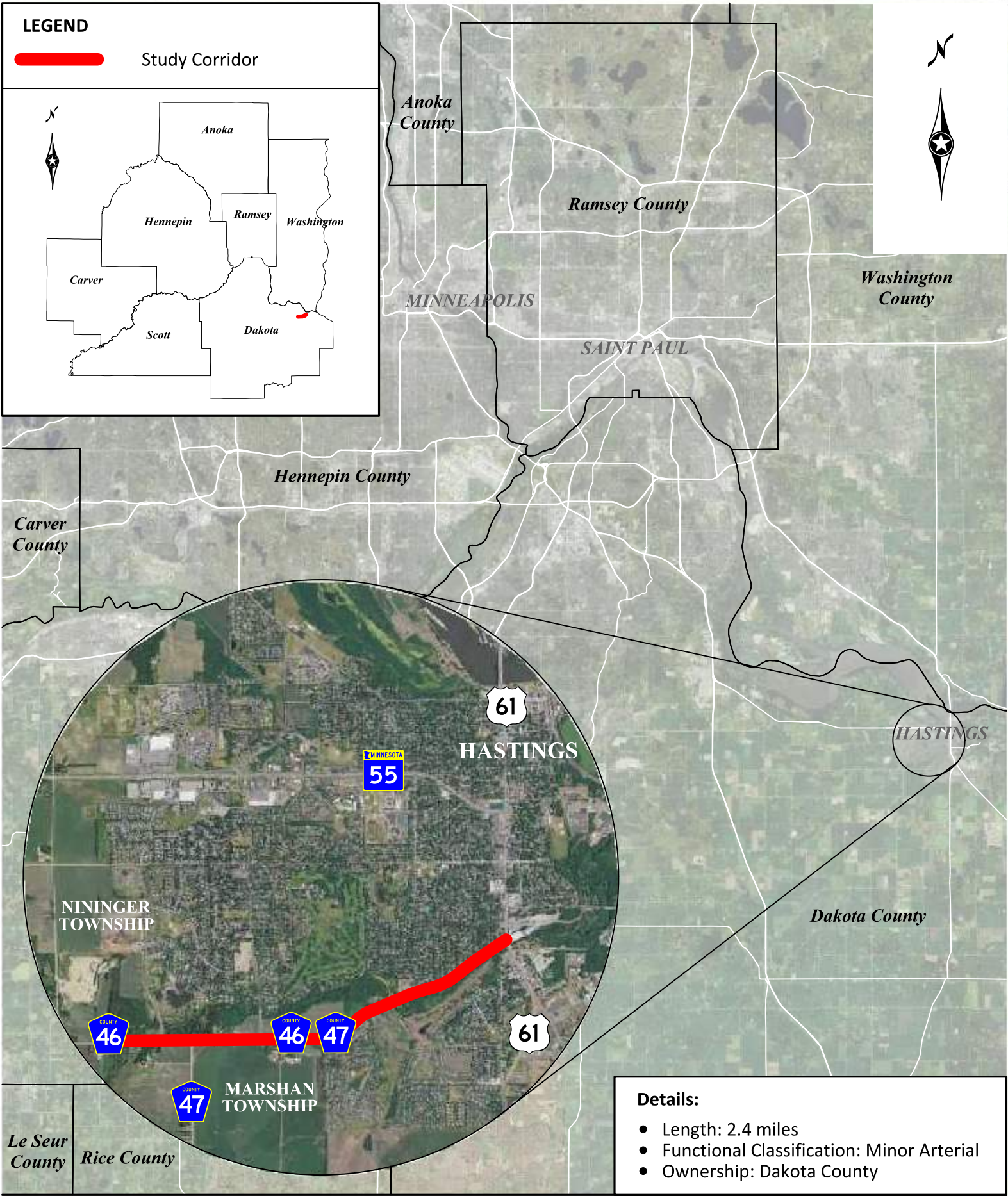
There appear to be potential needs and opportunities for improved bicycle and pedestrian facilities to improve access and safety along CSAH 46, between the adjacent neighborhoods and the TH 61 commercial area, and to provide better connections to the Vermillion River and associated open space.

STRATEGY REVIEW

The list of potentially applicable congestion management strategies was reviewed and each strategy rated for its ability to address the corridor needs to the extent data were available. A summary rating of each category is provided below. The complete assessment is provided in [Appendix C](#).

CSAH 46 Strategy Rating Summary


Category	Summary Rating	Notes
Travel Demand Management	Low	Adding pedestrian/bicycle facilities on CSAH 46 appears warranted to improve access, circulation and safety; could support removing some driving trips over time but not a major influence on congestion
Traffic Management Technologies	Low	While overall this category is not applicable to CSAH 46, two exceptions are 1) to implement improved access management and 2) to explore whether signal timing or related improvements are needed at the TH 61/CSAH 46 signal
Spot Mobility	High	Intersection improvements and turn lanes appear to be applicable strategies but should be considered within the context of the constrained right-of-way and concerns about speeding in the corridor
E-ZPass	n/a	E-ZPass is not applicable on CSAH 46
Strategic Capacity Enhancements	n/a	No need for additional mainline capacity identified

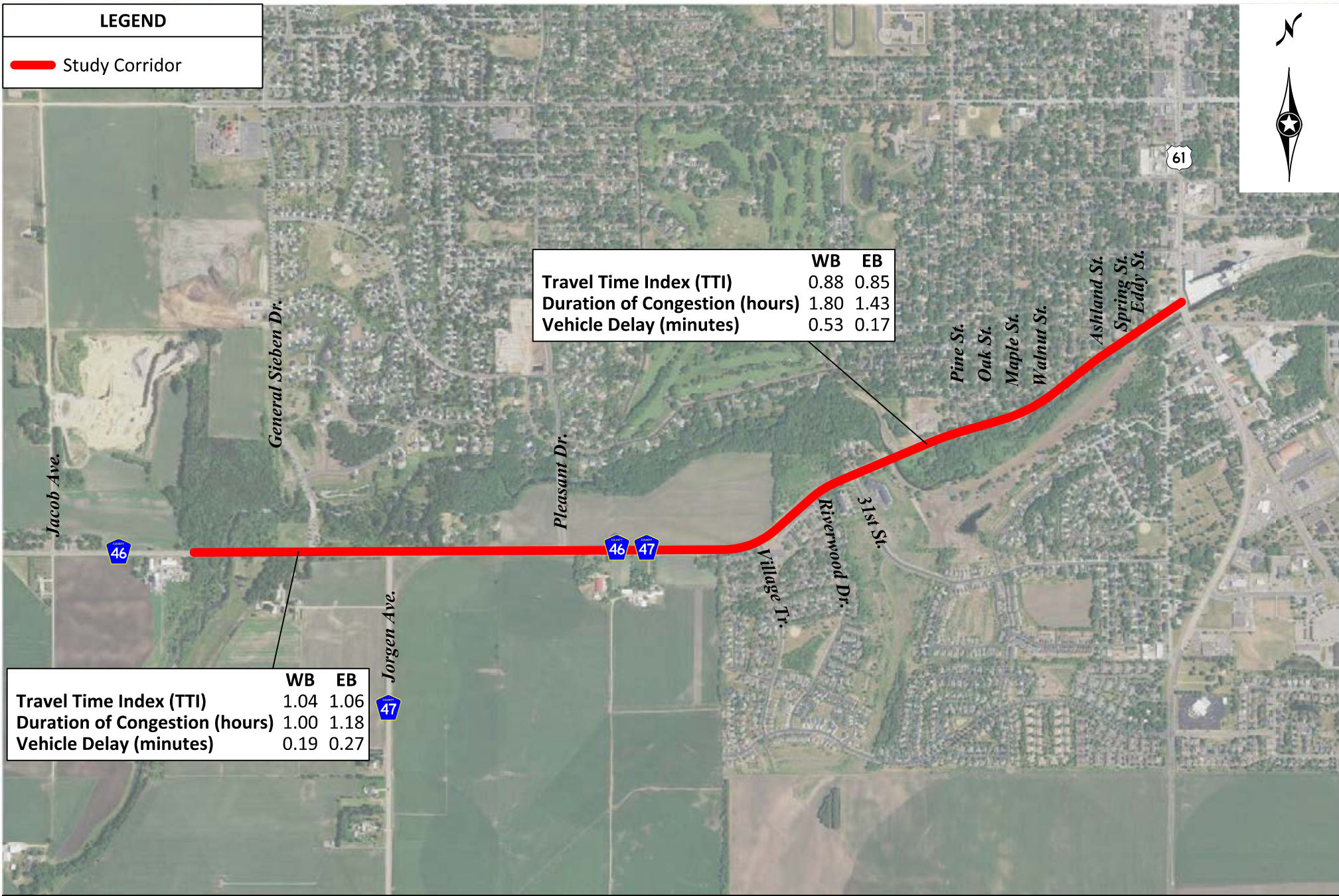


Congestion Analysis Handbook
 Example Corridor: CSAH 46

Figure 1
 Project Location

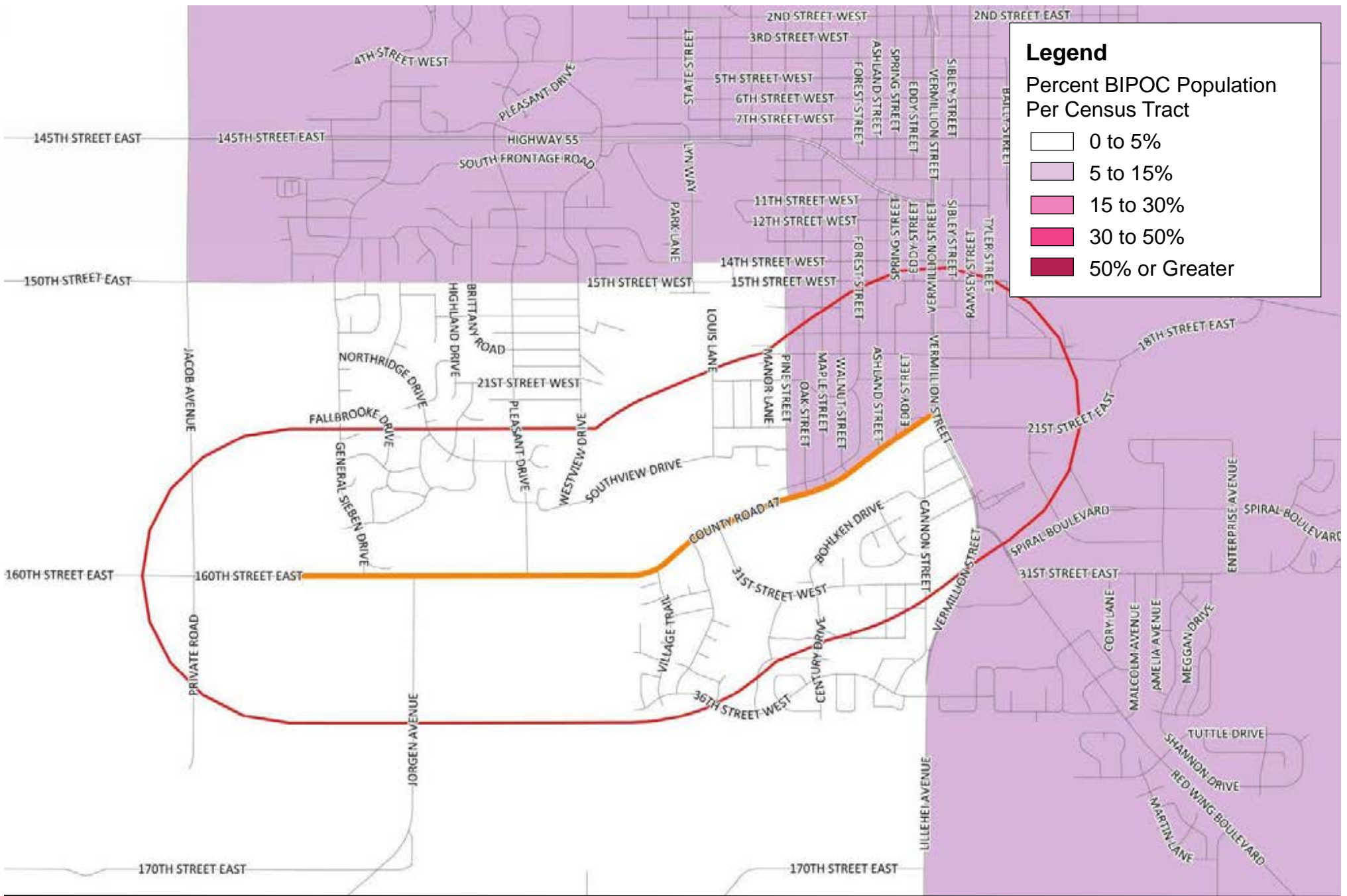
LEGEND

 Study Corridor



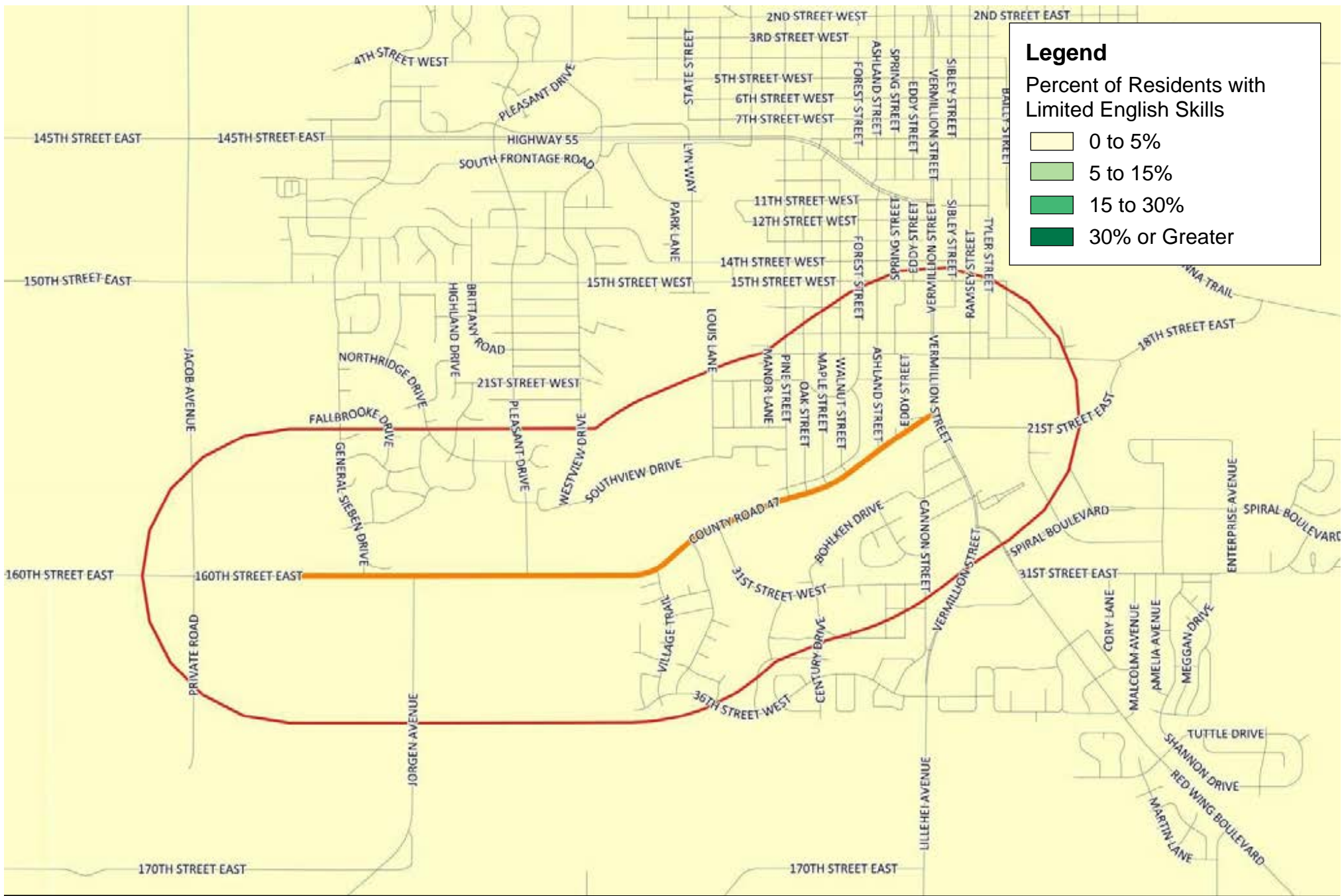
Congestion Analysis Handbook
 Example Corridor: CSAH 46

*Figure 2
 Congestion*



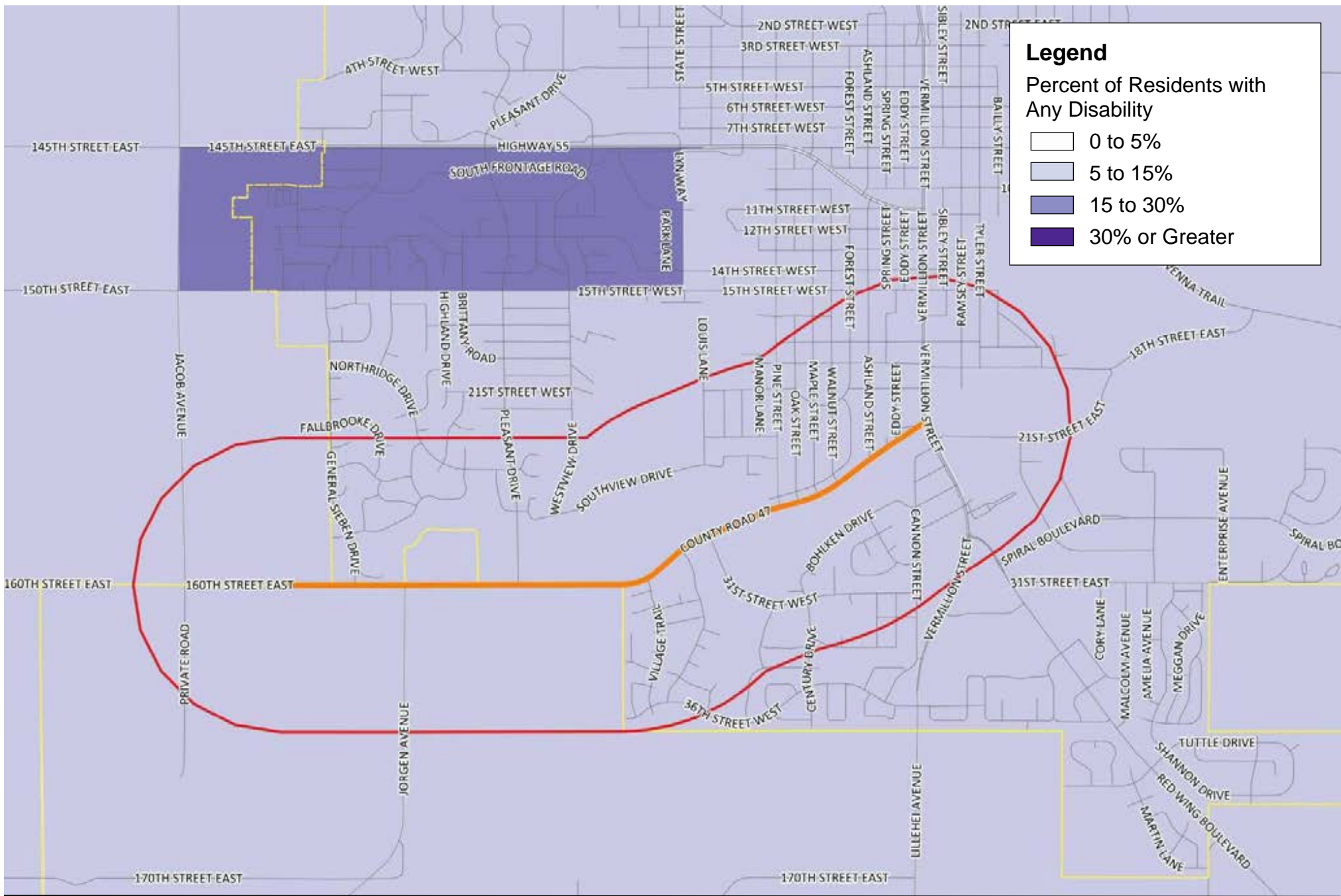
Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 3
Percent BIPOC Population



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 4
Percent of Residents with Limited English Skills



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 5
Percent of Residents with Any Disability

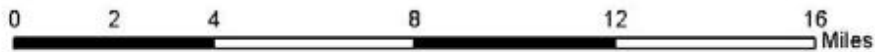
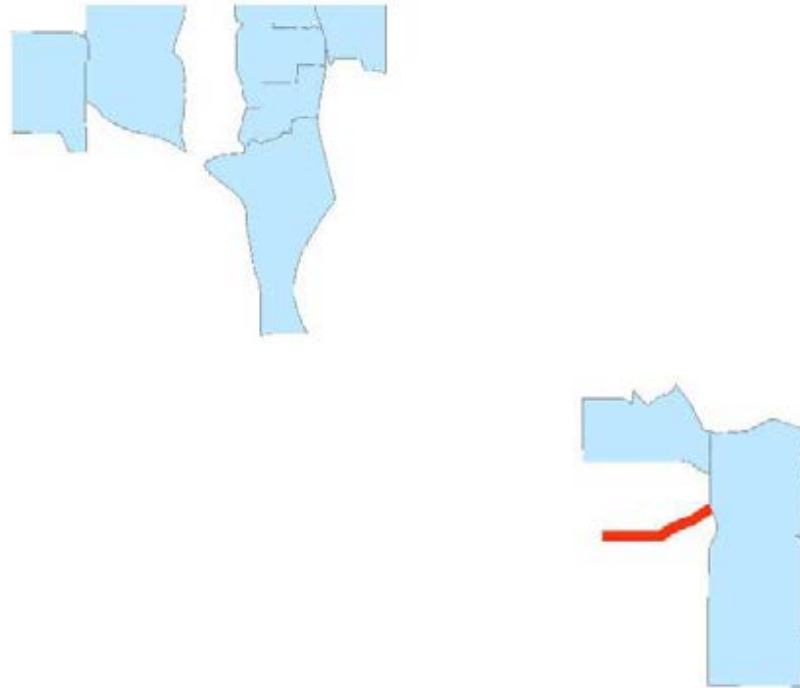
Socio-Economic Conditions

Pedestrian Facilities Project: CSAH 46 | Map ID: 1655799587750

Results

Total of publicly subsidized rental housing units in census tracts within 1/2 mile: 137

Project located in census tracts that are BELOW the regional average for population in poverty or population of color.

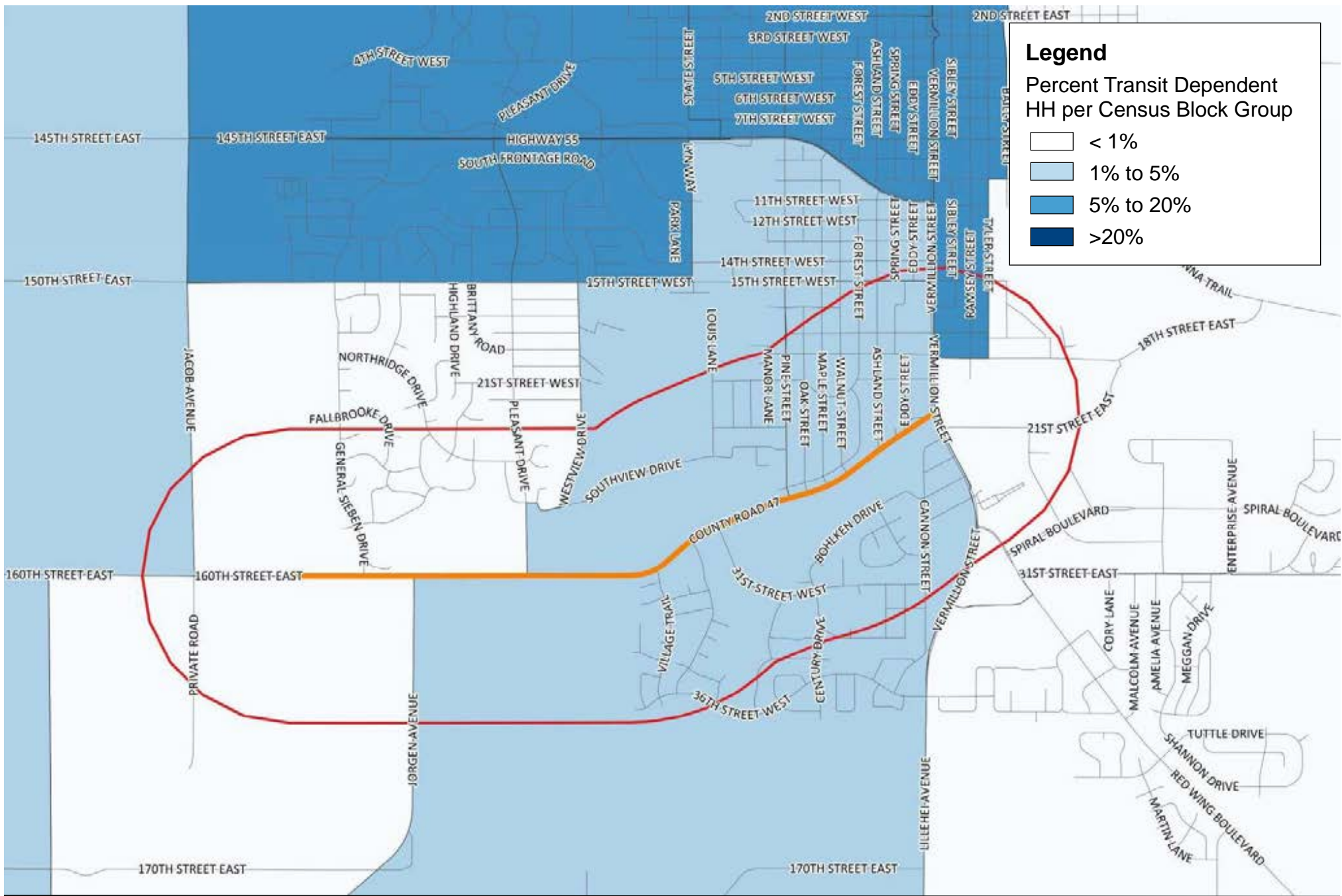


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LandscapeRSA2



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Congestion Analysis Handbook
 Example Corridor: CSAH 46

Figure 7
 Transit Dependence

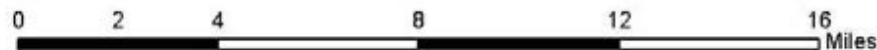
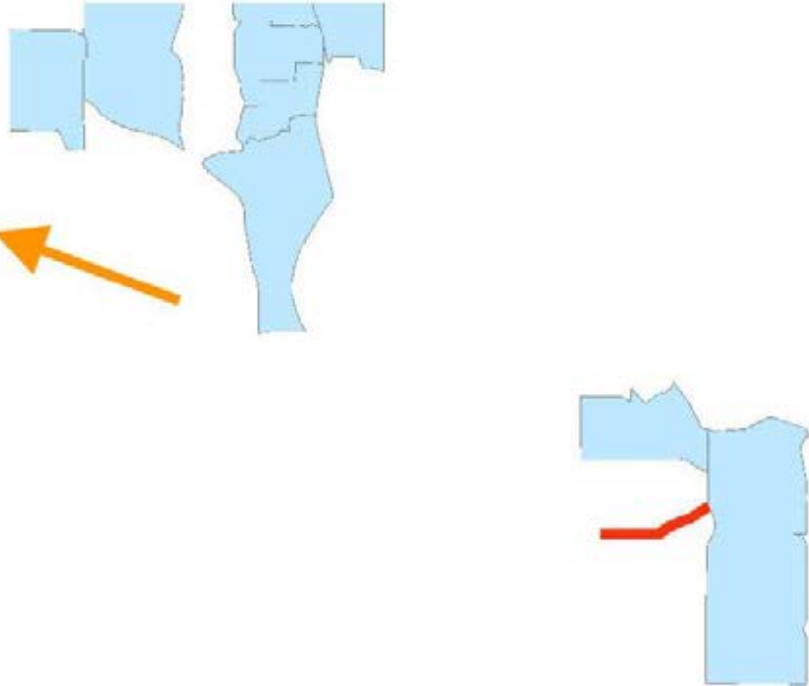
Socio-Economic Conditions

Pedestrian Facilities Project: CSAH 46 | Map ID: 1655799587750

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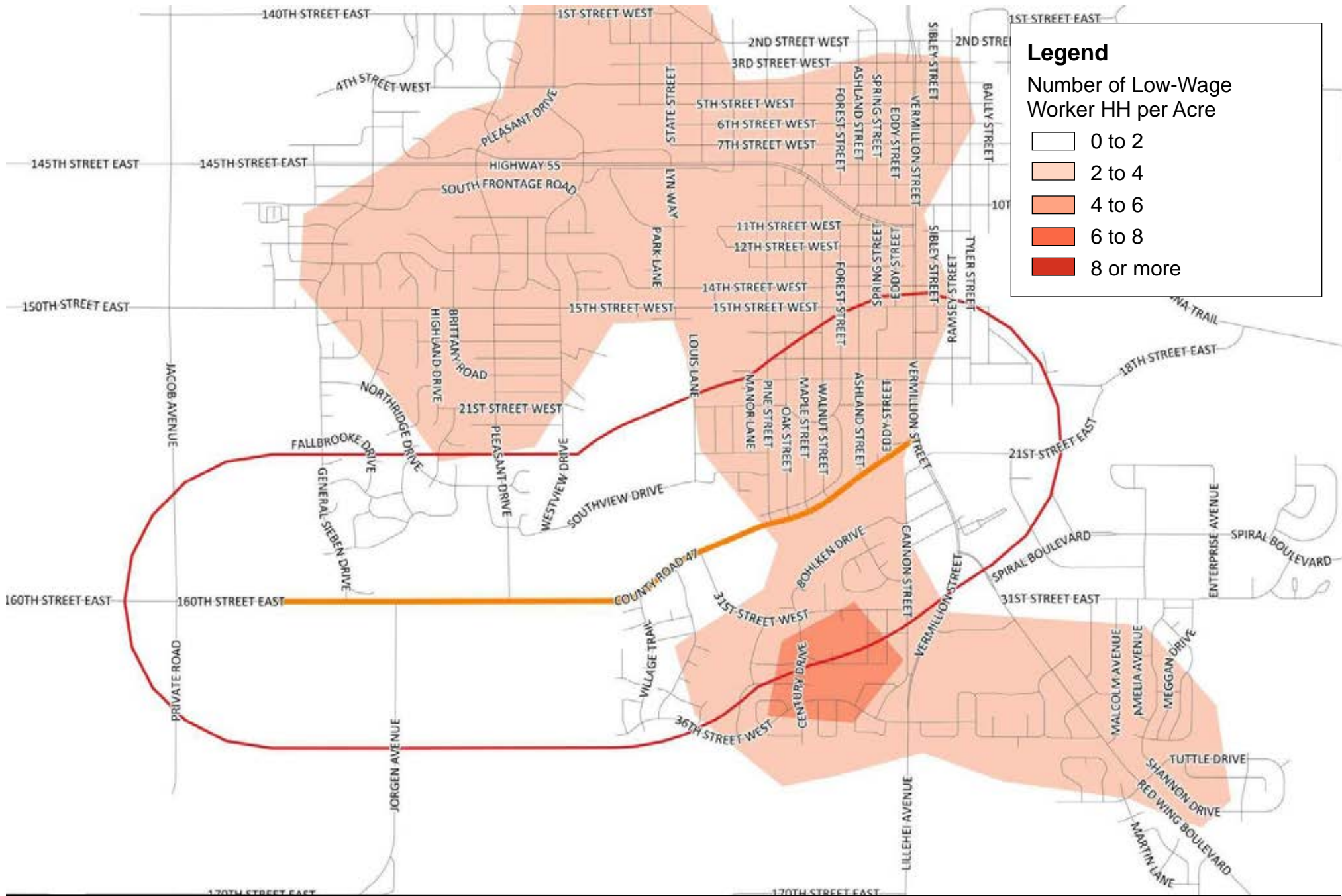


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Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 9
Low-Wage Workers

Regional Economy

Pedestrian Facilities Project: CSAH 46 | Map ID: 1655881013374

Results

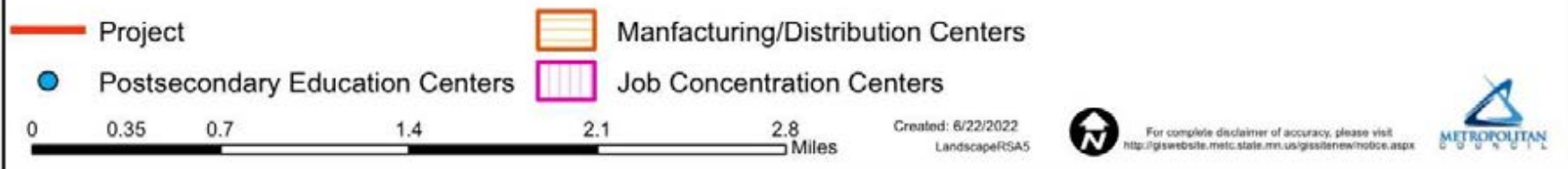
Within HALF Mi of project:

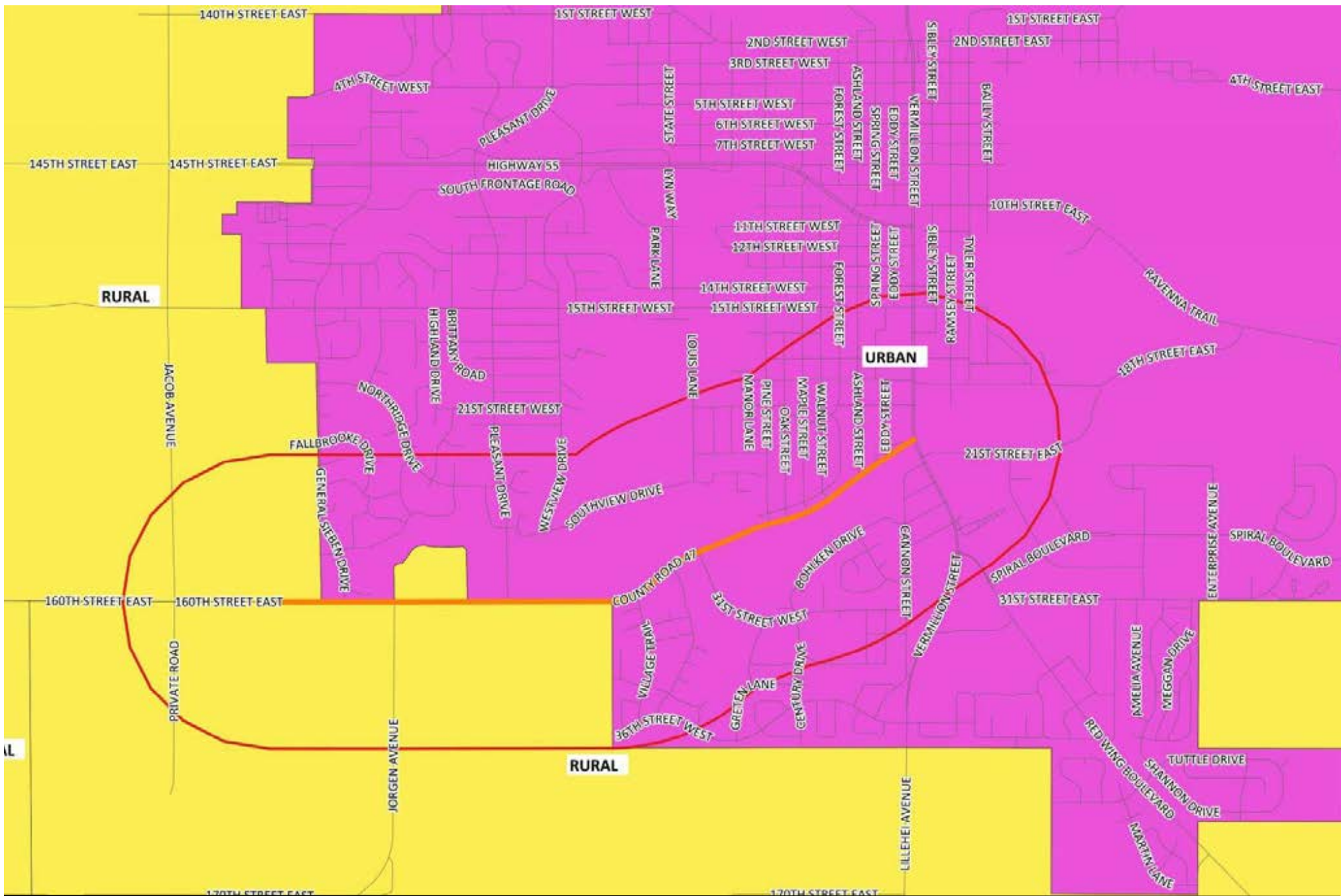
Postsecondary Students: 0

Total Population: 12265

Total Employment: 3092

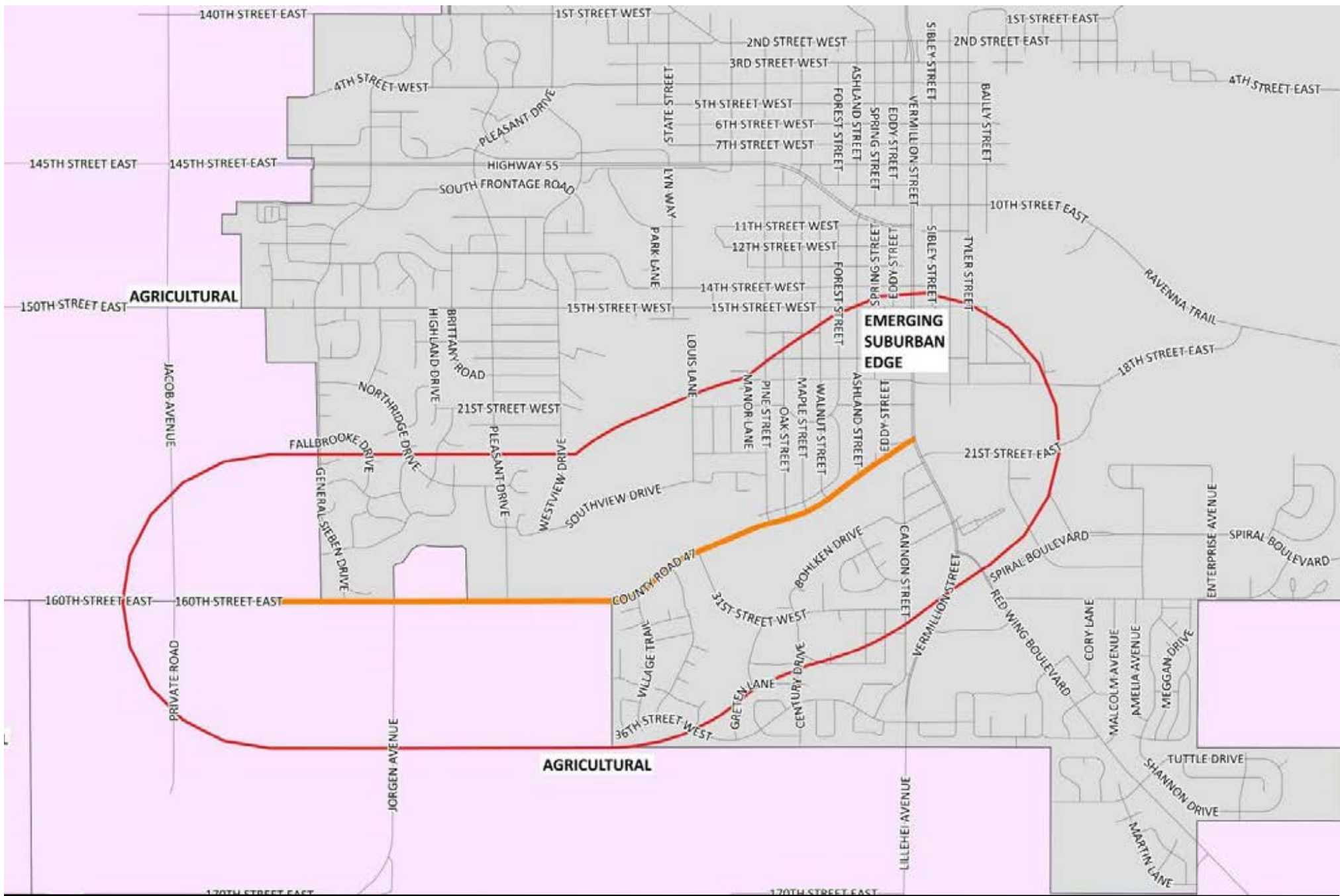
Mfg and Dist Employment: 993





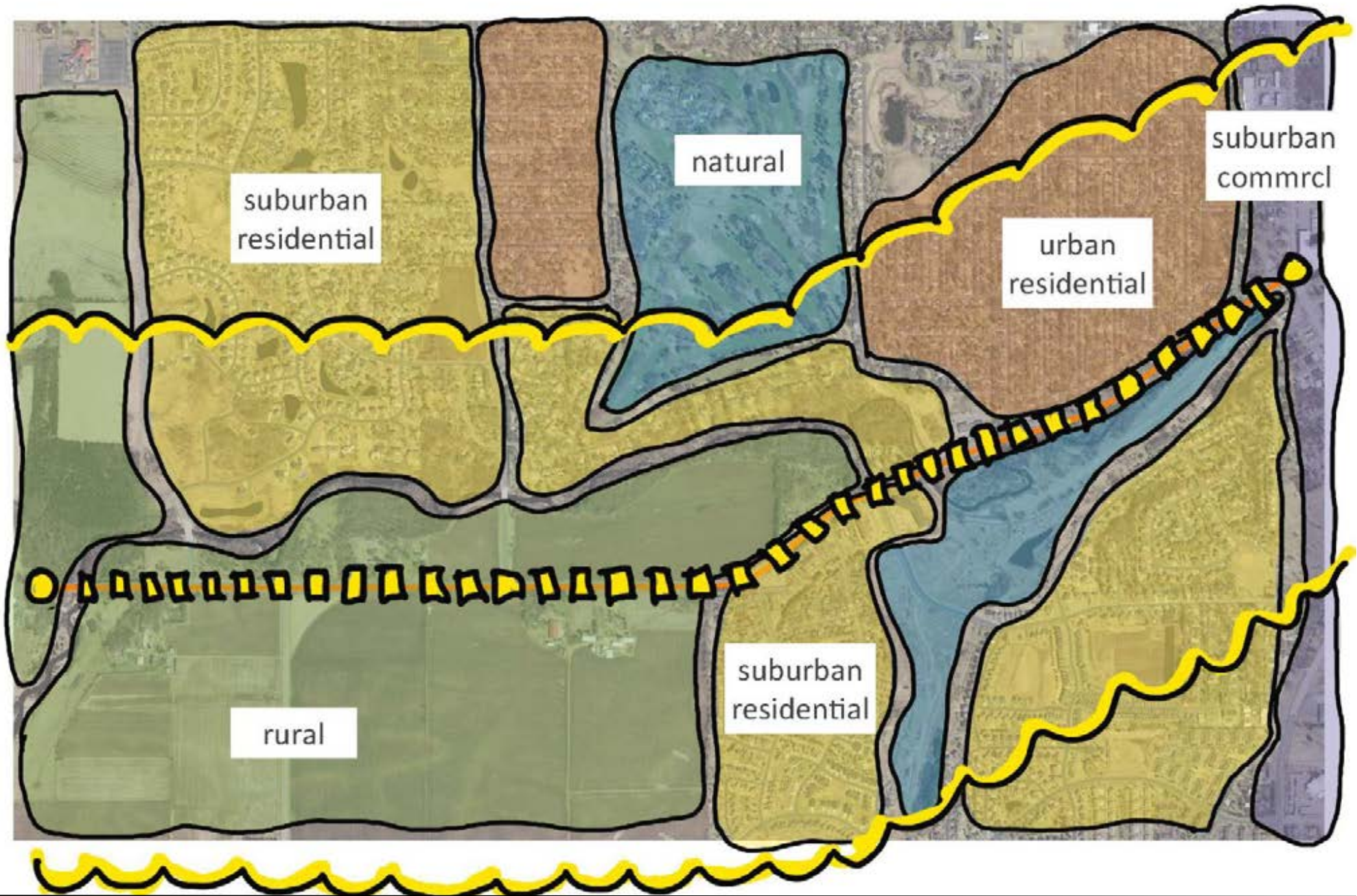
Congestion Analysis Handbook
Example Corridor: CSAH 46

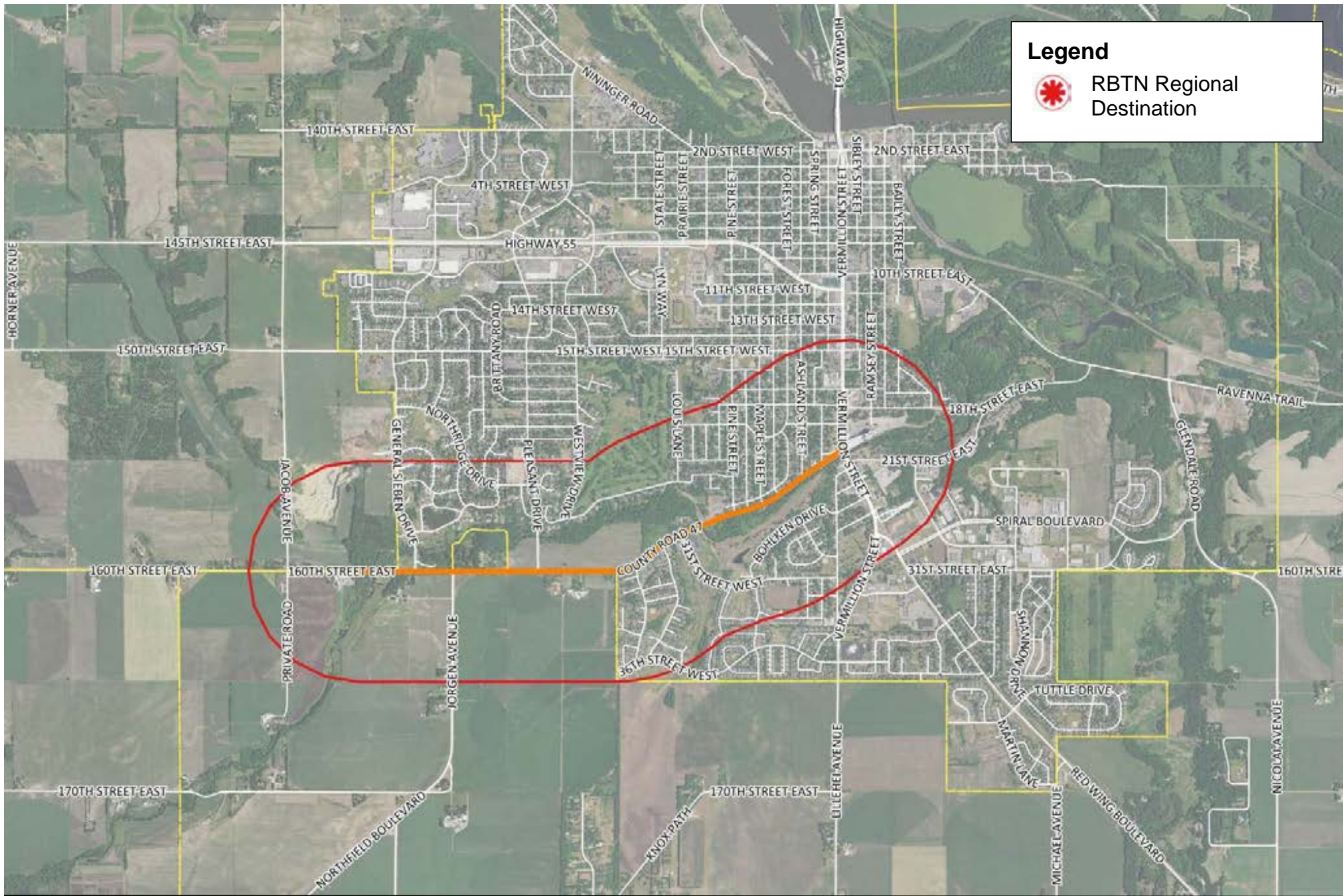
Figure 11
Service Area Type



Congestion Analysis Handbook
Example Corridor: CSAH 46

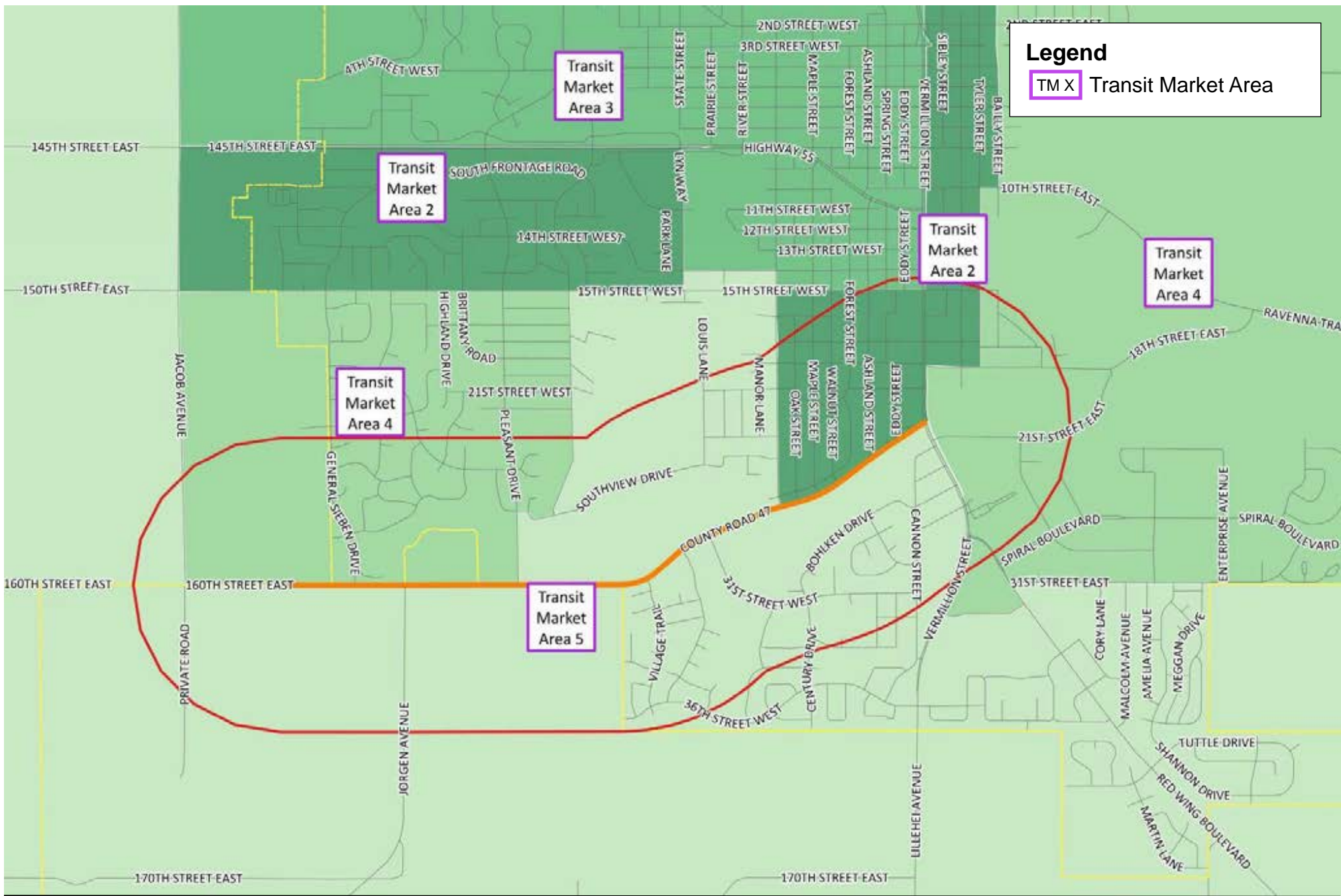
Figure 12
Community Designation





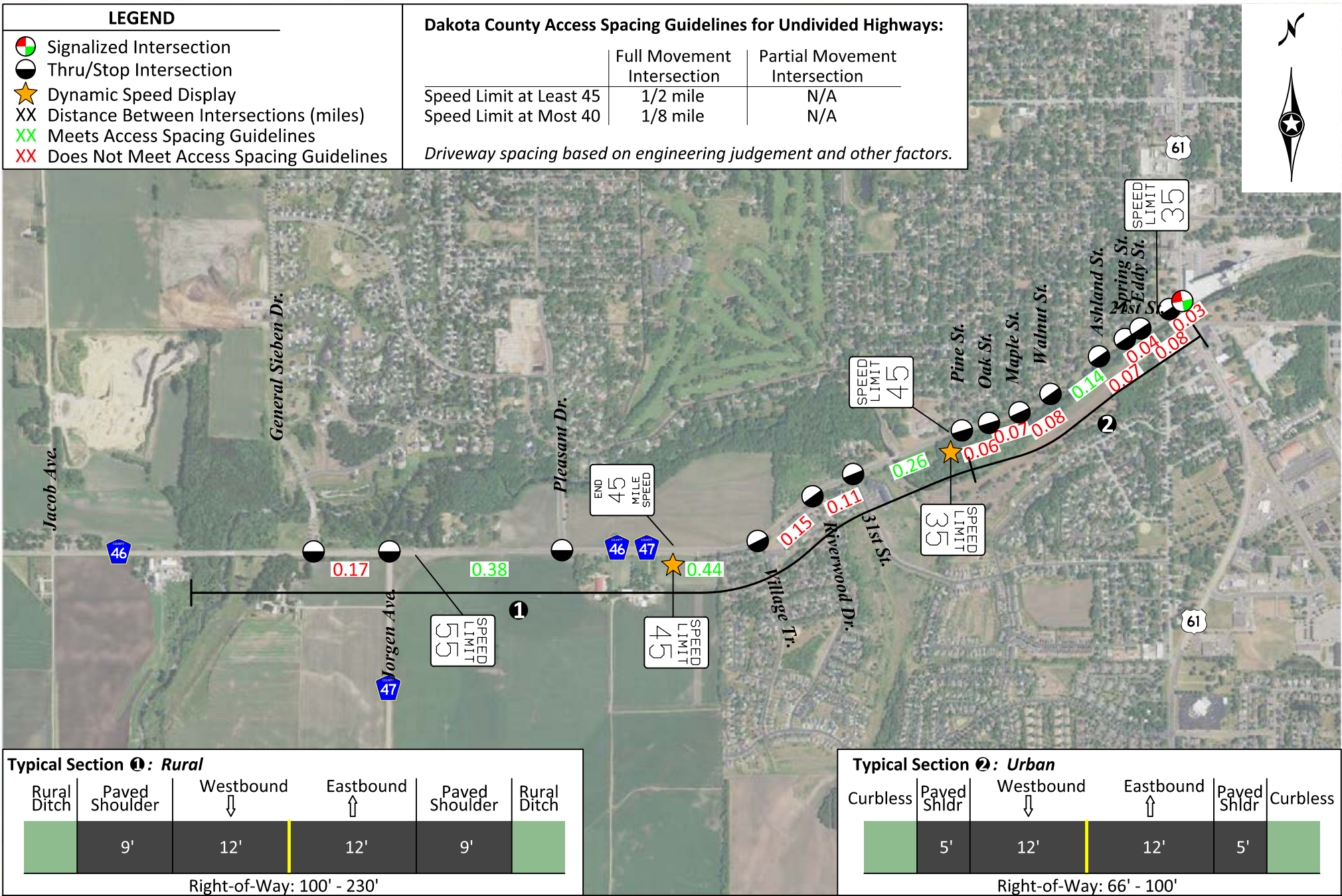
Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 14
Walk/Bike Origins and Destinations



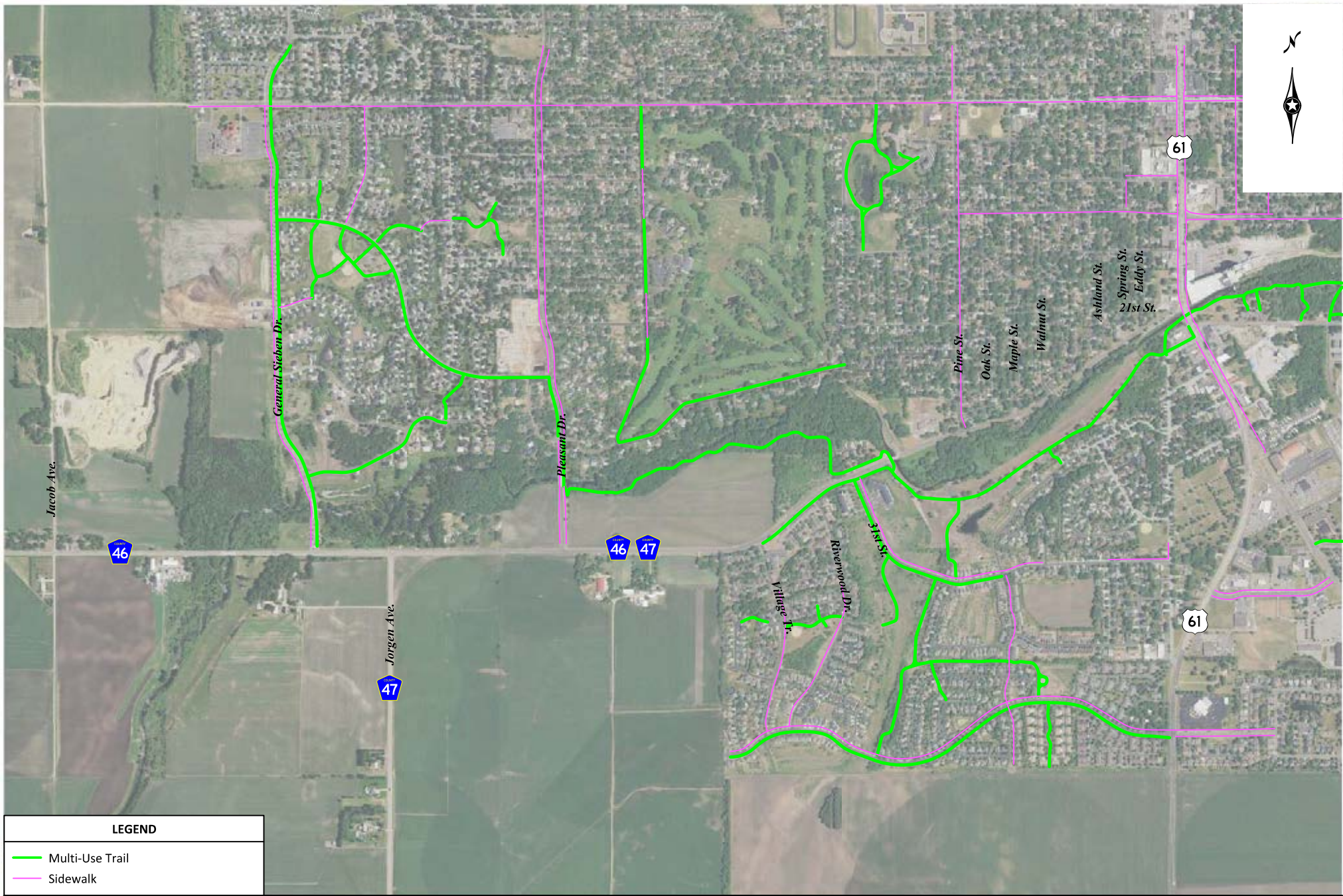
Congestion Analysis Handbook
 Example Corridor: CSAH 46

Figure 15
 Transit Market Area



Congestion Analysis Handbook
Example Corridor: CSAH 46



Figure 16
Roadway Features



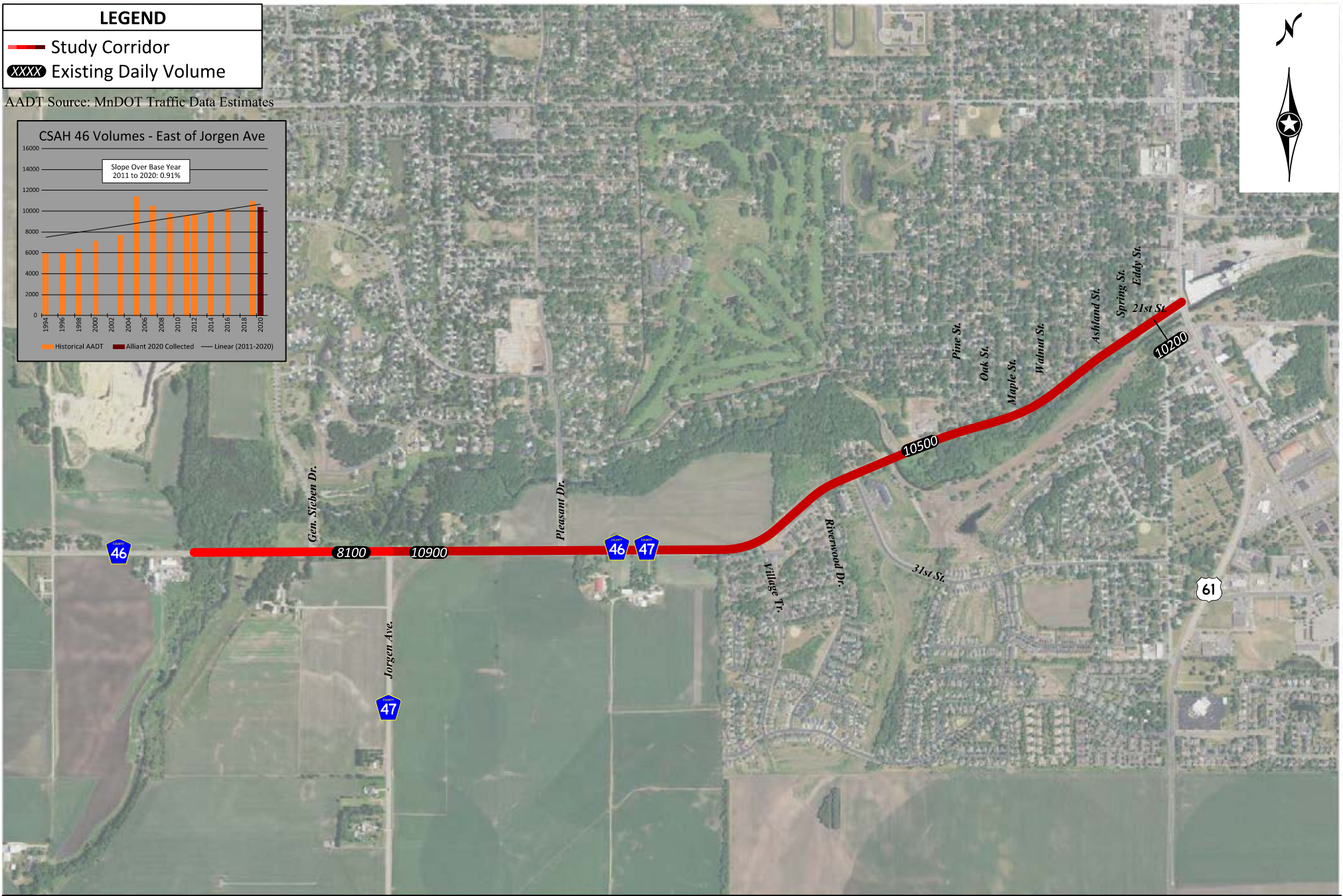
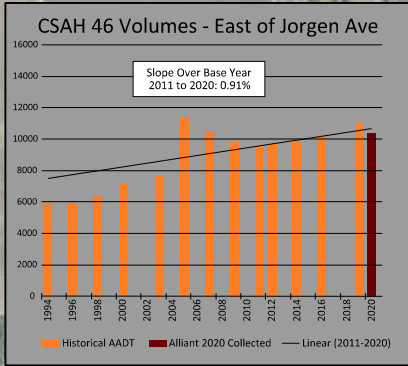
Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 17
Transit, Bicycle, and Pedestrian Features

LEGEND

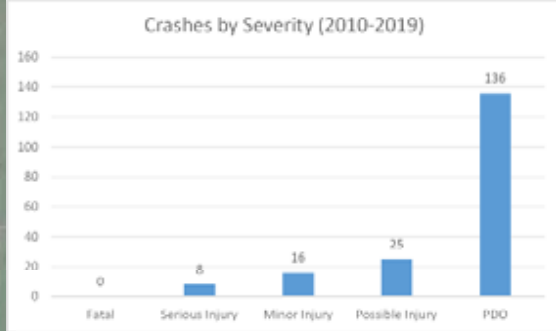
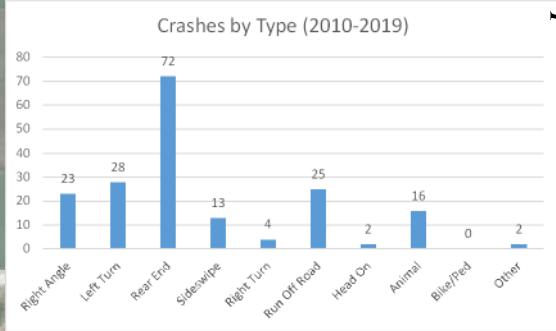
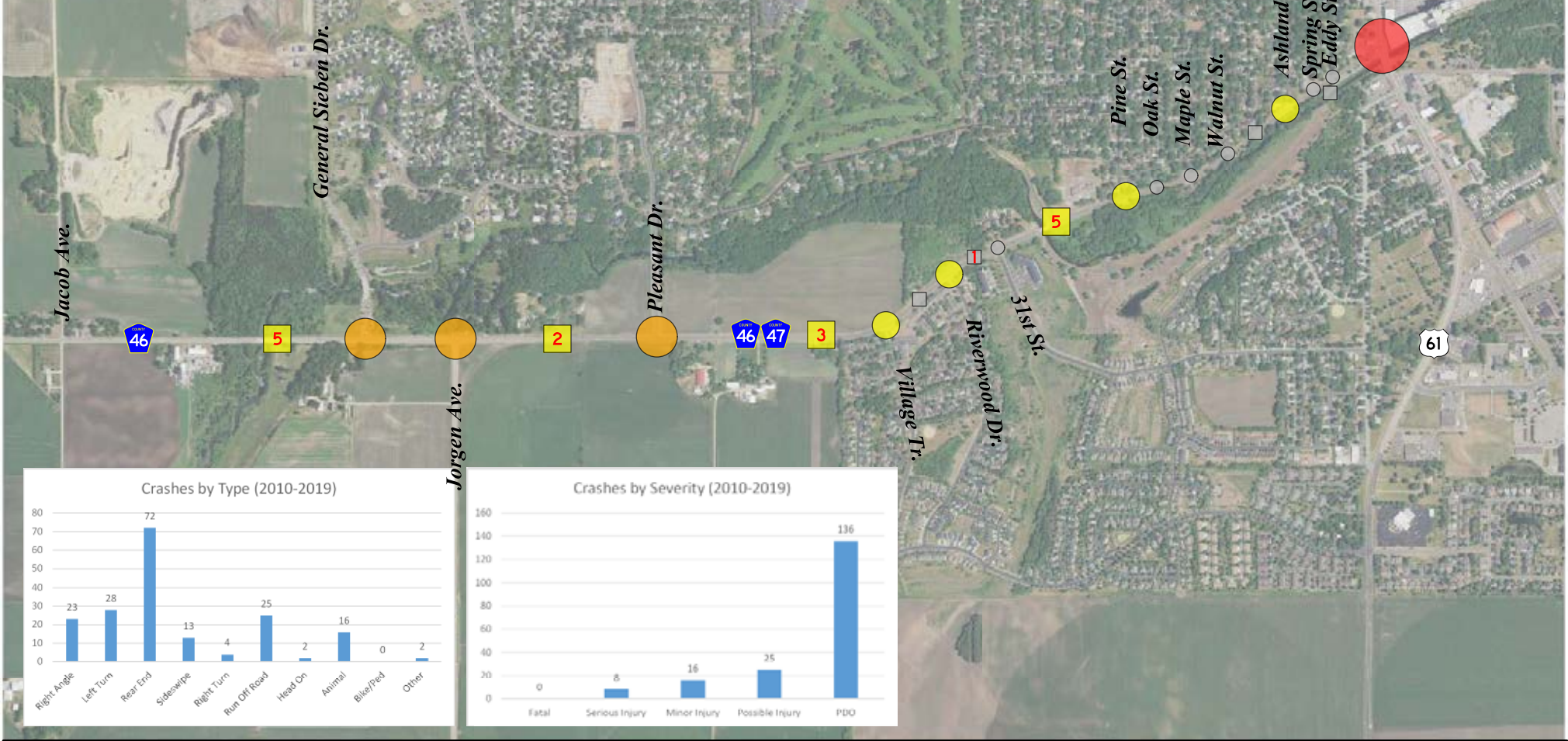
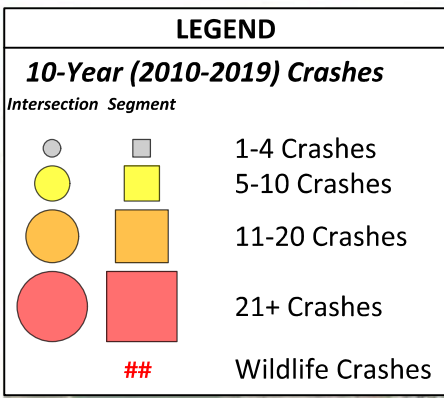
-  Study Corridor
-  Existing Daily Volume

AADT Source: MnDOT Traffic Data Estimates



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 18
Traffic Volumes



Congestion Analysis Handbook
Example Corridor: CSAH 46

Figure 19
Crashes

Corridor Analysis Summary

WEST BROADWAY AVENUE (HENNEPIN COUNTY ROAD 81): LOWRY AVENUE TO LYNDALE AVENUE

Introduction

This document contains the results of the congestion and characteristics analysis produced following the Congestion Analysis Handbook. The analysis results are summarized in text below in three sections: People and Equity, Land Use, and Transportation. The text is supported by maps and other graphics illustrating each primary data item collected.

LOCATION

West Broadway Avenue (Hennepin County Road 81) from Lowry Avenue to Lyndale Avenue is owned and maintained by Hennepin County. Portions of the road may be maintained by the City of Minneapolis. The corridor is 2 miles long and runs through the City of Minneapolis, with the Lowry Ave intersection at the border with the City of Golden Valley. It is classified as an A-minor Augmentor. (**Figure 1**)

CONGESTION SCREENING RESULTS

The TTI congestion screening result places the entire corridor at or just below the “Possibly Congested” category with AM and PM TTIs ranging from 0.99 to 1.02. Because of how close the TTI is to 1.0, this corridor is a good candidate for proceeding with the analysis. (**Figure 2**)

Assessment

PEOPLE AND EQUITY

Race and Ethnicity

According to Metropolitan Council data, most of the corridor is located in census tracts where greater than 50% of residents are Black, Indigenous, or People of Color (BIPOC). Toward the western end of the corridor, this number is 15-30% of the population. (**Figure 3**)

Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include the hiring or participation of community organizers or representatives from specific BIPOC communities. Consideration of specific culturally-appropriate communication approaches will be important for successful development of a project along this corridor.

Language Spoken

According to Metropolitan Council data, there is a wide range of English proficiency in the corridor, from an area at the east end where 30% or more residents have limited English skills to an area at the west end where only 0-5% have limited English skills. In between, these numbers are 5-15% or 15-30% people with limited English skills. (**Figure 4**)

Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include development of written and spoken materials in languages other than English, participation of interpreters, and other culture- and language-specific approaches.

People with Disabilities

According to Metropolitan Council data, there is a wide range of disability status in the corridor, with an area of 30% or greater people with disabilities at the east end and areas of 5-15% or 15-30% for the remainder of the corridor. (Figure 5)

Implications: Accommodations should be provided to facilitate participation in corridor engagement from residents with disabilities. Additionally, local knowledge should be used to determine specific accommodations needed. During project development, consider the needs of people with disabilities when developing the configuration of the design options.

Concentrated Poverty and Affluence

According to Metropolitan Council data, the corridor is located entirely within an Area of Concentrated Poverty. (Figure 6)

Implications: People living in and around the corridor are assumed to face challenging circumstances affecting their quality of life and life prospects, including employment, health, and educational outcomes. The well-being of corridor area residents should be prioritized by selecting corridor options and design choices that improve residents' safe and convenient access to Active Living options (walk, bike and transit), support local economic development, support access to employment and educational opportunities, and foster social connectivity and connection, including through placemaking activities.

Transit Dependence

According to US Census data, transit-dependence in the corridor ranges from less than 1% to greater than 20% and percentages in between. (Figure 7)

Implications: Area residents rely on walking, biking, and transit to a much greater extent than residents of other areas of the region for their daily travel. Considerations for users of these modes should be emphasized when selecting options for addressing congestion.

Affordable Housing

According to Metropolitan Council data, there are 3,904 units of publicly subsidized rental housing units in census tracts within 1/2 mile of the corridor, an average of 1,970 subsidized units per corridor mile. (Figure 8)

Implications: There number and density of publicly subsidized rental housing units in close proximity (within a ten-minute walk) of this corridor appears to be high. Public housing residents include a higher proportion of children, seniors, and people with mobility impairments who rely on wheelchairs and other mobility aids, and who do not have access to automobiles. Considerations for users of walk, bike, and transit modes should be emphasized when selecting options for addressing congestion.

Low-Wage Worker Household/Job Density

According to US Census 2010 LEHD Origin-Destination Employment Statistics (LODES), most of the corridor includes concentrations of low-wage worker households that are in the middle range (4 to 6 low-wage worker households per acre) of this measure. (Figure 9)

Implications: Low-wage workers are more likely to rely on transit to reach their places of employment and for other essential trips. When considering options for addressing congestion along this corridor, options that increase transit options and improve the operational characteristics of transit should be emphasized to better support these users.

Workers and Economy

According to Metropolitan Council data, the total employment within 1/2 mile of the corridor is 11,794 jobs, an average of 5,954 jobs per corridor mile. Of the total number of jobs, 1,659 jobs are in Manufacturing and Distribution sectors. (Figure 10)

Implications: There is a high number and concentration of jobs along and near (within a ten-minute walk) of the corridor. Access for workers (including lower-wage workers) within this constrained urban area can be addressed by prioritizing options that make more efficient use of the existing roadway cross section, including by improving transit and bicycle access and convenience.

LAND USE

Service Area Type (Urban/Rural)

The corridor is located entirely within the Metropolitan Urban Service Area (MUSA). (Figure 11)

Implications: Addressing congestion concerns through improving access to and operation of regional services, including transit, is appropriate given the corridor's location within the Metropolitan Urban Service Area.

Community Designation

The corridor is located entirely within the "Urban Center" Thrive 2040 Community Designation. (Figure 12)

Implications: Urban Center communities include the largest, most centrally located and economically diverse cities of the region. Because of their physical configuration, including interconnected street network, population and activity density, and mix of land uses, they are well suited for congestion approaches that include development and improvement of transit, walk, and bike options.

Context Zone

According to the land use contexts described in MnDOT's Technical Memorandum No. 18-07-TS-05, the predominant context for the corridor area is "Urban Residential." Immediately adjacent to the corridor, and south and east from its northern end, a portion of the corridor is located in a "Natural" context zone. A concentration of adjacent "Urban Commercial" uses begins one quarter of the way through the corridor. Near the corridor's eastern end, a variety of "Suburban Commercial" and "Industrial" contexts are also present. (Figure 13)

Implications: The wide variety of land uses along the corridor, the relatively fine "grain" of their distribution, the presence of significant park assets, and the close proximity to compact "urban residential" neighborhoods through the corridor's entire length help orient recommendations for addressing congestion toward TDM approaches and improving walk, bike and transit access and operations.

Walk/Bike Origins and Destinations

According to Metropolitan Council data, there are no regionally-significant bicycle transportation network destinations where people work, shop, recreate, or are entertained within a 1/2 mile of the corridor. However, within 1½ miles of the corridor, there is one such destination, Theodore Wirth Regional Park, a high-visitation regional park (Figure 14) Additionally, and as noted in the Context Zone analysis above (Figure 13) there are a significant number of fine-grained urban commercial uses and regional parks and trails facilities adjacent to and near the corridor.

Implications: Observation of the corridor area indicates there are numerous local shopping, employment, educational, and recreational destinations. To support local and regional access, consider improving access to walk, bike and transit options.

Transit Market Area

The corridor travels through transit markets 1 and 2. (Figure 15)

Implications: Transit markets 1 and 2 are the most cost-effective locations to make transit service investments. As a result, prioritizing transit and transit-related investments (like walkability, bikeability and mobility hub investments) is appropriate to leverage the corridor's currently existing transit advantages and characteristics, including its density of population and employment, the interconnectedness of its local street system, and the low number of cars owned by residents.

TRANSPORTATION

As of this writing, this segment of West Broadway is identified as a potential future route for the extension of the METRO Blue Line Light Rail Transit (LRT). The analysis here illustrates how the handbook would be applied to existing conditions, understanding that implementation of the regional transit project would significantly influence the transportation analysis.

Roadway Features

West Broadway Avenue is an urban street with varying typical sections, including divided and undivided segments. It is generally four lanes with turn lanes in some areas, and a two-way center turn lane for much of the western half of the corridor. The speed limit is 30 miles per hour throughout the corridor. The corridor has 11 signalized intersections, 14 through-stop intersections, and many driveways. Most of the corridor does not meet Hennepin County access spacing guidelines. (Figure 16)

Implications: West Broadway is an older urban arterial design with multiple lanes and curb tight sidewalks. Its changing cross-section reflects changing conditions but also creates inconsistent driver expectation. The feasibility of a narrower roadway cross-section could be explored to see if a more pedestrian friendly design can still accommodate vehicular demand. Close access spacing likely leads to congestion and safety issues.

Transit, Bicycle and Pedestrian Features

There are sidewalks along the entirety of the corridor, but they are directly adjacent to the roadway and are narrow in some areas. There are no bike routes on the corridor but there are some east-west and north-south routes nearby and crossing the study corridor. It is assumed that bicyclists do not often travel directly on West Broadway but do cross at major intersections.

Metro Transit routes 14 and 30 run along West Broadway, with 178 daily trips between the two routes. METRO C Line arterial BRT (aBRT) crosses the corridor at Penn Avenue, and the METRO D Line aBRT is a planned route (opening in 2022) that will cross at Fremont and Emerson Avenues. Other local bus routes travel along Lowry Avenue, Lyndale Avenue, and Golden Valley Road. (Figure 17)

Implications: Given the characteristics of the community populations, improved pedestrian facilities on West Broadway would improve connectivity and increase user comfort and access to transit, particularly on the eastern end of the corridor. Bicycle facilities on or parallel to West Broadway may be similarly valuable.

West Broadway is an important transit corridor. Improvements in the roadway that support transit would be consistent with the current use of the corridor and needs of the nearby populations.

Traffic Volumes

Traffic volumes range from 10,500 to 20,300, with the highest volumes at the eastern end of the corridor, between Emerson Avenue and Lyndale Avenue. Since 2003, traffic volumes have been decreasing slightly. (Figure 18)

Implications: Based on the volume to capacity ratio, most of the corridor appears to have a cross-section that accommodates corridor volumes, except between Emerson Avenue and Lyndale Avenue where traffic volumes exceed the roadway capacity. More specific review may be warranted to understand if the western end of the corridor has excess capacity. The relatively stable or decreasing traffic volumes suggest that vehicle travel demand also may be flat and that additional roadway capacity may not be needed in the future.

Crash History

Most crashes on West Broadway are concentrated on the eastern end of the corridor, between Girard Avenue and Lyndale Avenue. 32% of crashes on this segment are rear end crashes, which may be caused by congestion. Crashes primarily occur at intersections, with Penn Avenue having a higher concentration than other intersections west of Girard. (Figure 19)

Implications: Crash occurrence and severity increases with increasing traffic volumes along this corridor. The number of crashes is also greatest in the more commercial east end of the corridor. Pedestrian crashes follow this same pattern. When addressing any capacity deficiencies, pedestrian safety must also remain a priority.

Public Involvement

No public involvement activities have been conducted as part of this example but would be expected to be for an actual corridor assessment. Public involvement should include techniques to reach populations who are hard to reach or traditionally under involved (see People and Equity, above).

Summary: Context and Problem Statement

The two-mile extent of West Broadway being considered here is an older urban arterial that connects several land use contexts, from more residential and neighborhood commercial on the north/west to neighborhood and regional commercial uses on the south/east. Segment-level congestion measures indicate the corridor is “possibly congested,” with the exception of the far eastern segment between Emerson and Lyndale which is more congested. These more congested conditions at the east end of the corridor appear to be a function of the higher traffic volumes and larger commercial land uses. A closer look at this segment for potential access and intersection modifications may be warranted but should not compromise active transportation modes. Relatively flat traffic growth and wide cross section suggests the possible opportunity to reduce travel lanes (potential 4 to 3 lane conversion) in some locations on the corridor.

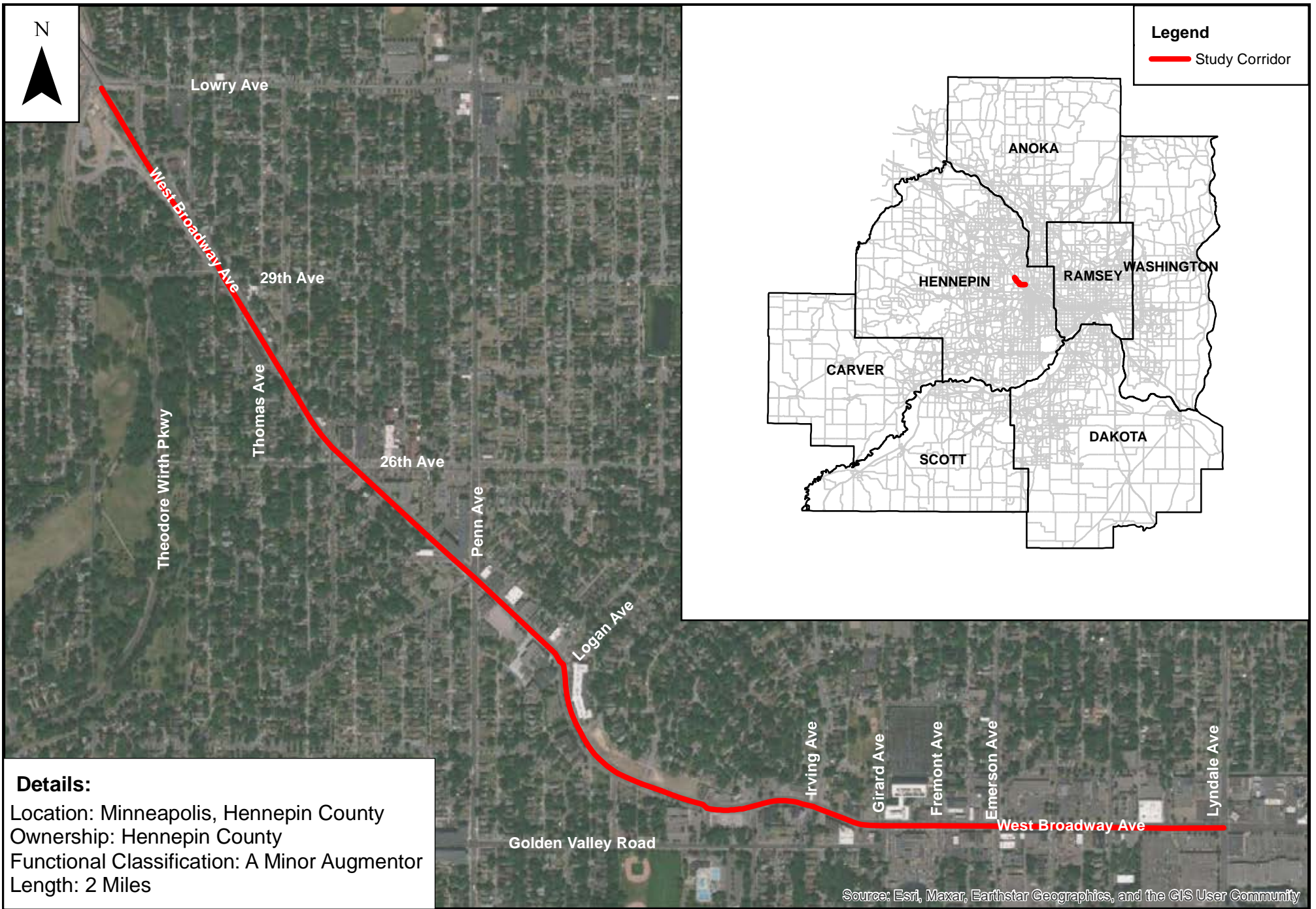
The corridor includes a complete sidewalk system and robust transit service. Multiple data points indicate large numbers of people near the corridor who rely on transit, walking, and bicycle modes. Further investment and support for non-vehicle modes would support the corridor populations who rely on these modes as their primary means of transportation.

Strategy Review

The list of potentially applicable congestion management strategies was reviewed and each strategy rated for its ability to address the corridor needs to the extent data were available. A summary rating of each category is provided below. The complete assessment is provided in [Appendix C](#).

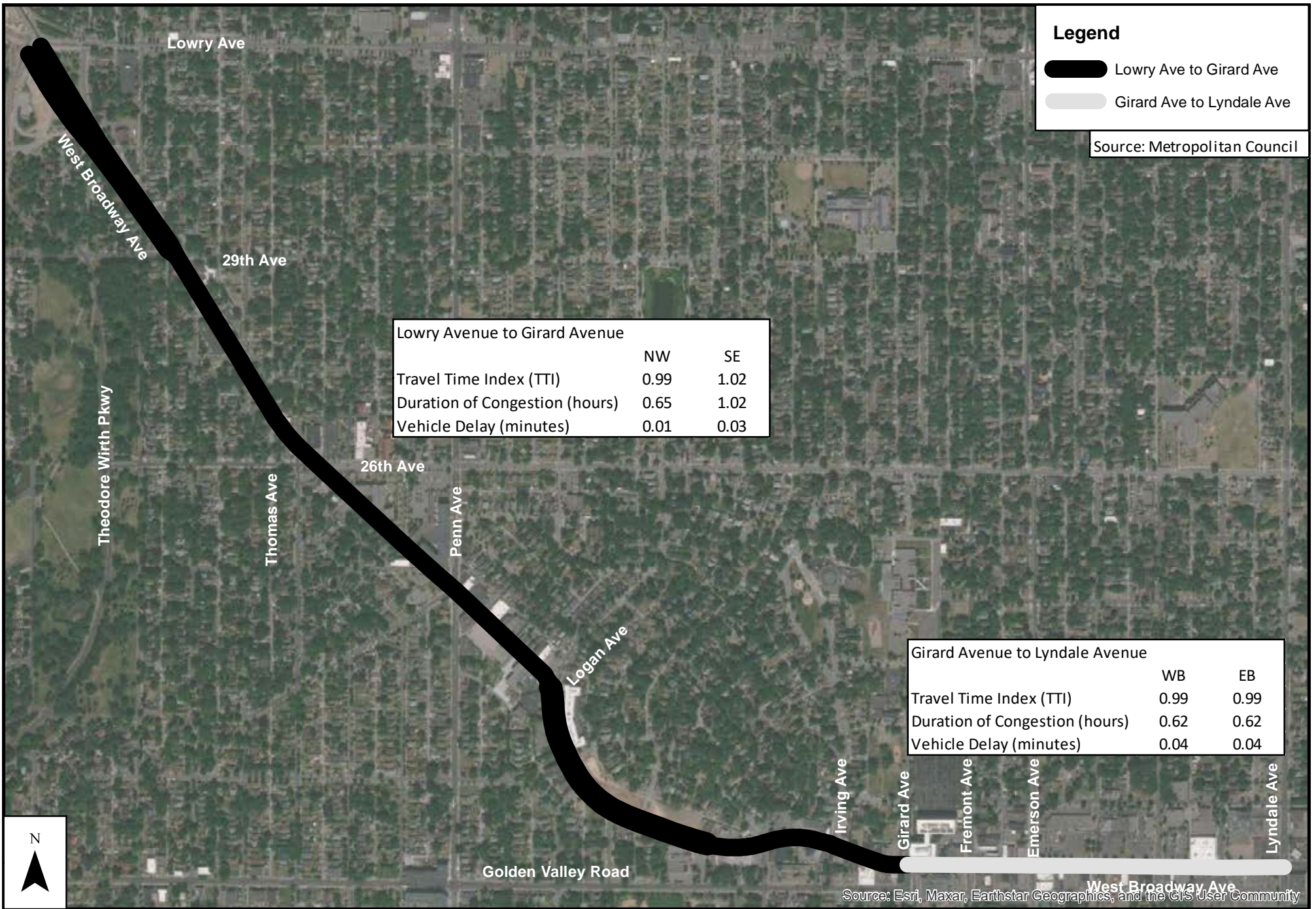
West Broadway Strategy Rating Summary

Category	Summary Rating	Notes
Travel Demand Management	Low/Medium	Despite relatively complete existing multimodal features, improvements to existing bike/ped/transit facilities, use and access are most aligned with population needs and corridor land use context and character; many potential opportunities to explore but need additional information
Traffic Management Technologies	Low	Verify signal timing and coordination is optimal
Spot Mobility	Low	Explore need/potential for intersection improvements (context-appropriate) – need intersection data; balance mobility with ped/bike safety and place
E-ZPass	n/a	Not applicable to this arterial corridor
Strategic Capacity Enhancements	n/a	Does not appear warranted and/or conflicts with other modes/uses



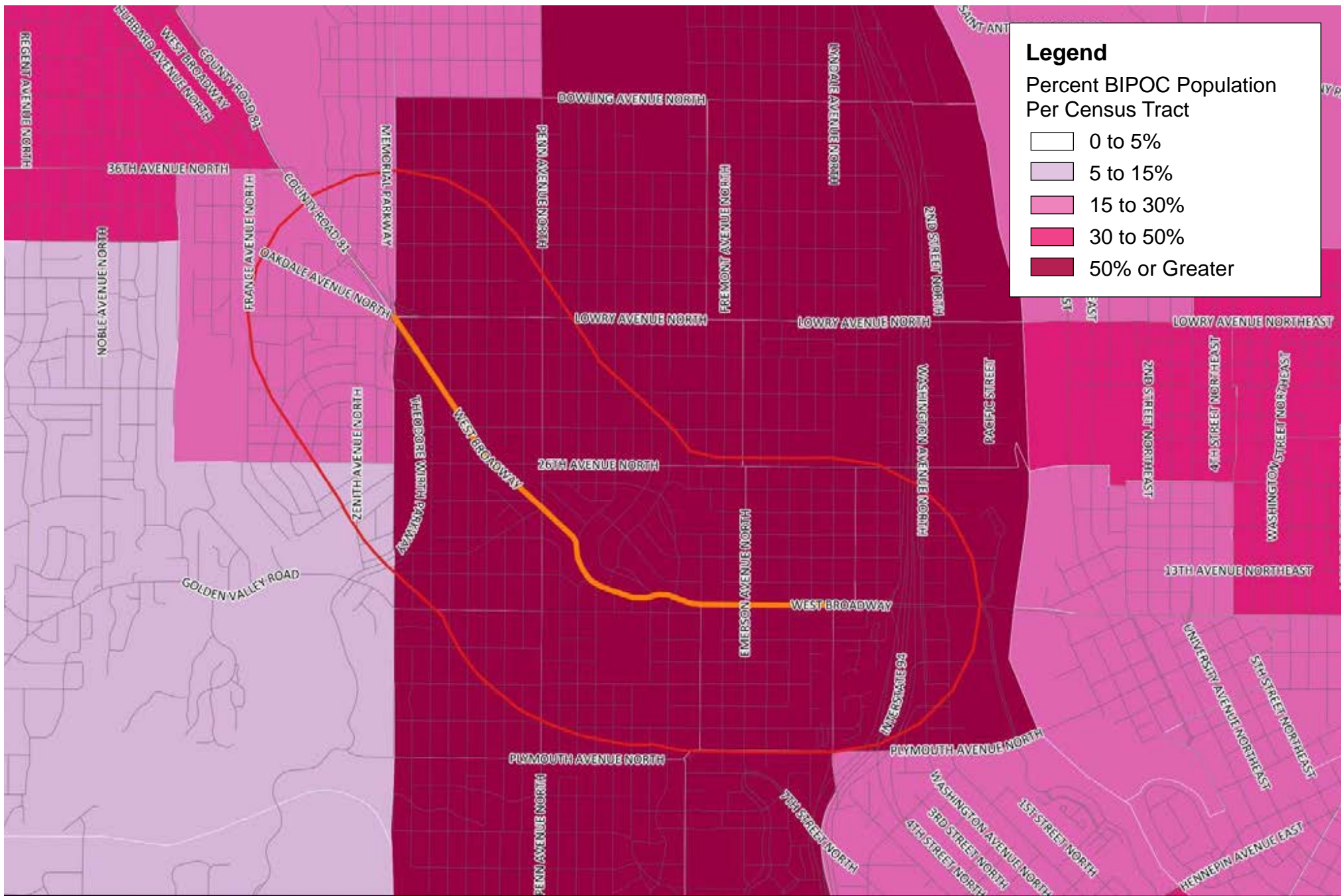
Congestion Analysis Handbook
Example Corridor: West Broadway Avenue

Figure 1
Project Location



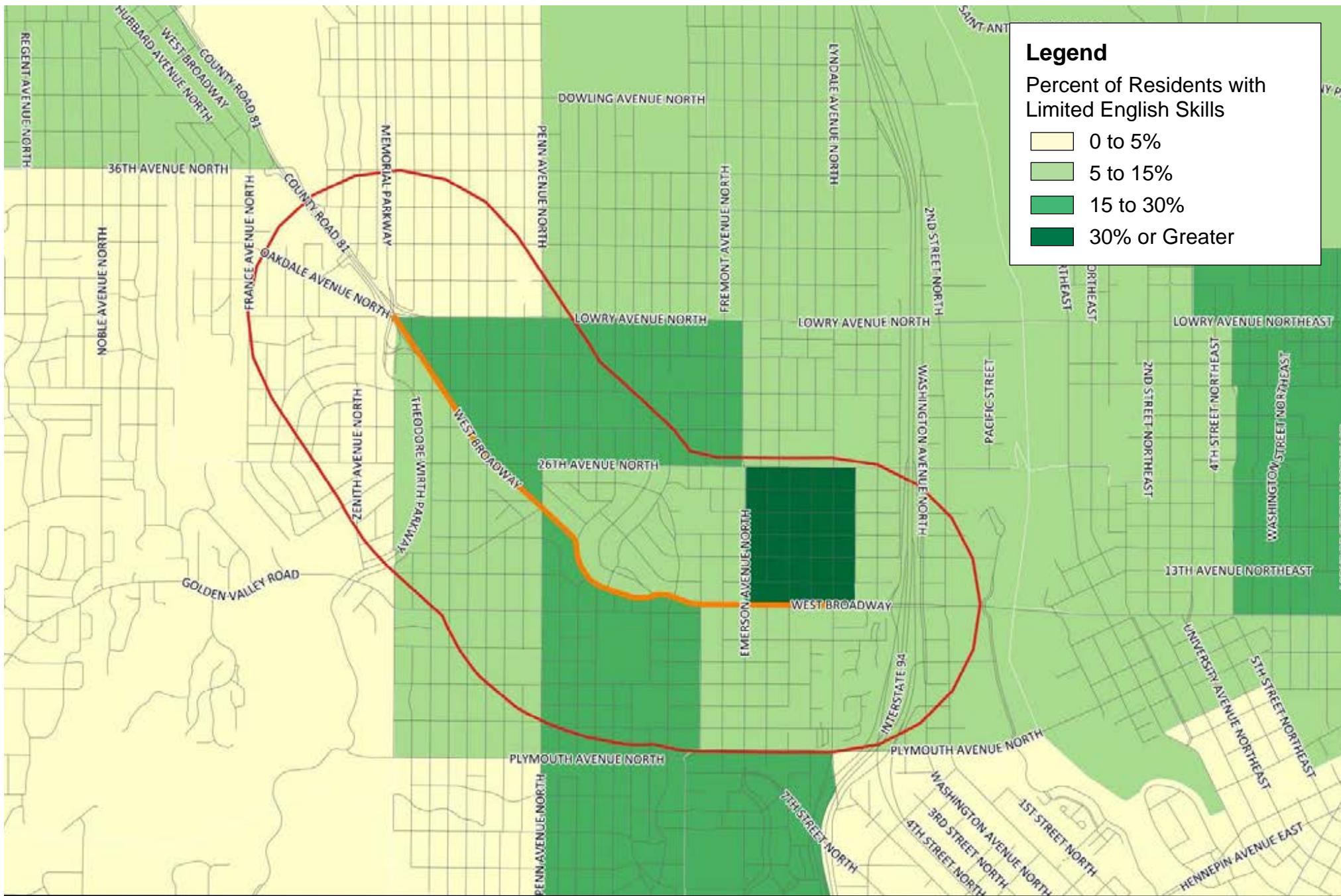
Congestion Analysis Handbook
Example Corridor: West Broadway Avenue

Figure 2
Congestion



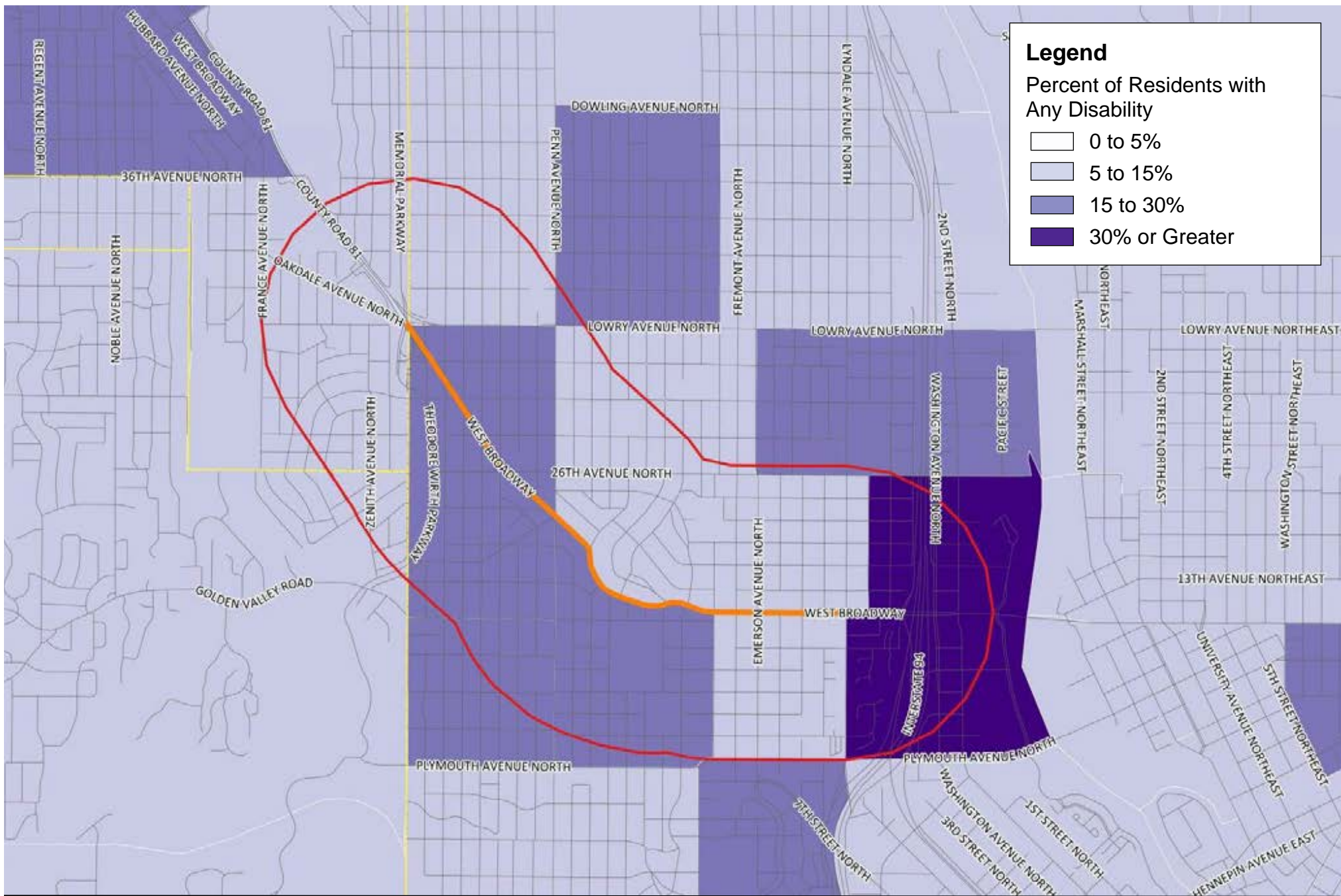
Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 3
Percent BIPOC Population



Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 4
Percent of Residents with Limited English Skills



Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 5
Percent of Residents with Any Disability

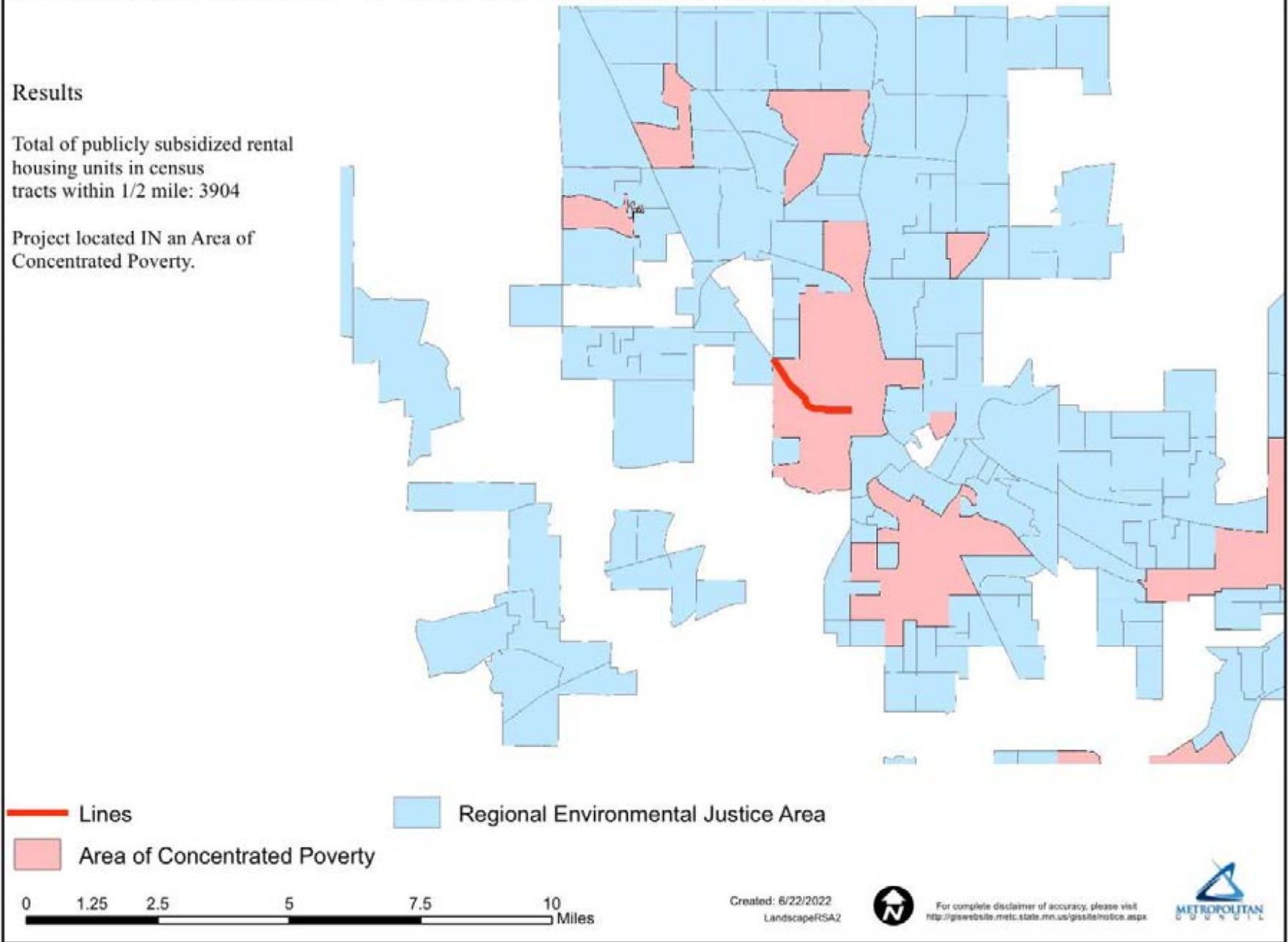
Socio-Economic Conditions

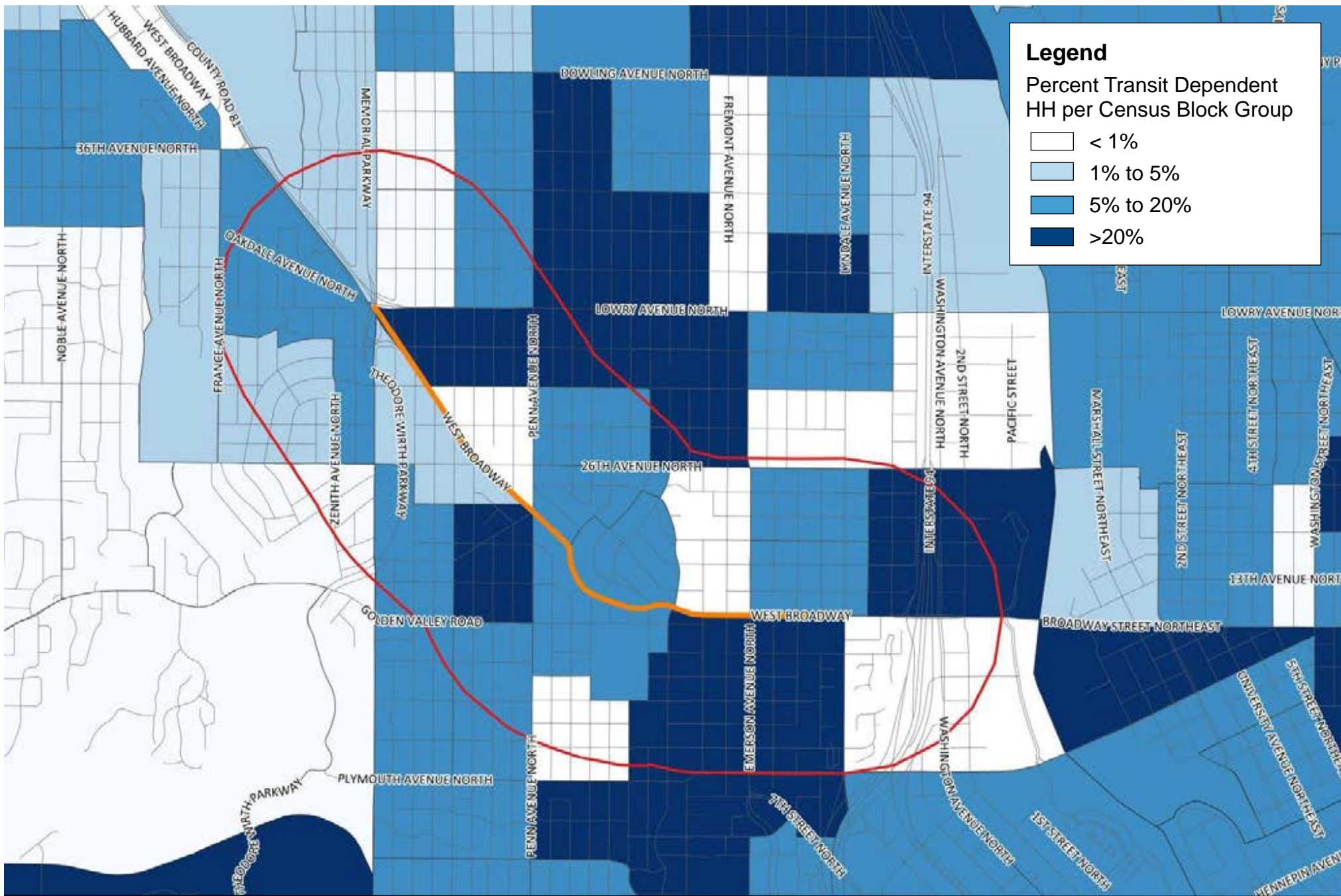
Pedestrian Facilities Project: West Broadway | Map ID: 1655934405282

Results

Total of publicly subsidized rental housing units in census tracts within 1/2 mile: 3904

Project located IN an Area of Concentrated Poverty.





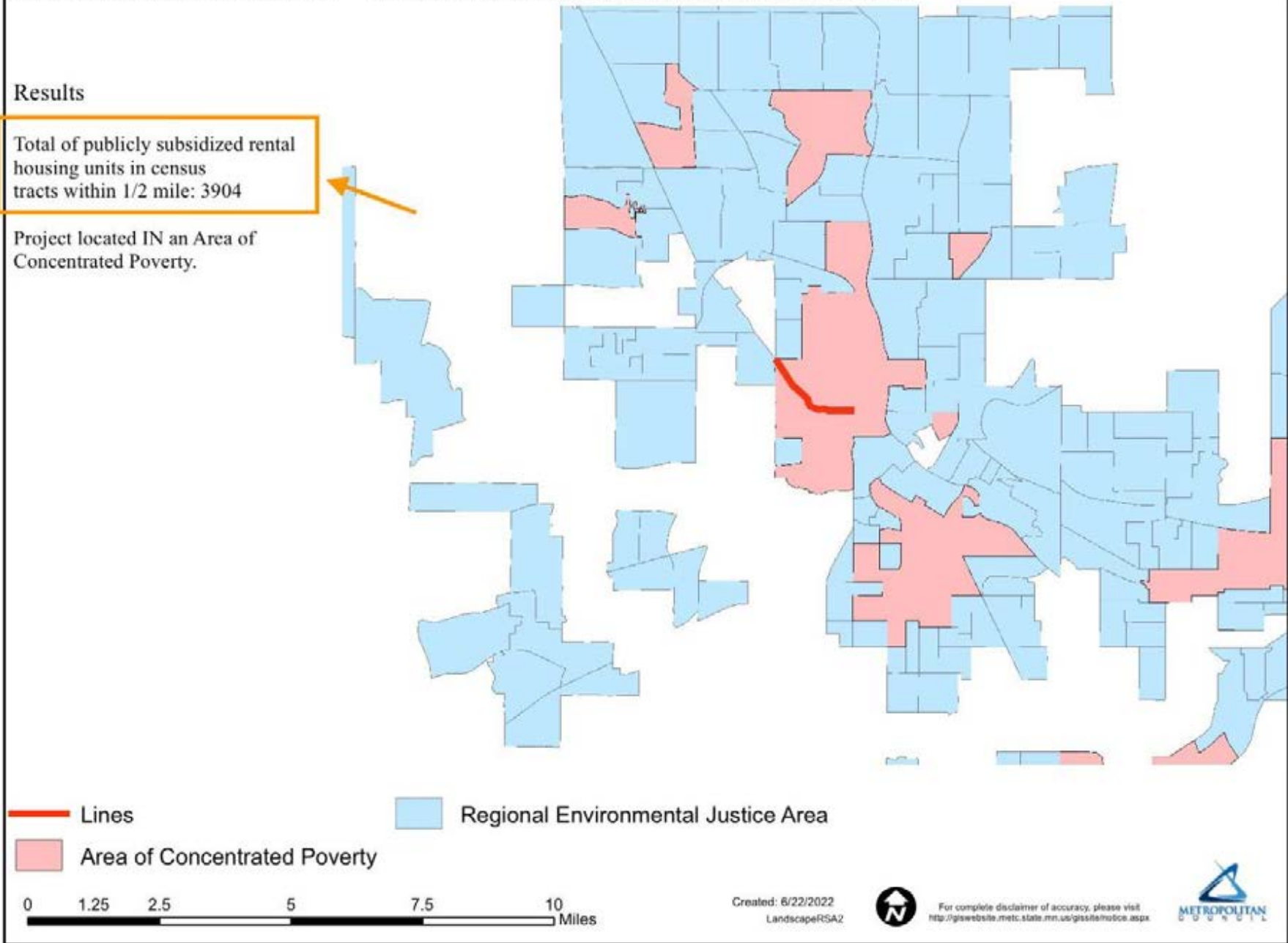
Congestion Analysis Handbook
Example Corridor: West Broadway

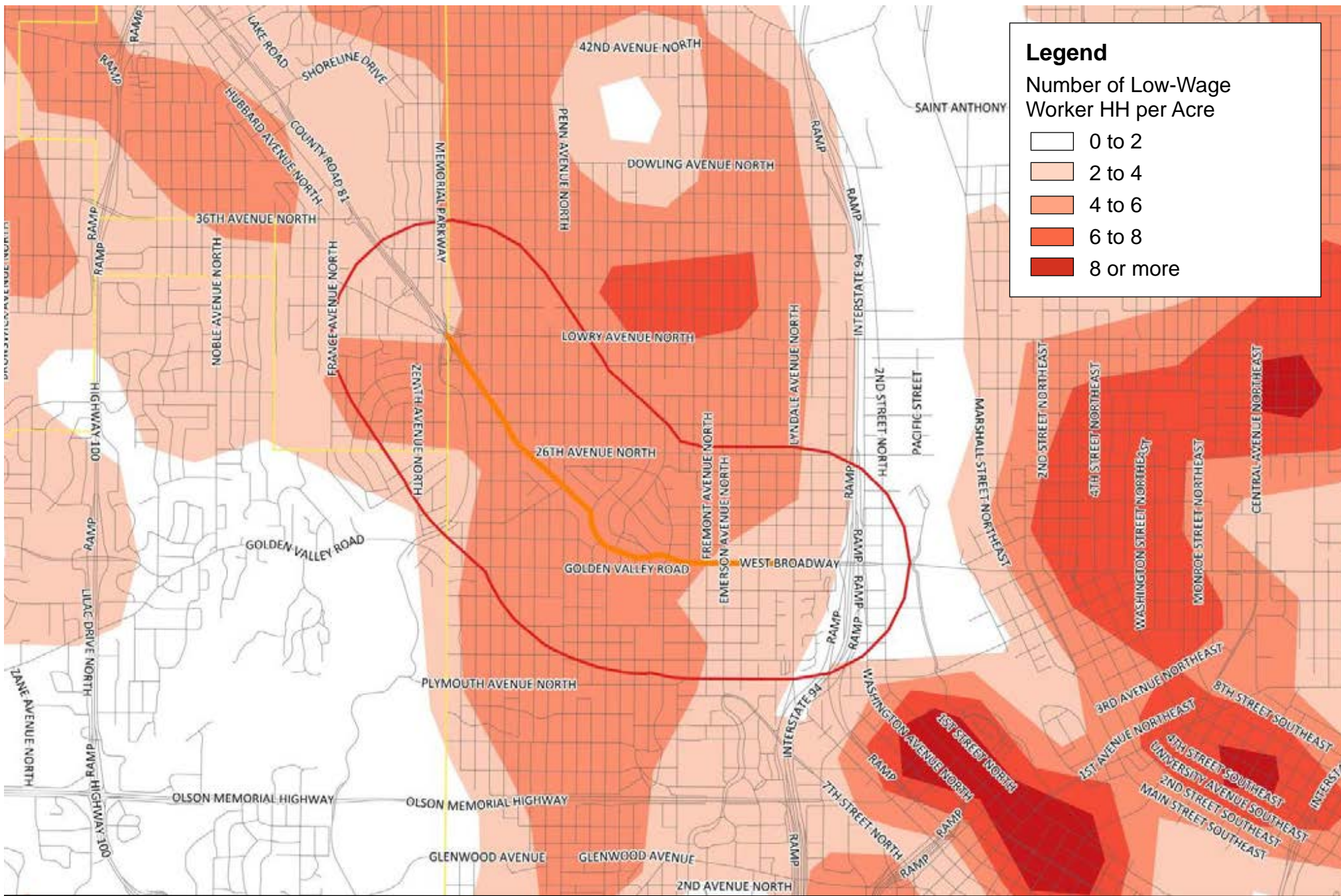
Figure 7
Transit Dependence

Results

Total of publicly subsidized rental housing units in census tracts within 1/2 mile: 3904

Project located IN an Area of Concentrated Poverty.





Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 9
Low-Wage Workers

Regional Economy

Pedestrian Facilities Project: West Broadway | Map ID: 1655934405282

Results

Within HALF Mi of project:
Postsecondary Students: 0

Total Population: 32958
Total Employment: 11794
Mfg and Dist Employment: 1659



-  Project
-  Job Concentration Centers
-  Manufacturing/Distribution Centers

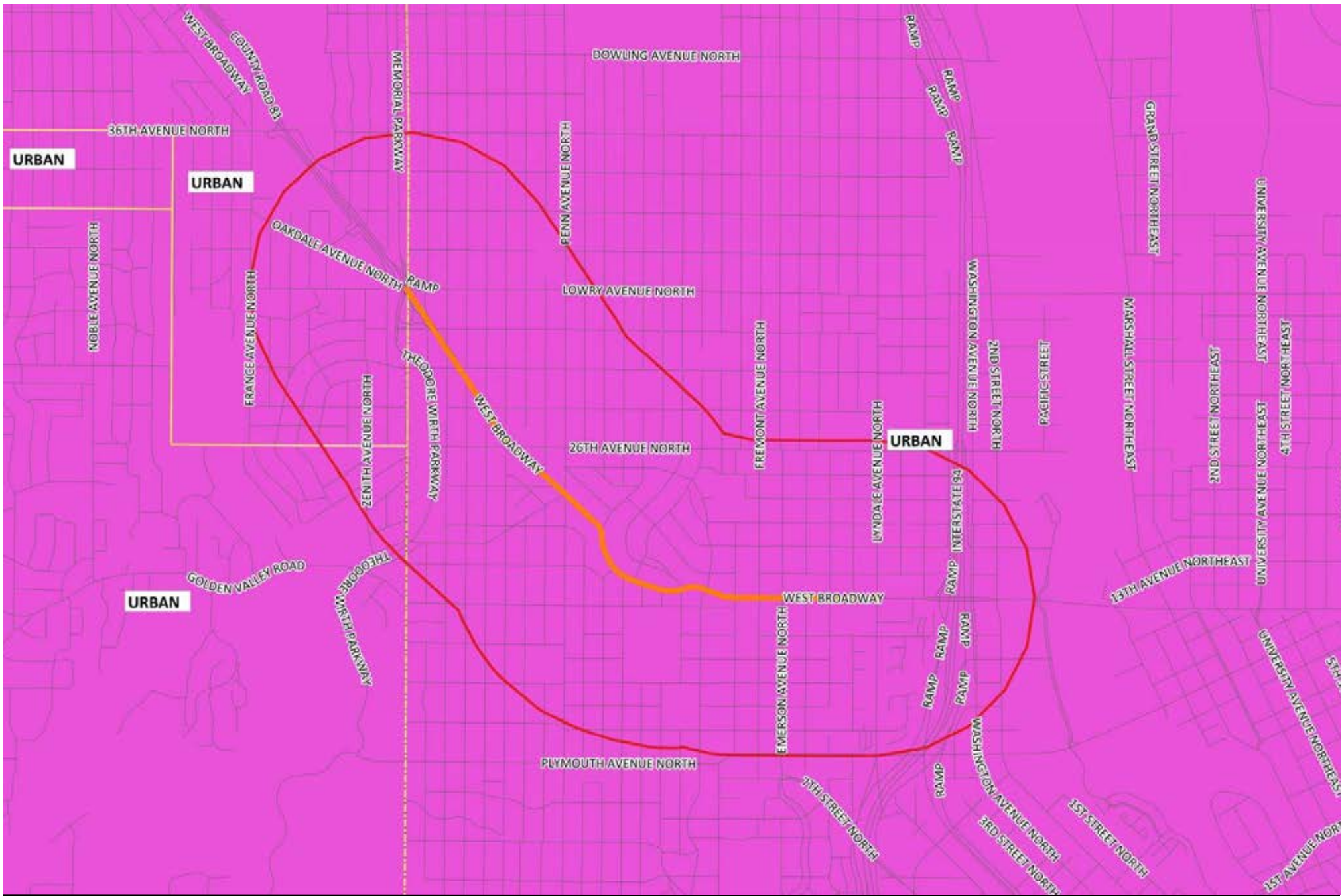


Created: 6/22/2022
LandscapeRSA5



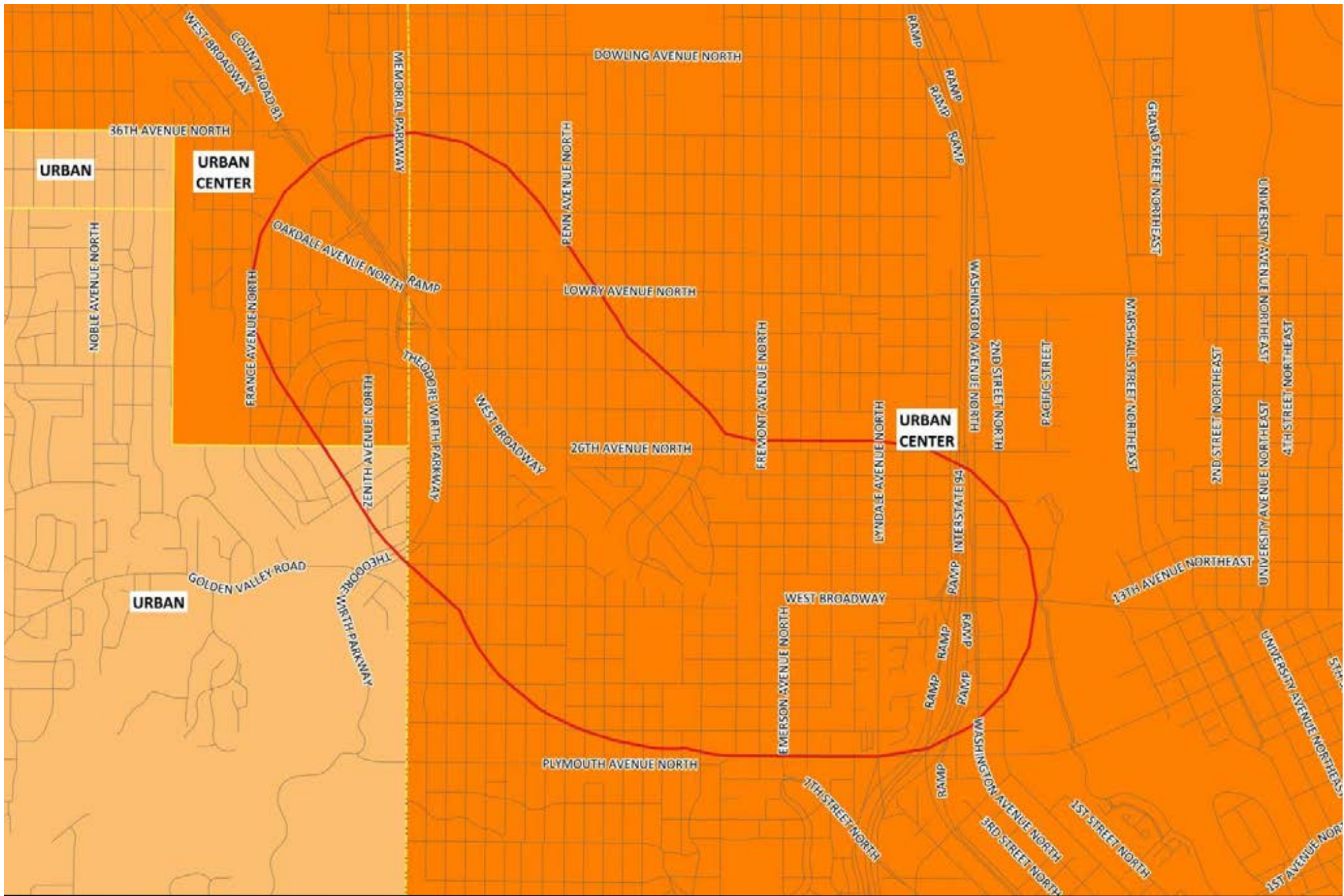
For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.nm.us/gis/tenew/notice.aspx>





Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 11
Service Area Type



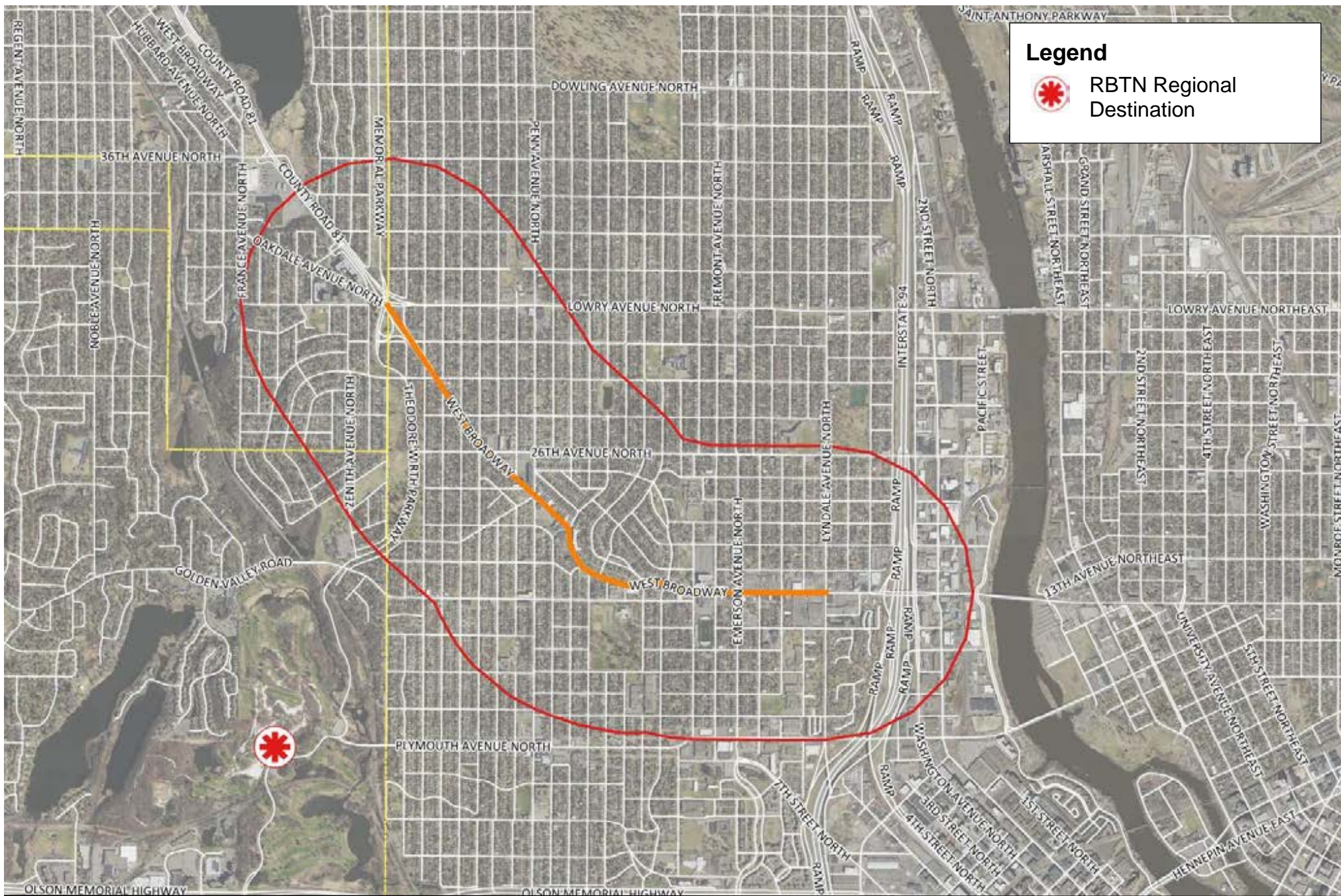
Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 12
Community Designation



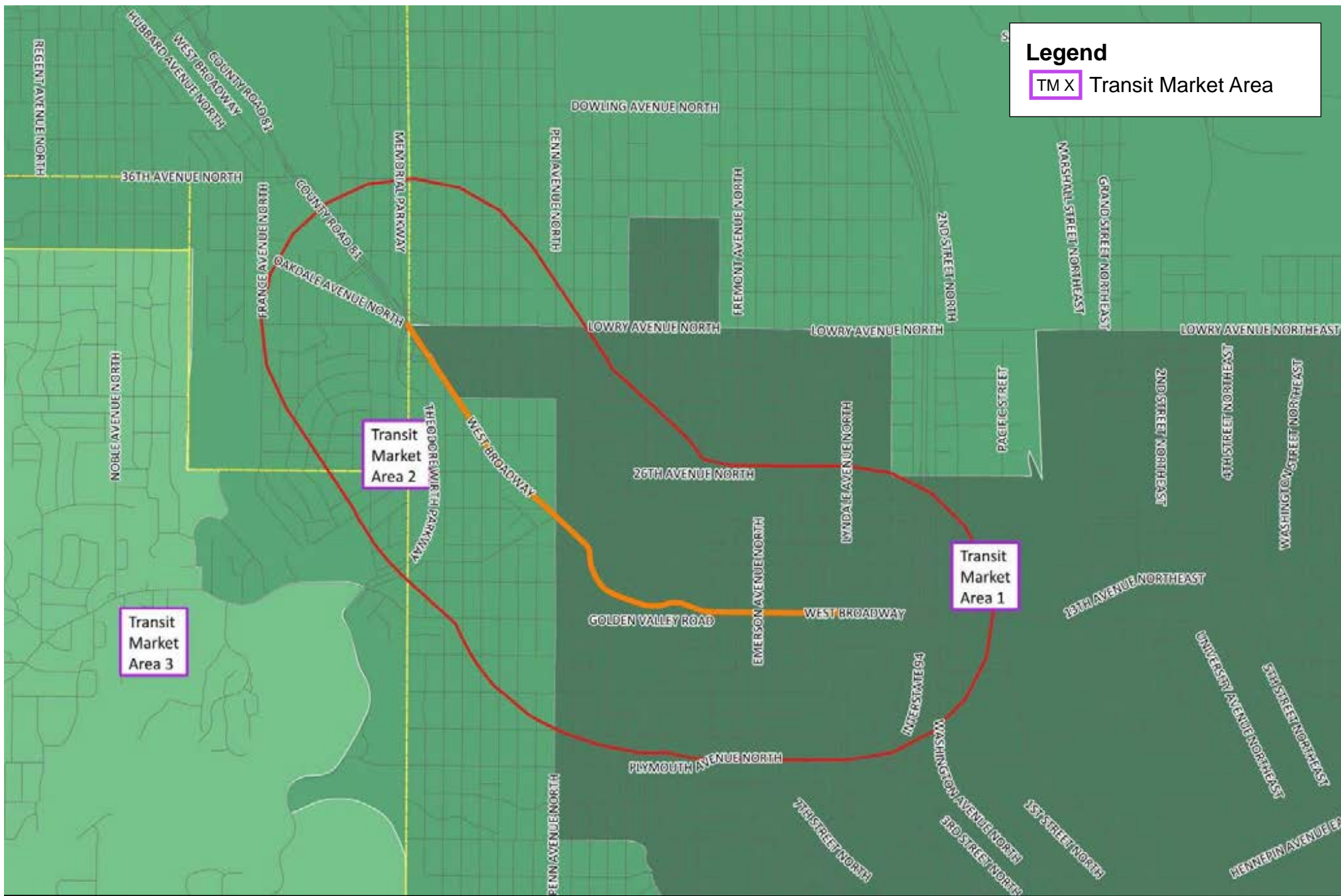
Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 13
Context Zone



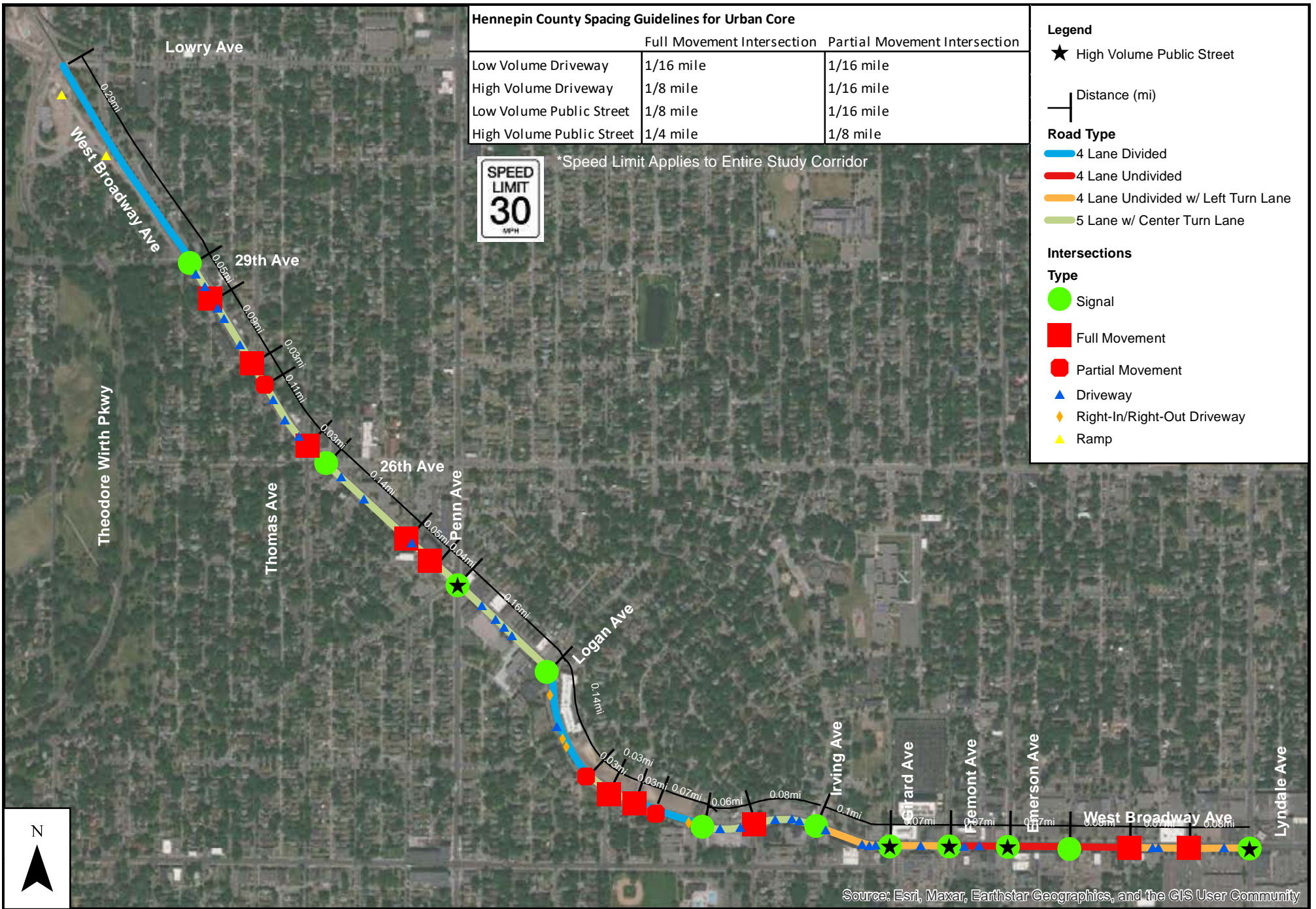
Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 14
Walk/Bike Origins and Destinations



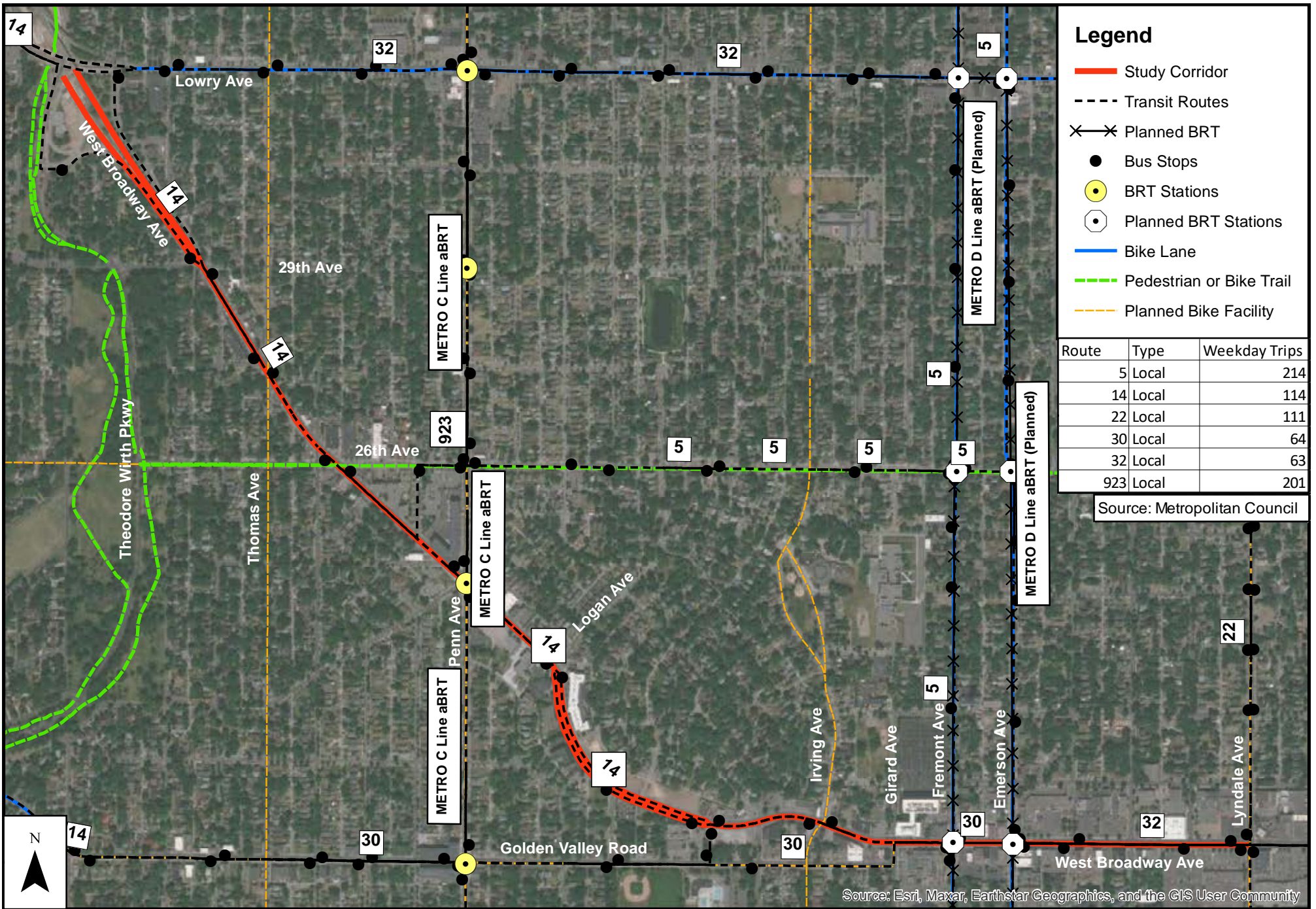
Congestion Analysis Handbook
Example Corridor: West Broadway

Figure 15
Transit Market Area



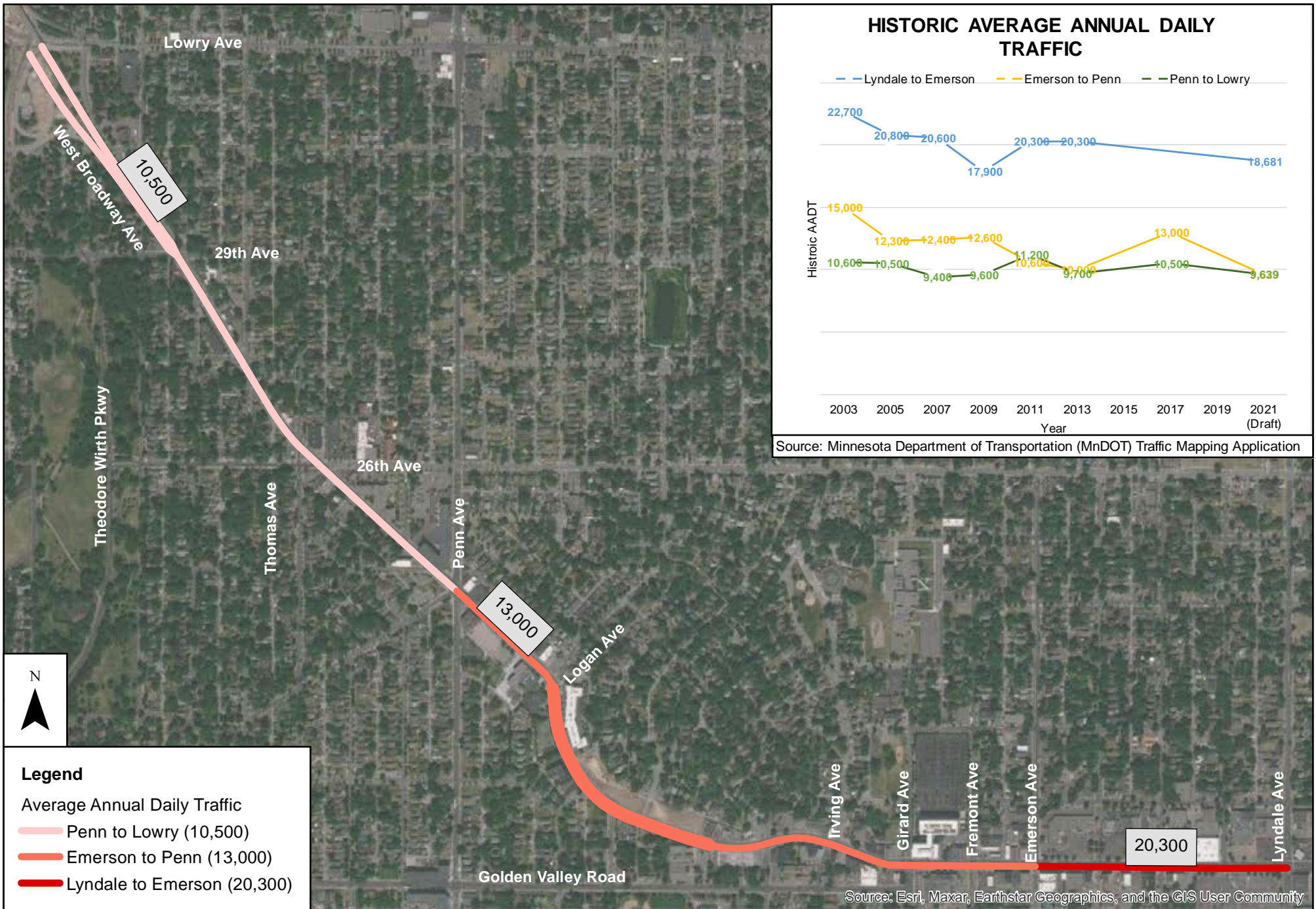
Congestion Analysis Handbook
 Example Corridor: West Broadway Avenue

Figure 16
 Roadway Features



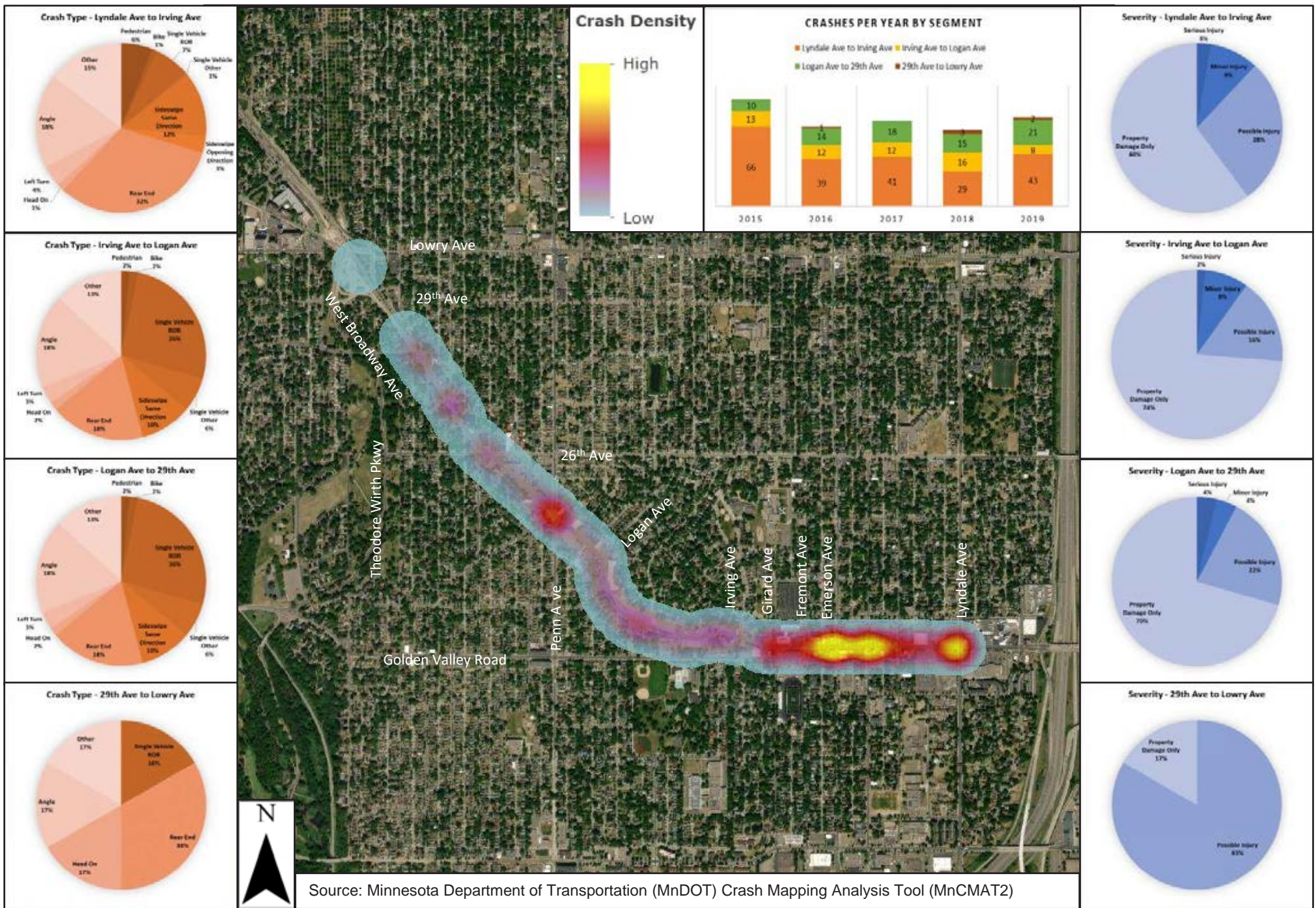
Congestion Analysis Handbook
 Example Corridor: West Broadway Avenue

Figure 17
 Transit, Bicycle and Pedestrian Features



Congestion Analysis Handbook
Example Corridor: West Broadway Avenue

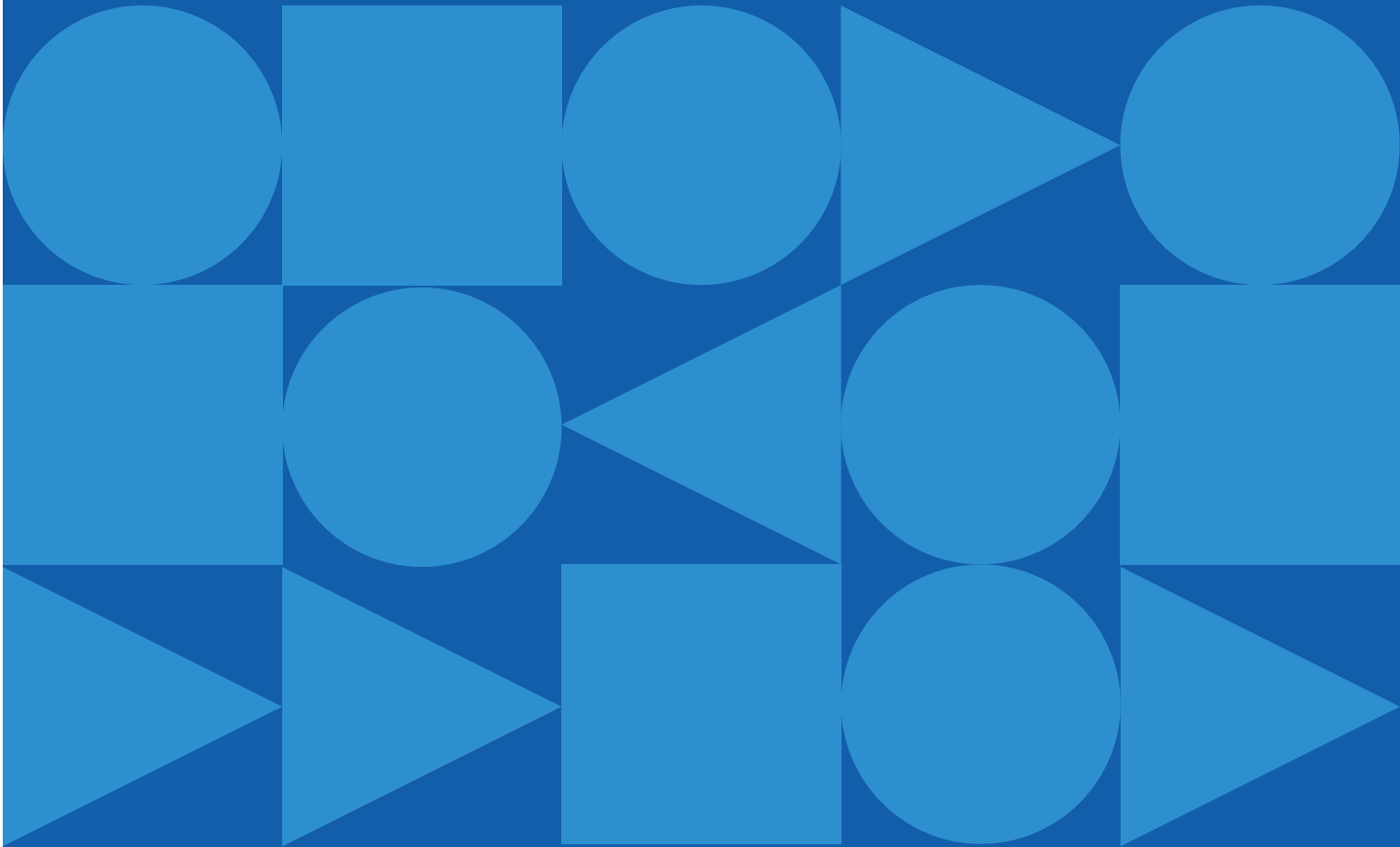
Figure 18
Traffic Volumes



Congestion Analysis Handbook
Example Corridor: West Broadway Avenue

Figure 19
Crashes

Strategy Screening Tool



Strategy Screening Tool

ID # (1) Strategy and Primary TPP Priority	Potential of Strategy to Address Identified Problem(s)	
	Rating	Notes
Priority 1. Travel Demand Management		
1.01 Congestion Pricing (MnPASS)		
1.02 Alternative Work Hours		
1.03 Telecommuting		
1.04 Guaranteed Ride Home Programs		
1.05 Alternative Mode Marketing and Education		
1.06 Safe Routes to School		
1.07 Preferential or Free Parking		
1.08 Event Transportation Management Plans		
1.09 Negotiated Demand Management Agreements		
1.10 Trip Reduction Ordinance		
1.11 Infill Developments		
1.12 Transit Oriented Developments		
1.13 Design Guidelines for Pedestrian-Oriented Development		
1.14 Mixed Use Development		
1.15 Long-Range Comprehensive Land Use Planning		
2.01 Transit Capacity Expansion		
2.02 Increasing Bus Route Coverage and/or Frequencies		
2.03 Implementing Regional Transitways		
2.04 Providing Real-Time Information on Transit Routes		
2.05 Reducing Transit Fares		
2.06 Providing Transit Advantages		
2.07 Provide Transit Signal Priority		
2.08 Encourage Off-Board Fare Collection		
2.09 Monitor Shifting Freight Numbers		
2.10 New Sidewalk Connections		
2.11 Enhanced Pedestrian Crossings		
2.12 Designated Bicycle Facilities on Local Streets		
2.13 Improved Bicycle Facilities at Transit Stations and Other Destinations		
2.14 Improved Safety of Existing Bicycle and Pedestrian Facilities		
2.15 Exclusive Non-Motorized ROW		
2.16 Complete Streets		
2.17 Preservation Projects with Multimodal Improvements		
2.18 Park-and-Ride Lots		
3.01 Ridesharing (Carpools & Vanpools)		
3.02 Employer-Landlord Parking Agreements		
3.03 Parking Management		
4.11 Geometric Improvements for Transit		
4.15 Shared Mobility		
4.21 Parking Restrictions		

ID # (1) Strategy and Primary TPP Priority	Potential of Strategy to Address Identified Problem(s)	
	Rating	Notes
Priority 2. Traffic Management Technologies		
4.01 Dynamic Messaging		
4.02 Advanced Traveler Information Systems (ATIS)		
4.03 Integrated Corridor Management (ICM)		
4.04 Automated and Connected Vehicles		
4.05 Advanced Traffic Management System (ATMS)		
4.06 Traffic Signal Coordination		
4.08 Changeable Lane Assignment/Dynamic Lane Control		
4.09 Vehicle Use Limitations and Restrictions		
4.10 Improved Signage		
4.12 Intermodal Enhancements		
4.13 Goods Movement Management		
4.14 Towing Improvements		
4.16 Ramp Metering		
4.20 Signal Timing		
4.23 Network Management		
4.26 Snow Removal		
4.27 Pavement and Bridge Deicing		
4.28 Incident Detection and Management Systems		
4.29 Dynamic Access Changes		
4.30 Access Management Policies		
Priority 3. Spot Mobility		
4.07 Bottleneck Relief		
4.17 Freeway Auxiliary Lanes that are Shorter than One Mile		
4.18 Ramp Modifications		
4.19 Interchange Removal		
4.24 Superstreet Corridors		
4.25 Alternative Intersection Design		
4.31 Coordinated Preservation Projects		
4.32 CMP Safety Mitigation		
5.02 Turn Lanes		
5.04 Intersection Improvements		
Priority 4. MnPASS (E-ZPass)		
5.05 High Occupancy Vehicle Lane Improvements		
5.06 Managed Lanes		
Priority 5. Strategic Capacity Enhancements		
4.22 One-Way Conversions		
5.01 Corridor Preservation		
5.03 Reallocation of Current Right-of-Way Space		
5.07 Interchange Configuration Modification		
5.08 Additional General-Purpose Lanes		
5.09 New Roadway Facilities		

(1) “Strategy ID” numbers reference the Metropolitan Council Congestion Management Process Policy and Procedures Handbook (August 2020), including [Appendix D](#) (Congestion Management Strategies Matrix)

CMP Strategy Screening: TH 77 Example Corridor

CMP Appendix D ID#	Strategy	Potential of Strategy to Address Identified Problem(s)	
		Rating	Notes
Priority 1. Travel Demand Management			
1.01	Congestion Pricing (MnPASS)	High	TH 77 is a Tier 3 MnPASS corridor; past studies have shown potential
1.02	Alternative Work Hours	Low	Could help reduce peak period congestion if enough
1.03	Telecommuting	Medium	Remote work following pandemic has resulted in fewer trips during peak periods
1.04	Guaranteed Ride Home Programs	Low	no info on how relevant this would be but more transit ridership could reduce trips on TH 77
1.05	Alternative Mode Marketing and Education	Low	More transit ridership could reduce trips on TH 77
1.06	Safe Routes to School	n/a	Could be part of bigger system solutions but have no information on this
1.07	Preferential or Free Parking	n/a	Don't see how this would help
1.08	Event Transportation Management Plans	n/a	Events are not a congestion cause on TH 77
1.09	Negotiated Demand Management Agreements	n/a	Don't see how this would help
1.10	Trip Reduction Ordinance	n/a	Assume this is relevant to single large generators; not relevant here
1.11	Infill Developments	n/a	Could be part of bigger system solutions but have no information on this
1.12	Transit Oriented Developments	Low	Could be part of bigger system solutions but have no information on this
1.13	Design Guidelines for Pedestrian-Oriented Development	Low	Could be part of bigger system solutions but have no information on this
1.14	Mixed Use Development	Low	Could be part of bigger system solutions but have no information on this
1.15	Long-Range Comprehensive Land Use Planning	n/a	Already being done within Met Council 2040 framework
2.01	Transit Capacity Expansion	Low	Improved transit service could help remove trips from TH 77
2.02	Increasing Bus Route Coverage and/or Frequencies	Low	Improved transit service could help remove trips from TH 77
2.03	Implementing Regional Transitways	Low	Red Line is in place; improved service could potentially reduce trips on TH 77
2.04	Providing Real-Time Information on Transit Routes	n/a	Generally exists already (not much room for improvement)
2.05	Reducing Transit Fares	Low	More transit ridership could reduce trips on TH 77
2.06	Providing Transit Advantages	Low	Bus only shoulders already exist on TH 77
2.07	Provide Transit Signal Priority	Low	Possibly could help with transit performance overall but not with highway congestion
2.08	Encourage Off-Board Fare Collection	n/a	Don't see how this would help
2.09	Monitor Shifting Freight Numbers	n/a	Freight not a specific issue on TH 77
2.10	New Sidewalk Connections	Low	Improved crossings over TH 77 could help reduce trips on TH 77
2.11	Enhanced Pedestrian Crossings	Low	Improved crossings over TH 77 could help reduce trips on TH 77
2.12	Designated Bicycle Facilities on Local Streets	Low	Could be part of bigger system solutions but have no information on this
2.13	Improved Bicycle Facilities at Transit Stations and Other Destinations	Low	Could be part of bigger system solutions but have no information on this
2.14	Improved Safety of Existing Bicycle and Pedestrian Facilities	Low	Would support non-motorized trips (need to identify specific needs)
2.15	Exclusive Non-Motorized ROW	n/a	Not applicable to freeway corridor
2.16	Complete Streets	n/a	Not applicable to freeway corridor
2.17	Preservation Projects with Multimodal Improvements	n/a	Not applicable to freeway corridor
2.18	Park-and-Ride Lots	n/a	Already exist in corridor; do not believe this is a congestion contributor
3.01	Ridesharing (Carpools & Vanpools)	Low	Could be part of bigger system solutions but have no information on this
3.02	Employer-Landlord Parking Agreements	Low	Could be part of bigger system solutions but have no information on this
3.03	Parking Management	n/a	Don't see how this would help
4.11	Geometric Improvements for Transit	n/a	Don't see how this would help
4.15	Shared Mobility	Low	Could be part of bigger system solutions but have no information on this
4.21	Parking Restrictions	n/a	Don't see how this would help
Priority 2. Traffic Management Technologies			
4.01	Dynamic Messaging	n/a	See response to ATIS
4.02	Advanced Traveler Information Systems (ATIS)	Low	Some already exists; could explore but don't think this a current issue
4.03	Integrated Corridor Management (ICM)	n/a	Don't see how this would help
4.04	Automated and Connected Vehicles	n/a	In full implementation (future) but not now
4.05	Advanced Traffic Management System (ATMS)	n/a	See response to ATIS
4.06	Traffic Signal Coordination	n/a	Not applicable to freeway corridor
4.08	Changeable Lane Assignment/Dynamic Lane Control	n/a	Reversible lane previously studied and rejected
4.09	Vehicle Use Limitations and Restrictions	n/a	Does not appear to be an issue on TH 77
4.10	Improved Signage	n/a	Don't believe this is a current issue
4.12	Intermodal Enhancements	n/a	Does not appear to be an issue on TH 77
4.13	Goods Movement Management	n/a	Does not appear to be an issue on TH 77
4.14	Towing Improvements	n/a	Does not appear to be an issue on TH 77
4.16	Ramp Metering	n/a	Some already exists; could explore but don't think this an current issue
4.20	Signal Timing	n/a	Not applicable to freeway corridor
4.23	Network Management	n/a	Not sure what this means/relevance
4.26	Snow Removal	n/a	Does not appear to be an issue on TH 77
4.27	Pavement and Bridge Deicing	n/a	Don't believe this is a current issue
4.28	Incident Detection and Management Systems	n/a	Don't believe incidents are significant congestion cause
4.29	Dynamic Access Changes	n/a	Don't see how this would help
4.30	Access Management Policies	n/a	Does not appear to be an issue on TH 77
Priority 3. Spot Mobility			
4.07	Bottleneck Relief	Medium	Assumes 2-lane segment at south end is a bottleneck
4.17	Freeway Auxiliary Lanes that are Shorter than One Mile	Medium	Explore, likely to provide congestion benefits
4.18	Ramp Modifications	Medium	Explore, not sure
4.19	Interchange Removal	n/a	Don't see how this would help
4.24	Superstreet Corridors	n/a	Not applicable to freeway corridor
4.25	Alternative Intersection Design	n/a	Not applicable to freeway corridor
4.31	Coordinated Preservation Projects	n/a	Does not appear to be an issue on TH 77
4.32	CMP Safety Mitigation	n/a	Does not appear to be an issue on TH 77
5.02	Turn Lanes	n/a	Not applicable to freeway corridor
5.04	Intersection Improvements	n/a	Intersections not applicable
Priority 4. MnPASS (E-ZPass)			
5.05	High Occupancy Vehicle Lane Improvements	High	TH 77 is a Tier 3 MnPASS corridor; past studies have shown potential; policy support
5.06	Managed Lanes	High	TH 77 is a Tier 3 MnPASS corridor; past studies have shown potential; policy support
Priority 5. Strategic Capacity Enhancements			
4.22	One-Way Conversions	n/a	Not applicable to freeway corridor
5.01	Corridor Preservation	n/a	R/W appears to be available
5.03	Reallocation of Current Right-of-Way Space	n/a	Space not available/not applicable on freeway corridor as designed
5.07	Interchange Configuration Modification	n/a	Reconfiguration does not appear to be warranted
5.08	Additional General-Purpose Lanes	Medium	Could address congestion but E-Zpass is favored by policy over GP lanes
5.09	New Roadway Facilities	n/a	Local system already developed/mature

For strategy definitions, see CMP Policy and Procedures Handbook Appendix D:

<https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Congestion-Management-Process/CmpDocs/CMP-Appendix-D.aspx>

CMP Strategy Screening: CSAH 46 Example Corridor

CMP Appendix D ID#	Strategy	Potential of Strategy to Address Identified Problem(s)	
		Rating	Notes
Priority 1. Travel Demand Management			
1.01	Congestion Pricing (MnPASS)	n/a	not applicable to CSAH 46
1.02	Alternative Work Hours	Low	Could help spread peaks and reduce congestion
1.03	Telecommuting	Low	Could help reduce demand during peak hours (COVID example)
1.04	Guaranteed Ride Home Programs	n/a	not transit friendly enough location
1.05	Alternative Mode Marketing and Education	n/a	would need more options (eg transit) to market first
1.06	Safe Routes to School	n/a	CSAH 46 walk trips more for recreation or purposes other than school
1.07	Preferential or Free Parking	n/a	not sure how this would be relevant to CSAH 46
1.08	Event Transportation Management Plans	n/a	not an issue here
1.09	Negotiated Demand Management Agreements	n/a	not an issue here
1.10	Trip Reduction Ordinance	n/a	Does not appear to be relevant to CSAH 46 issues
1.11	Infill Developments	Low	generally supportive as incentive to walk vs drive; potential to shift small numbers of trips
1.12	Transit Oriented Developments	Low	potential long-term strategy but no transit service today on CSAH 46
1.13	Design Guidelines for Pedestrian-Oriented Development	Low	generally supportive as incentive to walk vs drive; potential to shift small numbers of trips
1.14	Mixed Use Development	Low	potential long-term strategy but no transit service today on CSAH 46
1.15	Long-Range Comprehensive Land Use Planning	n/a	plans are in place, following met council guidance as relevant
2.01	Transit Capacity Expansion	Low	no current transit service but has long-term potential
2.02	Increasing Bus Route Coverage and/or Frequencies	Low	no current transit service but has long-term potential
2.03	Implementing Regional Transitways	Low	no current transit service but has long-term potential
2.04	Providing Real-Time Information on Transit Routes	n/a	no transit service on CSAH 46
2.05	Reducing Transit Fares	n/a	no transit service on CSAH 46
2.06	Providing Transit Advantages	n/a	no transit service on CSAH 46
2.07	Provide Transit Signal Priority	n/a	no transit service on CSAH 46
2.08	Encourage Off-Board Fare Collection	n/a	no transit service on CSAH 46
2.09	Monitor Shifting Freight Numbers	n/a	Does not appear to be relevant to CSAH 46 issues
2.10	New Sidewalk Connections	Low	Adding bike/ped facilities would support bike/walk access and safety
2.11	Enhanced Pedestrian Crossings	Low	Important for access, safety and circulation - but not clear it will influence congestion
2.12	Designated Bicycle Facilities on Local Streets	Low	not sure on specifics or degree of impact but in general support for bike/ped generally helpful
2.13	Improved Bicycle Facilities at Transit Stations and Other Destinations	Low	not sure on specifics or degree of impact but in general support for bike/ped generally helpful
2.14	Improved Safety of Existing Bicycle and Pedestrian Facilities	Low	Important for access and circulation - but not clear it will influence congestion
2.15	Exclusive Non-Motorized ROW	n/a	not sure what this means - see other bike/ped notes
2.16	Complete Streets	Low	Adding bike/ped facilities important for bike/walk access and safety but not big influence on congestion
2.17	Preservation Projects with Multimodal Improvements	n/a	not sure what this means - see other bike/ped notes
2.18	Park-and-Ride Lots	n/a	Not clear how this will help
3.01	Ridesharing (Carpools & Vanpools)	n/a	benefit would appear to be very low, presumably some programs already exist
3.02	Employer-Landlord Parking Agreements	n/a	not highly relevant in this more suburban to rural location
3.03	Parking Management	n/a	Does not appear to be relevant to CSAH 46 issues
4.11	Geometric Improvements for Transit	n/a	no transit service on CSAH 46
4.15	Shared Mobility	n/a	could be helpful if fully implementable but not really the issue on CSAH 46
4.21	Parking Restrictions	n/a	Don't see how this would help
Priority 2. Traffic Management Technologies			
4.01	Dynamic Messaging	n/a	not applicable to CSAH 46
4.02	Advanced Traveler Information Systems (ATIS)	n/a	not applicable to CSAH 46
4.03	Integrated Corridor Management (ICM)	n/a	not applicable to CSAH 46
4.04	Automated and Connected Vehicles	n/a	Don't see how this would help
4.05	Advanced Traffic Management System (ATMS)	n/a	not applicable to CSAH 46
4.06	Traffic Signal Coordination	n/a	currently only one signal (at TH 61)
4.08	Changeable Lane Assignment/Dynamic Lane Control	n/a	not applicable to CSAH 46
4.09	Vehicle Use Limitations and Restrictions	n/a	not applicable to CSAH 46
4.10	Improved Signage	n/a	Does not appear to be relevant to CSAH 46 issues
4.12	Intermodal Enhancements	n/a	not applicable to CSAH 46
4.13	Goods Movement Management	n/a	not applicable to CSAH 46
4.14	Towing Improvements	n/a	not applicable to CSAH 46
4.16	Ramp Metering	n/a	not applicable to CSAH 46
4.20	Signal Timing	Medium	possibly, if there are issues at TH 61 signal - need more information - explore
4.23	Network Management	n/a	not applicable to CSAH 46
4.26	Snow Removal	n/a	not applicable to CSAH 46
4.27	Pavement and Bridge Deicing	n/a	not applicable to CSAH 46
4.28	Incident Detection and Management Systems	n/a	not applicable to CSAH 46
4.29	Dynamic Access Changes	n/a	not applicable to CSAH 46
4.30	Access Management Policies	High	Access spacing does not meet guidelines; issue for safety and congestion
Priority 3. Spot Mobility			
4.07	Bottleneck Relief	n/a	Does not appear to be relevant to CSAH 46 issues
4.17	Freeway Auxiliary Lanes that are Shorter than One Mile	n/a	not applicable to CSAH 46
4.18	Ramp Modifications	n/a	not applicable to CSAH 46
4.19	Interchange Removal	n/a	not applicable to CSAH 46
4.24	Superstreet Corridors	n/a	not applicable to CSAH 46/no right-of-way
4.25	Alternative Intersection Design	High	consider roundabout(s)
4.31	Coordinated Preservation Projects	n/a	not applicable to CSAH 46
4.32	CMP Safety Mitigation	n/a	not applicable to CSAH 46
5.02	Turn Lanes	High	possibly - need more information - explore
5.04	Intersection Improvements	High	Intersection improvements appear to be needed and will help with traffic flow and safety
Priority 4. MnPASS (E-ZPass)			
5.05	High Occupancy Vehicle Lane Improvements	n/a	not applicable to CSAH 46
5.06	Managed Lanes	n/a	not applicable to CSAH 46
Priority 5. Strategic Capacity Enhancements			
4.22	One-Way Conversions	n/a	not applicable to CSAH 46
5.01	Corridor Preservation	n/a	not sure what this means/how relevant to CSAH 46
5.03	Reallocation of Current Right-of-Way Space	n/a	r/w not needed for lanes
5.07	Interchange Configuration Modification	n/a	not applicable to CSAH 46
5.08	Additional General-Purpose Lanes	n/a	mainline capacity does not appear to be a constraint currently
5.09	New Roadway Facilities	n/a	Don't see how this would help

For strategy definitions, see CMP Policy and Procedures Handbook Appendix D:

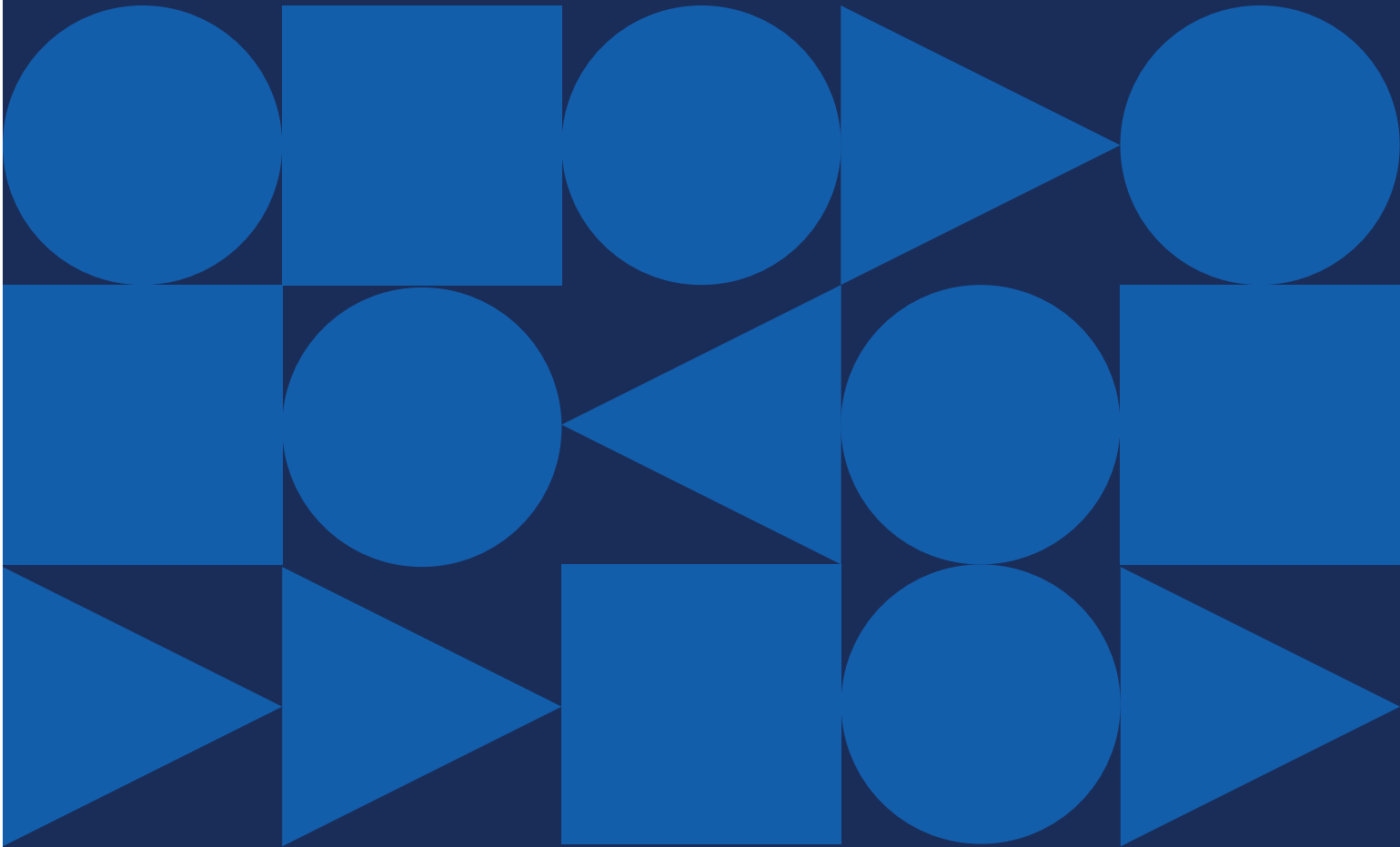
<https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Congestion-Management-Process/CmpDocs/CMP-Appendix-D.aspx>

CMP Strategy Screening: W. Broadway Example Corridor

CMP Appendix D ID#	Strategy	Potential of Strategy to Address Identified Problem(s)	
		Rating	Notes
Priority 1. Travel Demand Management			
1.01	Congestion Pricing (MnPASS)	n/a	not applicable to this urban arterial
1.02	Alternative Work Hours	Low	could reduce peak period demands; requires regional approach
1.03	Telecommuting	Medium	assume relatively fewer office workers but COVID has demonstrated the benefits
1.04	Guaranteed Ride Home Programs	Low	likely to benefit low-income community members; difficult to identify employers
1.05	Alternative Mode Marketing and Education	Low	service and facilities are in place so this would seem cost-effective
1.06	Safe Routes to School	Low	verify any need/opportunity
1.07	Preferential or Free Parking	n/a	not applicable in this neighborhood context
1.08	Event Transportation Management Plans	n/a	not a concern in this location
1.09	Negotiated Demand Management Agreements	n/a	assume already in place
1.10	Trip Reduction Ordinance	n/a	assume already in place
1.11	Infill Developments	Low	Already occurs but important to maintain
1.12	Transit Oriented Developments	Low	already occurs but important to maintain
1.13	Design Guidelines for Pedestrian-Oriented Development	Low	assume already in place but important to maintain
1.14	Mixed Use Development	Low	already occurs but important to maintain
1.15	Long-Range Comprehensive Land Use Planning	Low	assume already appropriate to this context but important to maintain
2.01	Transit Capacity Expansion	Low	already good transit coverage verify need/opportunity
2.02	Increasing Bus Route Coverage and/or Frequencies	Low	already good transit coverage verify need/opportunity
2.03	Implementing Regional Transitways	Low	W. Broadway is potential route for Blue Line Extension; local benefits likely mixed
2.04	Providing Real-Time Information on Transit Routes	n/a	already in place
2.05	Reducing Transit Fares	Medium	high levels of poverty on and near corridor
2.06	Providing Transit Advantages	Low	verify any opportunity for this (e.g., bus stopping in traffic vs. not)
2.07	Provide Transit Signal Priority	Low	verify any need/opportunity/benefit
2.08	Encourage Off-Board Fare Collection	n/a	W Broadway not identified for A-BRT
2.09	Monitor Shifting Freight Numbers	n/a	does not appear to be a concern/driver here
2.10	New Sidewalk Connections	n/a	sidewalk system is complete
2.11	Enhanced Pedestrian Crossings	Low	needs specific review for potential needs/opportunities
2.12	Designated Bicycle Facilities on Local Streets	n/a	W Broadway unlikely to accommodate bike facility and robust/planned system exists
2.13	Improved Bicycle Facilities at Transit Stations and Other Destinations	Low	likely opportunities for this; explore
2.14	Improved Safety of Existing Bicycle and Pedestrian Facilities	Medium	wider sidewalks and separation from traffic would be significant enhancement
2.15	Exclusive Non-Motorized ROW	n/a	no opportunity for this (fully built out)
2.16	Complete Streets	Medium	wider sidewalks, etc. should be prioritized with any improvement project
2.17	Preservation Projects with Multimodal Improvements	n/a	not applicable to this urban arterial
2.18	Park-and-Ride Lots	n/a	not applicable in this urban context
3.01	Ridesharing (Carpools & Vanpools)	Low	potential benefit for accessing suburban job centers
3.02	Employer-Landlord Parking Agreements	Low	likely in place but beneficial especially to lower-income urban commuters
3.03	Parking Management	n/a	generally already in place in Minneapolis
4.11	Geometric Improvements for Transit	Low	explore whether this is a need or opportunity
4.15	Shared Mobility	Low	good for occasional use by people without access to cars but is expensive
4.21	Parking Restrictions	n/a	does not appear to be a concern on W Broadway
Priority 2. Traffic Management Technologies			
4.01	Dynamic Messaging	n/a	not applicable to this urban arterial
4.02	Advanced Traveler Information Systems (ATIS)	n/a	not applicable to this urban arterial
4.03	Integrated Corridor Management (ICM)	n/a	not applicable to this urban arterial
4.04	Automated and Connected Vehicles	n/a	positive benefit in long-term if/when fleet turns over but not foreseeable
4.05	Advanced Traffic Management System (ATMS)	n/a	not applicable to this urban arterial
4.06	Traffic Signal Coordination	Low	assume signals coordinated appropriately already but worth reviewing
4.08	Changeable Lane Assignment/Dynamic Lane Control	n/a	not applicable to this urban arterial
4.09	Vehicle Use Limitations and Restrictions	Low	verify any existing restrictions (are inappropriate trucks a problem?)
4.10	Improved Signage	n/a	no indication that this is a concern
4.12	Intermodal Enhancements	n/a	no indication that this is a concern
4.13	Goods Movement Management	n/a	unlikely to be an issue, esp at east end where loading is likely not on W Broadway
4.14	Towing Improvements	n/a	not likely to be more than an occasional issue
4.16	Ramp Metering	n/a	not applicable to this urban arterial
4.20	Signal Timing	Low	assume signals are optimally timed already but worth reviewing
4.23	Network Management	Low	consider, depending on intersection performance data (on and adjacent to corridor)
4.26	Snow Removal	n/a	not applicable to this urban arterial
4.27	Pavement and Bridge Deicing	n/a	not applicable to this urban arterial
4.28	Incident Detection and Management Systems	n/a	not applicable to this urban arterial
4.29	Dynamic Access Changes	n/a	not applicable to this urban arterial
4.30	Access Management Policies	Low	review access spacing/management opportunities, esp. at east end
Priority 3. Spot Mobility			
4.07	Bottleneck Relief	n/a	no bottleneck issues
4.17	Freeway Auxiliary Lanes that are Shorter than One Mile	n/a	not applicable to urban arterial
4.18	Ramp Modifications	n/a	not applicable to urban arterial
4.19	Interchange Removal	n/a	not applicable to urban arterial
4.24	Superstreet Corridors	n/a	not applicable to urban arterial
4.25	Alternative Intersection Design	n/a	not applicable to urban arterial
4.31	Coordinated Preservation Projects	n/a	not applicable to urban arterial
4.32	CMP Safety Mitigation	n/a	not applicable to urban arterial (but crashes likely to cause some delay)
5.02	Turn Lanes	Low	possibly consider at intersections? But not a expense of other modes
5.04	Intersection Improvements	Low	intersection improvements warranted? (don't have intersection data)
Priority 4. MnPASS (E-ZPass)			
5.05	High Occupancy Vehicle Lane Improvements	n/a	not applicable to urban arterial
5.06	Managed Lanes	n/a	not applicable to urban arterial
Priority 5. Strategic Capacity Enhancements			
4.22	One-Way Conversions	n/a	not a one-way/not appropriate for context
5.01	Corridor Preservation	n/a	urban/built out/expansion not recommended
5.03	Reallocation of Current Right-of-Way Space	Low	possibly solution at east end of corridor?
5.07	Interchange Configuration Modification	n/a	not applicable to urban arterial
5.08	Additional General-Purpose Lanes	n/a	not applicable to urban arterial
5.09	New Roadway Facilities	n/a	urban grid/parallel routes built out

For strategy definitions, see CMP Policy and Procedures Handbook Appendix D:

<https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Congestion-Management-Process/CmpDocs/CMP-Appendix-D.aspx>



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