Congestion Management Process

Draft CMP Congestion Analysis Handbook

METROPOLITAN COUNCIL

10/13/2022 – TPP Technical Working Group – Dave Burns and Tim Burkhardt

Contents

METROPOLITAN COUNCIL

Handbook Purpose and Design

- Help stakeholder agencies and the Metropolitan Council collaboratively identify congestion problems and potential solutions within the context of the regional Congestion Management Process (CMP)
- Designed to simplify the process of assessing and managing congestion while promoting regional collaboration and consistency with the CMP
- Links regional congestion management policy and guidance to community context and transportation needs

Handbook Goals

Provide Guidance

- Provide guidance to stakeholder agencies to help implement the 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

- Use a methodology that prepares users to develop and prioritize multimodal strategies consistent with the CMP and the TPP.

Emphasize People

- Understand transportation needs of people who live in the corridor. Include traditionally underrepresented populations and those with limited access to cars.

Link to Funding

- Prepare users to apply for Regional Solicitation and other competitive sources of funds by aligning with the priorities of those funding sources and programs.

Approach

Keep it Simple

- Selected data only, GIS/map-based
- Transportation Travel Index (TTI)

Integrate Lived Experience

- Interpret, don’t just report

Screen for Possible Strategies

- Incorporation of Strategy Review Matrix

Validate with Sample Corridors

- Range of geography and uses

Living Document

- Update as policy and resources change

Development Process

Consultant Team

- Alliant Engineering + Community Design Group

Project Management Team

- Met Council, MnDOT, FHWA
- 10 meetings

CMP Advisory Committee

- City and County staff representatives
- 5 meetings

Schedule

- 18 months

CMP Handbook: 4 Steps

Step 1: Screen for Congestion

- Travel Time Index (TTI)

Step 2: Understand Context and Causes

- People and Equity
- Land Use
- Transportation

Step 3: Prepare Analysis Summary

- Assessment and Implications
- Public Involvement
- Problem Statement

Step 4: Review Strategies

- Travel Demand Management (TDM)
- Traffic Management Technologies
- Spot Mobility
- E-ZPASS
- Strategic Capacity Enhancements

Step 1: Screen for Congestion

Guides users to the Met Council Congestion Dashboard to look up TTI values

Travel Time Index (TTI)*

- TTI > 1.25 Congested
- TTI 1.0-1.25 Possibly Congested
- TTI <1.0 Not Congested

*TTI: The ratio of actual travel time to free-flow travel time on a given roadway segment.

Step 2: Understand Context and Causes

Collect, analyze, and document data to support multimodal strategies

People and Equity

- BIPOC Population
- Limited English Skills
- Disability Status
- Concentrated Poverty and Affluence
- Transit Dependence
- Affordable Housing
- Low-Wage Worker Household/Job Density
- Workers and Economy

Land Use

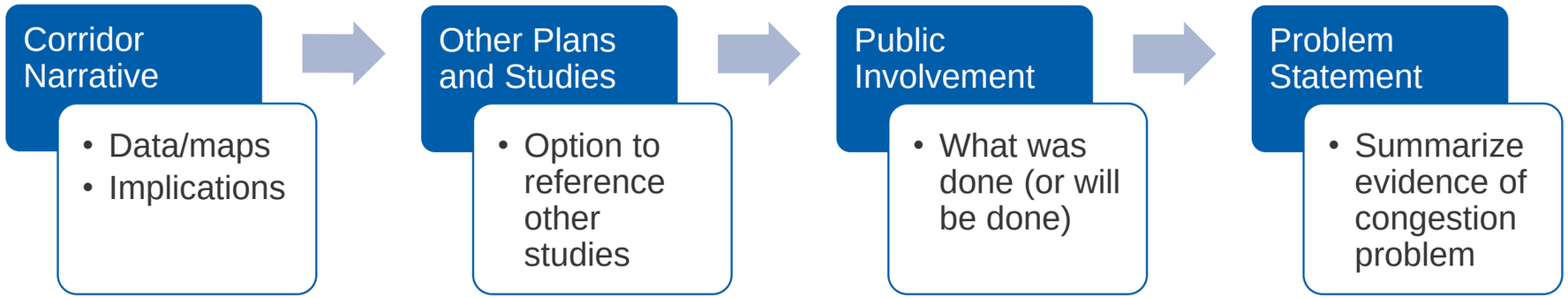
- Service Area Type (Urban/Rural)
- Community Designation
- Context Zone
- Walk/Bike Origins and Destinations
- Transit Market Area

Transportation

- Roadway Features
- Transit, Bicycle and Pedestrian Features
- Traffic Volumes
- Crashes
- Optional Data

Step 3: Prepare Analysis Summary

Summarize data and implications and prepare problem statement



Step 4: Consider Strategies

Review and rate potential strategies to address congestion (Excel tool)

Follow Regional Mobility Hierarchy

1. Travel Demand Management (TDM)
2. Traffic Management Technologies
3. Spot Mobility
4. E-ZPASS
5. Strategic Capacity Enhancements

Rate for Ability to Address Needs/Problems

- By Individual Strategy
  - Low
  - Medium
  - High
  - N/A
- Provide Notes
- Summarize by Category

Summary Checklist – Data and Exhibits

TWIN CITIES CONGESTION ANALYSIS HANDBOOK

Location and Congestion Screen Exhibits & Data Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 1: Project Location	☐ Roadway ownership ☐ Functional classification ☐ CMP network group ☐ Corridor length
Exhibit 2: Traffic Operations and Mobility	☐ Roadway capacity ☐ Existing AM + PM travel time indices (TTI) ☐ Duration of congestion (hours per day TTI>1.25) ☐ Average AM + PM vehicle delay

People Exhibits & Data Elements Checklist

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

Land Use Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 10: Service Area Type	☐ Service area type
Exhibit 11: Community Designation	☐ Community designation
Exhibit 12: Context Zone	☐ Aerial photography ☐ MnDOT land use context: types, identification, and use
Exhibit 13: Walk/Bike Origins and Destinations	☐ Regional bicycle transportation network destinations
Exhibit 14: Transit Market Area	☐ Transit market areas

TWIN CITIES CONGESTION ANALYSIS HANDBOOK

Transportation Exhibits & Data Elements Checklist

EXHIBIT	DATA ELEMENTS NEEDED
Exhibit 15: Roadway Features	☐ Interchange locations and types ☐ Intersection access locations and types + control type ☐ Rail crossings ☐ Typical section ☐ Posted speed ☐ Access spacing ☐ Frontage roads (if applicable)
Exhibit 16: Transit, Bicycle and Features	☐ Existing and planned pedestrian features ☐ Existing and planned bicycle features ☐ Transit characteristics (type, routes, stops) ☐ Transit frequency/volumes
Exhibit 17: Traffic Volumes	☐ AADT ☐ Historical trends
Exhibit 18: Crashes	☐ Number/location of crashes ☐ Crash types ☐ Crash severity
Optional	☐ Pedestrian volumes ☐ Bicycle volumes ☐ Transit ridership ☐ Person throughput ☐ Daily traffic volume profile ☐ Vehicle turning movements/ramp volumes ☐ Truck percentages ☐ Forecast volumes ☐ Forecast capacity ☐ Trip types, speeds, origins & length (time and distance)

Instruction Sheets and Figures

TWIN CITIES CONGESTION ANALYSIS HANDBOOK

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"

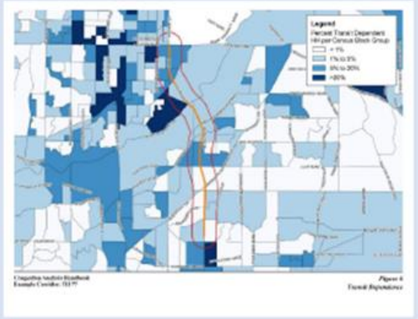
DOCUMENTATION

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

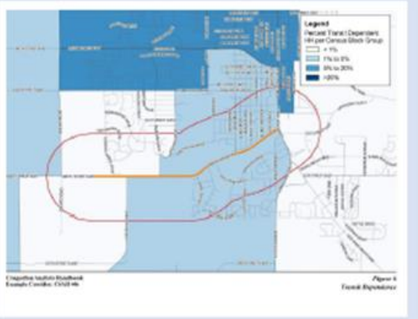
TWIN CITIES CONGESTION ANALYSIS HANDBOOK

Transit Dependence Example Figures

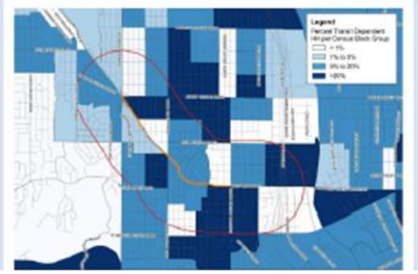
CORRIDOR 1 – TH 77



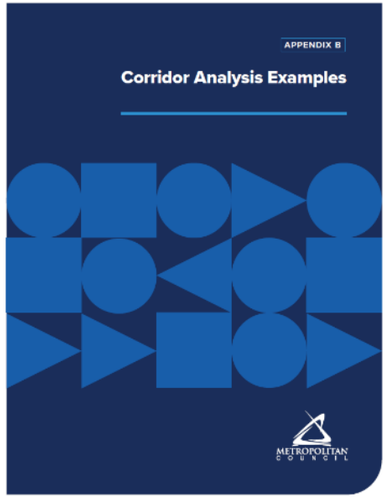
CORRIDOR 2 – CSAH 46



CORRIDOR 3 – WEST BROADWAY



Sample Write-ups for the 3 Corridors



Corridor Analysis Summary

HWY 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 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 (Hwy 77) between I-494 and 138th Street is owned at 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 and is in CMP Network Group 2. (**Figure 1**)

CONGESTION

Based on the volume-to-capacity (V/C) ratio, the corridor operates at LOS B, C, or D, depending on the segment. The more congested areas are between the TH 13 and Killebrew Drive, and just south of 35E. The TTI congestion screening result places the Hwy 77 corridor in the "Possibly Congested" category (TTI between 1.0 and 1.25). (**Figure 2**)

Assessment

PEOPLE AND EQUITY

Demographics: Race and Ethnicity

According to Metropolitan Council data, the corridor is located within a variety of Census Tracts that have low, medium, high, and very high (greater than 50%) concentrations of Black, Indigenous, or People of Color (BIPOC) populations. (**Figure 3**)

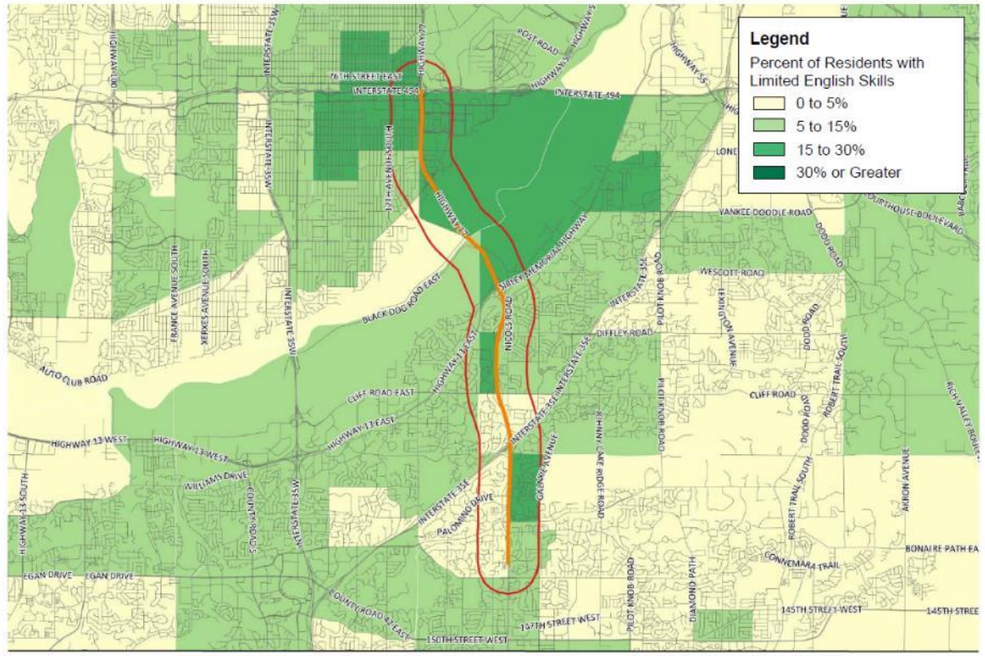
Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include the hiring or participation of community organizers or representatives from specific BIPOC communities. Consideration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

Demographics: Language Spoken

According to Metropolitan Council data, the corridor is located in an area with low, medium, and high presence of residents with limited English language skills. (**Figure 4**)

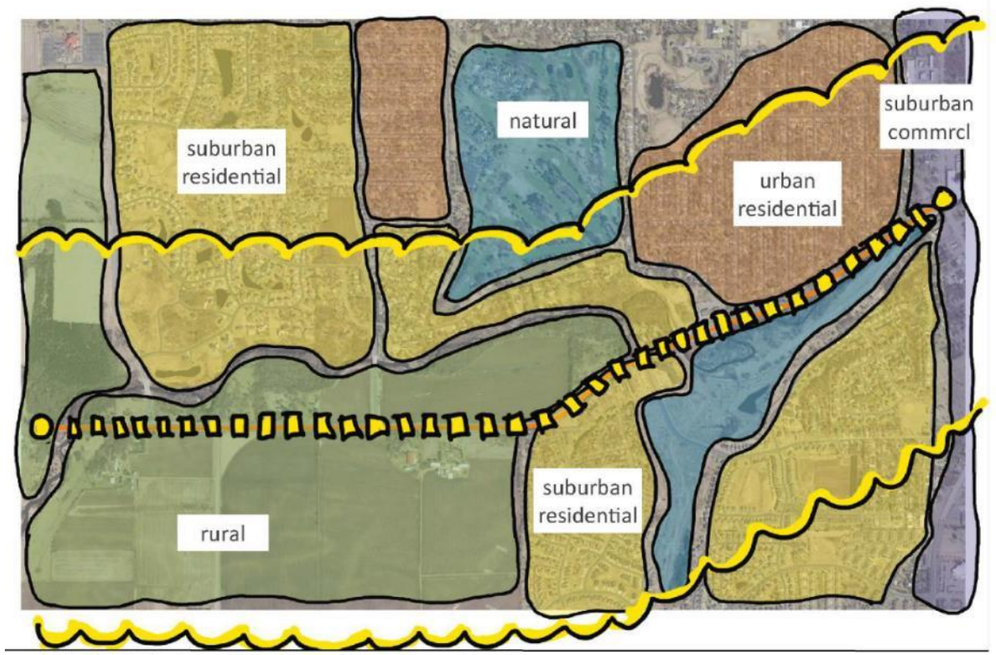
Implications: Successful implementation of project-related communications (including social marketing campaigns and initiatives) and community outreach / engagement efforts should include development of written and spoken materials in languages other than English, participation of interpreters, and other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

Sample Maps and Graphics (1)



Congestion Analysis Handbook
Example Corridor: TH 77

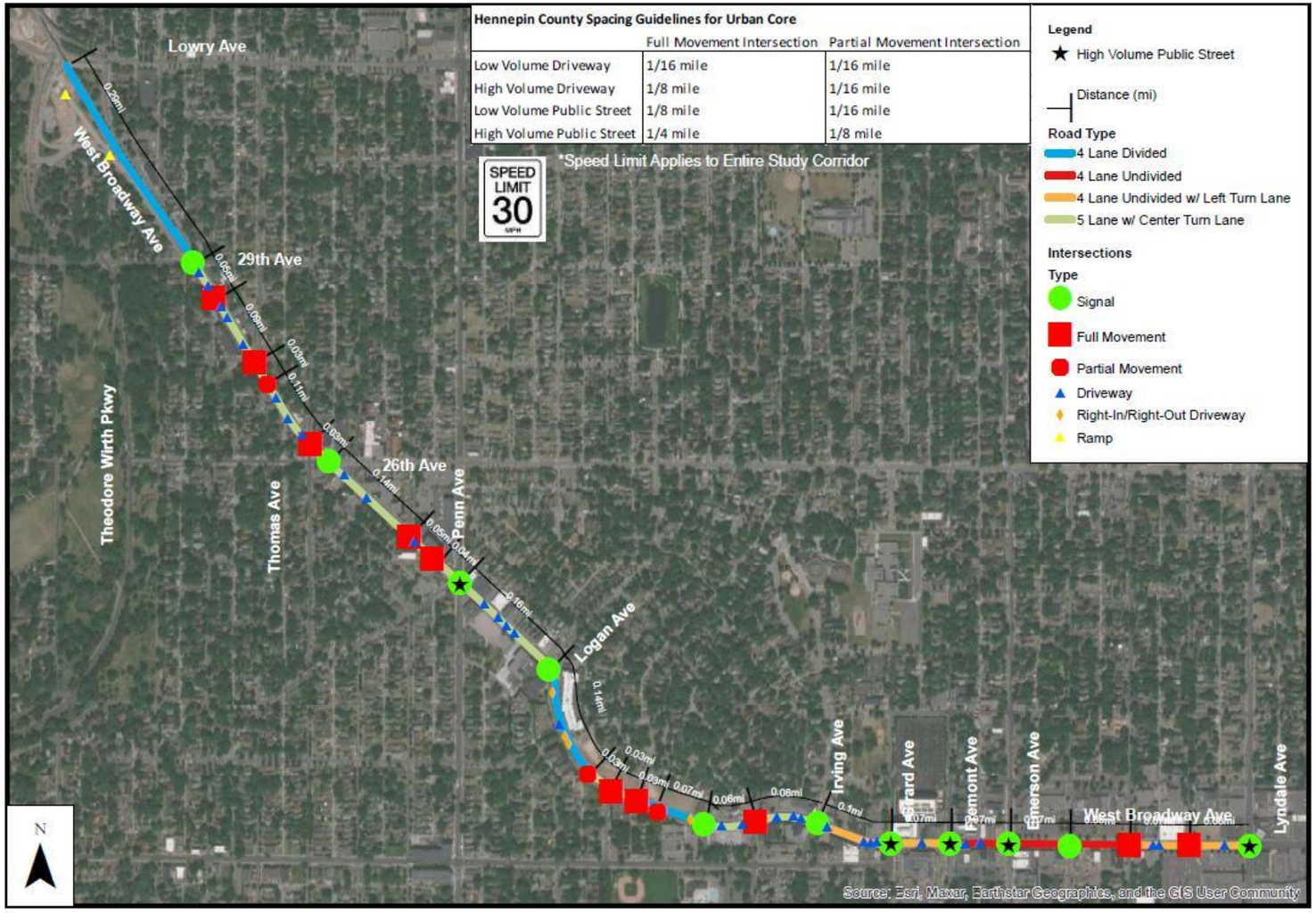
Figure 4
Percent of Residents with Limited English Skills



ngestion Analysis Handbook
ample Corridor: CSAH 46

Figure 12
Context Zone

Sample Maps and Graphics (2)



Congestion Analysis Handbook
Example Corridor: West Broadway Avenue (County Road 81)

Figure 15
Roadway Features

Sample of Screening Tool (1)

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)

Sample of Screening Tool (2)

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 II 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
4.13	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
4.14	Goods Movement Management	n/a	Does not appear to be an issue on TH 77
4.16	Towing Improvements	n/a	Does not appear to be an issue on TH 77
4.18	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
4.24	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

CMP Strategy Screening: CSAH 46 Example Corridor

CMP Appendix D ID#	Strategy	Potential of Strategy to Address Identified Problem(s)	
		Rating	Notes
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 needd 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://metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Congestion-Management-Process/CmpDocs/CMP-Appendix-D.aspx

Next Steps

- Finalize and release Handbook/tool
- New contract to test tool within more corridor contexts (on demand)
- Gain input from stakeholders/refine as needed
- Update/refine as CMP Policies and Procedures Handbook is refined

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