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NEWSLETTER OF THE NORTH CENTRAL SECTION
INSTITUTE OF TRANSPORTATION ENGINEERS
Volume 38 | Number 3 | Summer 2021

INSIDE THIS EDITION

inciter
Cortney Falero
Newsletter Editor

Pedestrian Crossing Treatment Prioritization for Corridor with High Pedestrian Volume

Luis C. Flores, PE | Ramsey County

In each issue, the INCITER features an article coordinated by one of NCITE's technical committees. This article is a contribution from the **Complete Streets & Safety Committee.**

In the years since its 2014 opening in St Paul, MN, the Metro Green Line Light Rail Transit (LRT) line has had a substantial impact on pedestrian volumes crossing University Ave. (CSAH 34) to get to the LRT stations located along the median of the avenue.

To address pedestrian safety concerns resulting from this demand in ridership, Ramey County, with the support of the City of Saint Paul, will be implementing several Rectangular Rapid Flashing Beacon (or RRFB) pedestrian crosswalk systems at various locations along University Ave. in the near future (see layout in Figure 1 below). A publication by the Federal Highway Administration (FHWA) found that "…RRFBs appear to be an effective tool for producing large numbers of drivers yielding right-of-way to pedestrians in crosswalks at sites where drivers rarely yielded to pedestrians. The results seem to be maintained over time." Clearinghouse Crash Modification Factor (CMF) 9024, entitled "Install Rectangular Rapid Flashing Beacon" corresponds to a crash reduction factor (CRF) of 47.4%, further substantiating this treatment as effective.

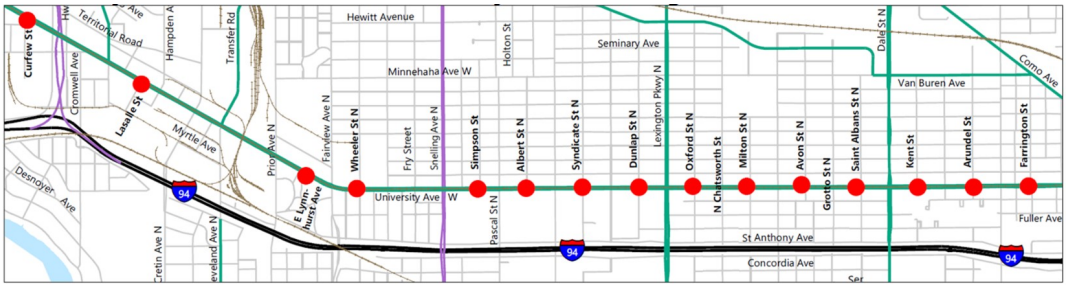

Figure 1 University Ave (CSAH 34) layout. The red dots represent signed crosswalk locations.

The catenary system and tracks for the Metro Green Line run along the median of University Avenue in Saint Paul, MN for over half of its 11-mile route. Of its 23 stations (18 plus five shared with the Blue Line), 11 are located along University Ave. – approximately 5.7 miles from the Prospect Park station to the Capitol/Rice St station. To access the Green Line stations from the north and

(Continued on page 11)

JOB OPENINGS

Visit the NCITE website for current job openings | nc-ite.org

EXECUTIVE COMITTEE

President	**Kevin Peterson**, Washington County 651.430.4330 Kevin.Peterson@co.washington.mn.us
Vice President	**Tyler Krage**, Alliant Engineering, Inc. 507.450.9305 tkrage@alliant-inc.com
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Directors	**Mark Powers**, SRF Consulting Group 651.333.4144 MPowers@srfconsulting.com
	Cortney Falero, SRF Consulting Group 763.452.4806 cfalero@srfconsulting.com
Past President	**Jacob Folkeringa**, SRF Consulting Group 763.452.4730 jfolkeringa@srfconsulting.com

TECHNICAL COMMITTEES

Geometric Design	**Position Open**
Intersection Traffic Control	**Cade Botten,** Hennepin County 612-596-0173 Cade.Botten@hennepin.us
Emerging Technologies	**Position Open**
Complete Streets and Safety	**Hannah Johnson,** Alliant Engineering 612.758.3080 hjohnson@nc-ite.org
Planning Methods and Applications	**Krista Anderson**, SRF Consulting Group 763.452.4804 kanderson@srfconsulting.com
Traffic Operation and Maintenance Discussion Group	**Adam Bruening**, Washington County 651.430.4398 adam.bruening@co.washington.mn.us
Simulation and Capacity Analysis	**Sudheer Dhulipala,** WSB 763.762.2839 SDhulipala@wsbeng.com

STANDING COMITTEES

Young Member Committee	**Jack Olsson,** Kimley Horn 651.393.6158 Jack.Olsson@kimley-horn.com
	Cameron Valuch, Alliant Engineering, Inc. 612.428.7044 cvaluch@alliant-inc.com
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STUDENT CHAPTERS

University of Minnesota— TC	**Mats Dale**, President dale0179@umn.edu
North Dakota State University	**Hizb Ullah Sajid**, President lhizbullah.sajid@ndsu.edu
University of Minnesota— Duluth	**Jason Miller**, President dtsoduluth@gmail.com

MIDWESTERN ITE

Midwestern ITE District Director	**Kristi Sebastian**, Dakota County 952.891.7178 kristi.sebastian@co.dakota.mn.us
Midwestern ITE District NCITE Officer	**Jeff Preston**, Stantec 651.604.4816 Jeff.Preston@stantec.com

PRESIDENT'S MESSAGE

Kevin Peterson, *2021 NCITE President*

Kevin Peterson
President

I want to start with some very sad Section news; **Robert (Bob) Sands** passed away the weekend of August 7. Bob was a Bob was not only a long-standing member of ITE / NCITE, a Distinguished Section Member, Section Life Member, and Section Past President (1990). On behalf on the NCITE I send my condolences. Additionally, I am saddened to hear of the passing of **Derrick Zarling**, **Sue Zarling**'s husband, your family is in our thoughts.

The first NCITE related Covid-19 correspondence I received was in March 2020 (almost 18 months ago)! I am so proud that NCITE has continued to engage its members through Section Meetings, Committee Meetings, Younger-Member Gatherings, Summer Socials, and Annual Meetings among other events. Thank you to everyone for thinking outside of the box to keep things rolling, I can't wait to see what changes become permanent. With that being said, I was so excited to gather in-person for the 2021 Summer Social at the Walker Art Center. This event included mini-golf, food, drinks, and much needed face-to-face socialization. Many thank-yous to this year's Board, specifically, **Cortney Falero**, **Mark Powers**, and **Tyler Krage**!

Looking ahead, the first Great Lakes District Annual Meeting is quickly approaching. This meeting will be held in-person in Colobus Ohio August 29-31. I'm excited about the NCITE members that are set to deliver presentations. If you are on the fence about attending, I want to assure you that a District level meeting is a great introduction to an ITE conference. It's a fantastic way to learn, earn PDHs, and socialize! Don't hesitate to reach out to me or visit the website for more information.

NCITE Elections are right around the corner! This year we will be soliciting candidates for (at least) three Board Positions (Director x2, Treasurer, Secretary), awards (Transportation Professional of the Year and Young Transportation Professional of the Year), Scholarships (Intern x2 and Student x2). Self-nominations are appreciated. If you'd like more information contact me or the Executive Board.

Thank you again to everyone for their flexibility during these crazy pandemic-times, and please do your best to enjoy the rest of summer!

UPCOMING EVENTS

ite Calendar

ITE Calendar for District, Section, & Chapter Meetings

Stay Connected with Virtual Events
Online | Dates Vary

ncite

Attend an Upcoming NCITE Technical Committee Meeting! Check out upcoming topics here.

For more information on the committees and how you can get involved:
https://nc-ite.org/Committee_Listing

For professional development opportunities:
http://nc-ite.org/content.php?page=Professional_Development_Meetings

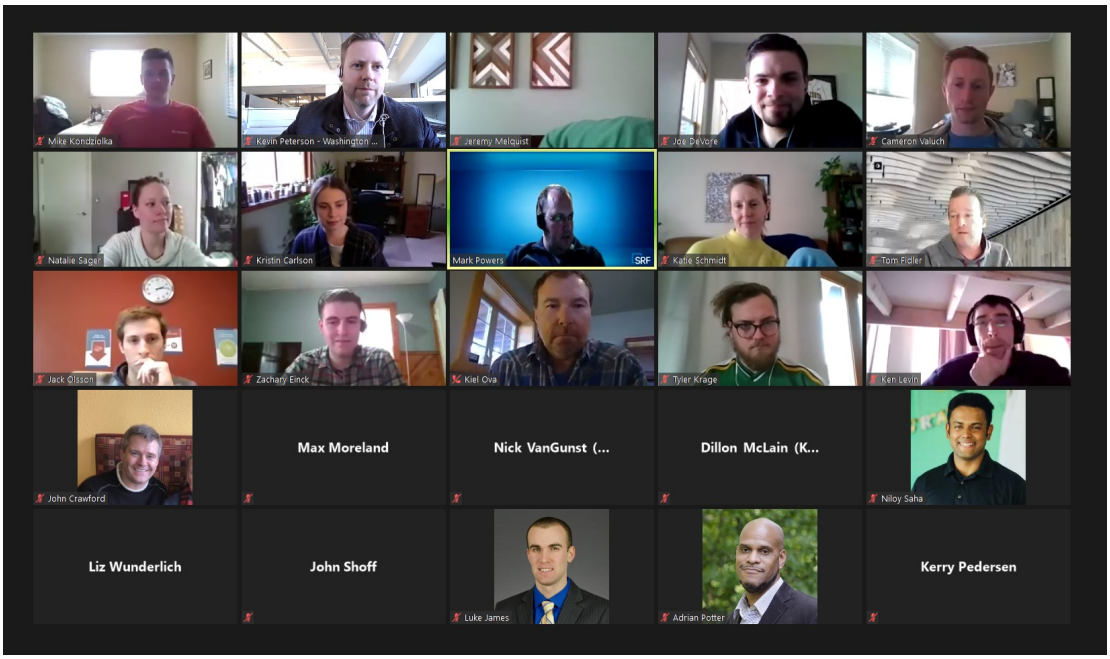
SECTION MEETING UPDATES

February Section Meeting

The February Section Meeting featured a presentation by **Matt Pacyna** from **SRF** and **Jacob Nordick** from **SRF** on the Fargo Main Avenue Reconstruction Project which was awarded the Transportation Achievement Award for NCITE in 2020. Watch the presentation on YouTube!

Highlights included:

- This full reconstruction project improved pavement conditions, sidewalks and ADA compliance, and replaced city utilities past their normal life expectancy. Additionally, updates to help maintain acceptable traffic operations were completed, including adding turn lanes.
- Project began in June 2016 and the final design and bid package was completed in September 2019. Construction in 2018, anticipated cost is $10M.
- The City developed a Collective Vision Statement, that identified the cities needs and focus areas for the future. Three goals for Main Streets across North Dakota included building healthy and vibrant communities, 21st Century workforce, and smart and efficient infrastructure.



March Section Meeting-

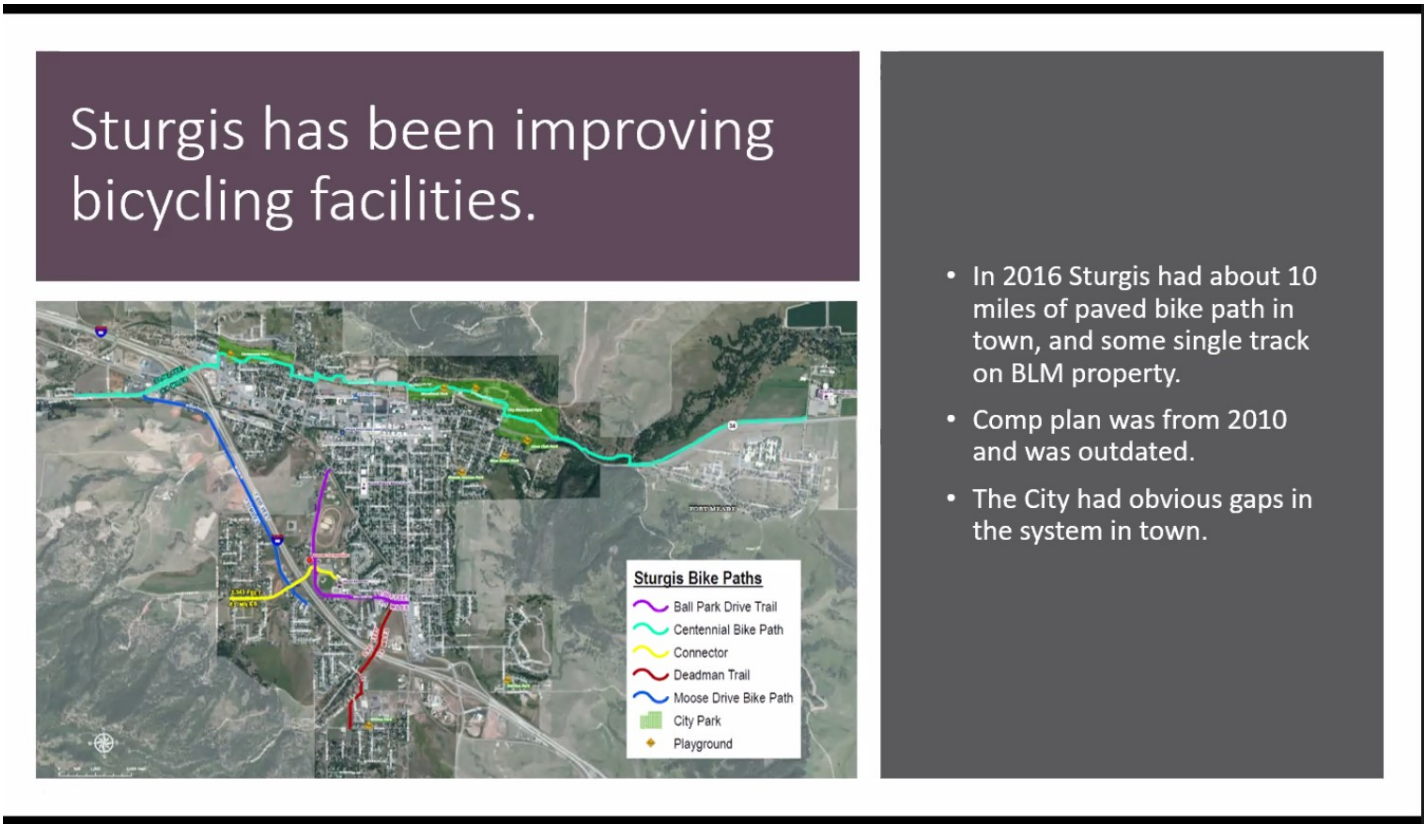
The March Section Meeting featured a presentation on the Sturgis Trail Improvements by **Liz Wunderlich** the **City Engineer of Sturgis, South Dakota.**.

Highlights included:

- Various funding sources were sought out, including grant applications, as well as county, and DOT assistance.
- Recent additions include a bike park, Fort Meade Trail, Barry Stadium Trail (built by BHT), and Centennial Trails. Fort Meade Trail is in a historical district and needed to undergo environmental documentation (completed by the BLM). The city worked with the Fort Meade History Museum to add 10 historical signs along the trail.
- Trails are also used for horseback riding, the National Guard has been asked to assist with this process. The city is also working with State Game Fish and Parks (GF&P) to incorporate a unique walk and fishing experience.

SECTION MEETING UPDATES

March Section Meeting (continued)



April Section Meeting-

The April Section Meeting featured a presentation on the D Line Bus Rapid Transit (BRT) Project by **Shahin Khazrajafari** of **Metro Transit** and **Ryan Bauman** of **HDR**. Watch the presentation on YouTube!

Highlights included:

- Bus Rapid Transit (BRT) is an enhanced bus service with higher elevation platforms and lower bus floors to help with boarding. The stations also have improved amenities and there are reduced wait times at intersections due to transit signal priority. There are more frequent trips with BRT (typically every 10 minutes) and stops approximately every half mile.
- The D Line corridor will operate in Minneapolis, Richfield, and Bloomington; between the Chicago-Lake Transit Center to the Mall of America. Buses will stop in-lane, which makes service more efficient.
- Multi-Agency coordination has been an important element of this project. These agencies include: Hennepin County, MnDOT, the City of Minneapolis, the City of Richfield, the City of Brooklyn Center, and the City of Bloomington.
- Project design was completed in 2020 and construction is now underway. Substantial completion will be in November 2022, with the route operational by December 2022. Construction will be completed in 2023.

SECTION MEETING UPDATES

May Section Meeting-

The May Section Meeting featured a presentation on Transportation Equality by **Abdullahi Abdulle** of **MnDOT** and **Hally Turner** of **MnDOT**.

Highlights included:

- Abdullahi provided a background on past harms done with construction of interstates in the1950s that divided MN neighborhoods and disproportionally impacted people of color.
- There are new opportunities to make transportation planning and investment decisions centered on the needs of people. See the community as the expert, not the other way around.
- Minnesota GO is a program with a goal of maximizing our multimodal transportation system for the health of people, the environment, and our economy.
- Equity is a means and an end. Results, process, and relationships define success.
- MnDOT's Advancing Transportation Initiative includes: research, community conversations, equitable contracting and engagement, programs and process review, research projects (performance measures, gender equity in transportation), and updated long-range plans.
- Statewide Multimodal Transportation Plan: Current working Transportation Equity Definition (under development): Transportation equity ensures the benefits and burdens of transportation spending, services, and systems are fair, which historically have not been fair, and people— especially Black, Indigenous and People of Color—are empowered in transportation decision making.
- MnDOT's developed transportation equity trivia and are available to host this at office or group events or to give presentations on equity or the Statewide Multimodal Transportation Plan. Contract Hally.Turner@state.mn.us if you are interested in this. They will be posting this live online too.
- Lessons learned include:
  - Lack of an agency-wide transportation equity definition or specific target populations is a challenge.
  - Equitable engagement is necessary but not sufficient.
  - Facilitation is important. Reach out to MnDOT if you need help or guidance.
  - Statewide solutions to advance equity can help address broader transportation challenges and vice versa.
  - Need to move beyond research to implementation.
- Resources:
  - Advancing Transportation Equity Initiative: https://www.dot.state.mn.us/planning/program/advancing-transportation-equity/
  - Metropolitan Council / City of Seattle Racial Equality Toolkit
  - Urban Sustainability Directors Network: Equity Foundations Training

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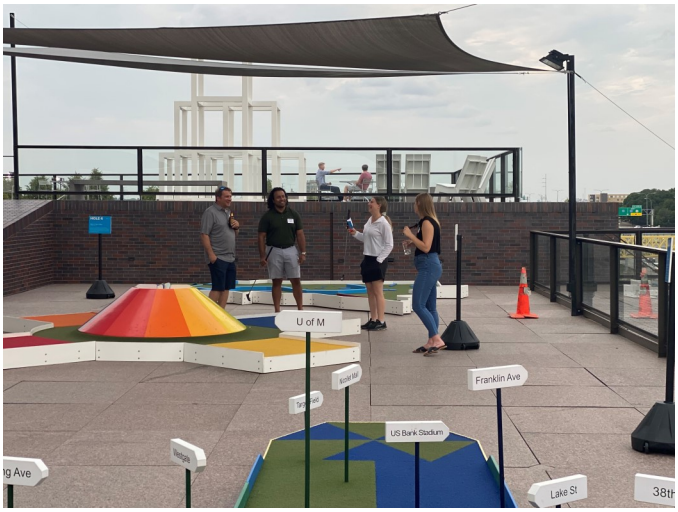
We continue to iterate the way we complete these meetings, and this time has been a perfect opportunity to try out some new things. However, if you have anything that may make these meetings work better or enhance the value for the section, we'd love to hear your thoughts! Please let any your thoughts be known to a member of the board.

SUMMER SOCIAL 2021

The NCITE Summer Social was held on August 8th at the **Walker Art Center Skyline Mini Golf** in **Minneapolis, MN**. Thanks to everyone that came out to the event, $730 was raised for the student scholarship fund!!



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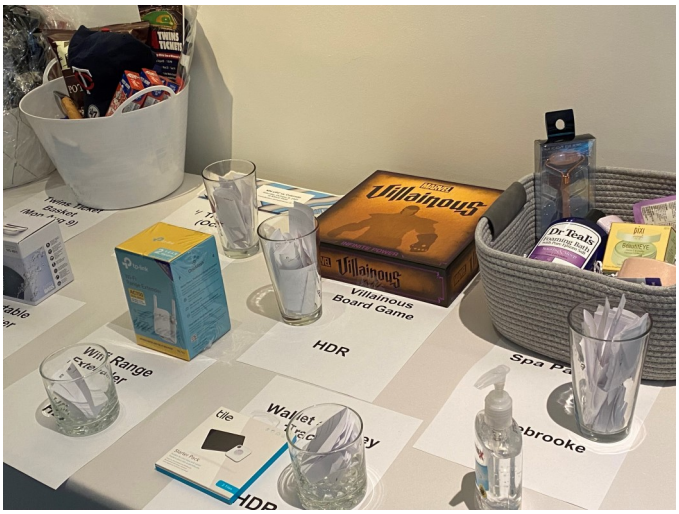


YMC UPDATE

Thanks to all who came out for our annual Bike & Brewery event! We had a great turnout and got to try out a new bike route. Thanks to Zach Toberna for his planning efforts for this awesome event! Our next event is already on the calendar – a kickball matchup against the APWA-MN Young Professionals Group. This event will be held on Wednesday, August 18th at 5:30pm at Rice and Arlington Fields.

More info to come on our future event!!

If you would like to be added to the YMC email list, or know of any new hires/coworkers that would enjoy our events, please send email addresses to
Jack Olsson (Jack.Olsson@kimley-horn.com) or **Cameron Valuch (cvaluch@alliant-inc.com)**

south side of University Ave. requires all LRT riders to use crosswalks. Within these stations there are currently 15 (per direction) non-signalized marked and signed crosswalk locations along University Ave. Some of these non-signalized crosswalks are located where on-street parking is allowed, which, along with traffic lights, trees, signage, and other obstructions may limit a motorist's ability to anticipate pedestrian traffic. In addition to these Green Line stations, bus stops are located along the outside eastbound and westbound lanes within this road segment.

The proximity of this corridor to areas of high development density and its parallel route to I-94 (about a quarter mile south) contributes to a high volume of pedestrians seeking to use public transit. To provide safe mobility to transit riders and other pedestrians, prioritizing the implementation of pedestrian crossing enhancements at these locations is crucial.

Measures & Procedure

To rank and quantify the need at each of the 15 locations, the following measures were evaluated. The contribution weight (in percentage) for each measure is in parenthesis:

- bus ridership (15%)
- LRT ridership (15%)
- Intersection crash rate - three and five-year (30%)
- pedestrian/bicycle crash rate – five-year (40%)

The measure of highest influence was the five-year pedestrian and bicycle crash rate, due to its direct relationship to a location's history of crashes involving vulnerable road users. The Average Annual Daily Traffic (or AADT) along this University Ave. segment ranges from 10,400 to 17,800 vehicles per day; this figure considers both directions. Table 1 below shows the various crash and severity rates for each intersection considered. Crash rate (CR) is defined as the number of crashes per million vehicles entering an intersection for a given number of years. The Severity Rate (SR) takes into account an intersection's crash severity (K=Fatal, A=Serious Injury, B=Minor Injury, C=Possible Injury, and PDO=Property Damage Only). The horizontal bars within some of the Excel cells were achieved through the program's conditional formatting features and illustrate each location's rates for comparison.

Table 1: University Ave intersection rates related to safety and crash history for three and five year periods

Intersecting Street w/University Ave.	Entering Vol.	'16-'18 (3 yr)	3 yr CR	3 yr SR	'16-'18 'Ped/Bike Crashes	'15 - '19 (5 yr)	5 yr CR	5 yr SR	'15-'19 'Ped/Bike Crashes
1. Curfew Street	16100	2	0.11	0.11	0	2	0.07	0.07	0
2. Lasalle Street	18800	1	0.05	0.05	0	2	0.06	0.06	0
3. East Lynnhurst Avenue	14200	3	0.19	0.26	0	7	0.27	0.54	2
4. Wheeler Street	13975	7	0.46	0.72	1	12	0.47	0.63	1
5. Simpson Street	15800	11	0.64	1.10	3	13	0.45	0.76	4
6. Albert Street	15800	13	0.75	1.10	4	21	0.73	1.11	7
7. Syndicate Street	18600	11	0.54	1.08	2	18	0.53	0.94	3
8. Dunlap Street	18600	5	0.25	0.25	1	9	0.27	0.32	3
9. Oxford Street	17100	2	0.11	0.11	0	4	0.13	0.13	0
10. Milton Street	17100	7	0.37	0.48	0	12	0.38	0.48	0
11. Avon Street	17100	1	0.05	0.05	0	7	0.22	0.29	0
12. St. Albans Street	17100	7	0.37	0.48	0	13	0.42	0.51	0
13. Kent Street	15100	5	0.30	0.30	0	9	0.33	0.47	1
14. Arundel Street	16100	8	0.45	0.74	2	16	0.54	0.75	2
15. Farrington Street	17300	3	0.16	0.26	0	3	0.10	0.16	0

Measures were assigned rankings in which a lower number indicates a high priority value in that measure, as seen in Table 2.

Table 2: University Ave. intersection ranking summary—number depicted are rankings not ranks

Intersection w/University Ave.	Rankings					
			3 Year Summary		5 Year Summary	
	Boarding (Bus)	Boarding GL	CR	Ped/Bike Crash	CR	Ped/Bike Crash
1. Curfew Street	14	8	12	7	14	9
2. Lasalle Street	14	9	15	7	15	12
3. East Lynnhurst Avenue	6	10	10	7	9	5.5
4. Wheeler Street	9	15	4	5	4	7.5
5. Simpson Street	2	1	2	2	5	2
6. Albert Street	1	2	1	1	1	1
7. Syndicate Street	5	2	3	3	3	3.5
8. Dunlap Street	4	4	9	5	10	3.5
9. Oxford Street	3	4	13	7	12	12
10. Milton Street	11	11	6	7	7	12
11. Avon Street	12	11	14	7	11	12
12. St. Albans Street	7	6	6	7	6	12
13. Kent Street	10	6	8	7	8	7.5
14. Arundel Street	8	13	5	3	2	5.5
15. Farrington Street	13	13	11	7	13	12

Finally, measures were weighed and ranked, as shown in Table 3.

Table 3 University Ave. weighted rankings

Intersection w/University Ave.	Rank
Albert Street	1
Simpson Street	2
Syndicate Street	3
Arundel Street	4
Dunlap Street	5
Wheeler Street	6
St. Albans Street	7
Kent Street	8
Milton Street	9
Oxford Street	10
3. East Lynnhurst Avenue	11
Farrington Street	12
Curfew Street	13
Avon Street	14
Lasalle Street	15

Other additional factors considered included each intersection's proximity to schools and to future Ramsey County and City of Saint Paul projects.

(Continued on page 13)

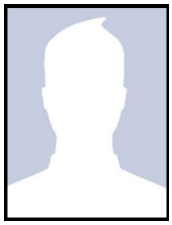
Pedestrian Crossing Prioritization for Corridor with High Ped Volumes (continued from page 12)

Conclusions and Future

In late 2020, Ramsey County was awarded Highway Safety Improvement Program (HSIP) funding as part of that year's Regional Solicitation process which will make it possible to address the top four ranked intersections. Support from the City of Saint Paul was provided during the application process in conjunction with a letter of support. Pedestrian crossing treatments at the subsequent four intersections (ranked five through eight) will be implemented in conjunction as part of the County's Transportation Improvement Program. This project is in line with Ramsey County's *All Abilities Transportation Network*, an organization-wide approach to ensure that transportation projects prioritize the most vulnerable users. In addition to the implementation of two sets of RRFBs (four total) at each location, Accessible Pedestrian Signals (APS) will be installed and pedestrian ramps will be reconstructed to meet Americans with Disabilities Act (ADA) standards.

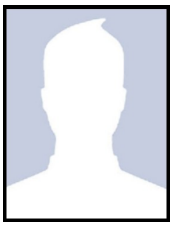
https://nacto.org/case-study/university-avenue-green-line-minneapolis-st-paul/
https://www.fhwa.dot.gov/publications/research/safety/pedbike/10046/index.cfm
http://www.cmfclearinghouse.org/detail.cfm?facid=9024
https://metrocouncil.org/Council-Meetings/Committees/Transportation-Advisory-Board-TAB/2020/December-16,-2020/2020-38-AT-2020-HSIP-Project-selection.aspx
https://www.ramseycounty.us/sites/default/files/Projects%20and%20Initiatives/RamseyCounty2040_Active%20Living%20Ramsey.pdf

TECHNICAL COMMITTEE UPDATE



Geometric Design Technical Committee
Committee Chair: **Position Open**
Recent Agenda Items: No recent meetings
Future Agenda Items: No planned meetings
Next Meeting: TBD

Intersection Traffic Control Technical Committee
Committee Chair: **Cade Botten -** Cade.Botten@hennepin.us
Recent Agenda Items: Non-motorized traffic—bike signals, ped detection, LPI
Future Agenda Items: Timing/Amalysis Technology—Synchro 11, TranSync, File Maintenance and workflow
Next Meeting: TBD



Emerging Technologies in Transportation Technical Committee

The Intelligent Transportation Systems Committee has become the Emerging Technologies Transportation Committee. Jake Eisinger (Washington County) and Zach Parsons (Bolton & Menk) are the new Co-Chairs. Keep an eye on the NCITE website to learn more about the new committee and upcoming meetings.

Complete Streets and Safety Committee
Committee Chair: **Hannah Johnson -** hjohnson@nc-ite.org
Recent Agenda Items: No recent meetings
Future Agenda Items: No planned meetings
Next Meeting: TBD

Planning Methods and Applications Technical Committee
Committee Chair: **Krista Palmer** - kpalmer@srfconsulting.com
Recent Agendas Items: TBI survey results
Future Agendas Items: Impacts of telecommuting on travel demand modeling
Next Meeting: TBD

Traffic Operation and Maintenance Discussion Group
Committee Chair: **Adam Bruening** - adam.bruening@co.washington.mn.us
Recent Agenda Items: Greg Boche (City of Woodbury) introduced as new committee chair.
Future Agenda Items: TBD
Next Meeting: TBD (First Wednesday of each month)

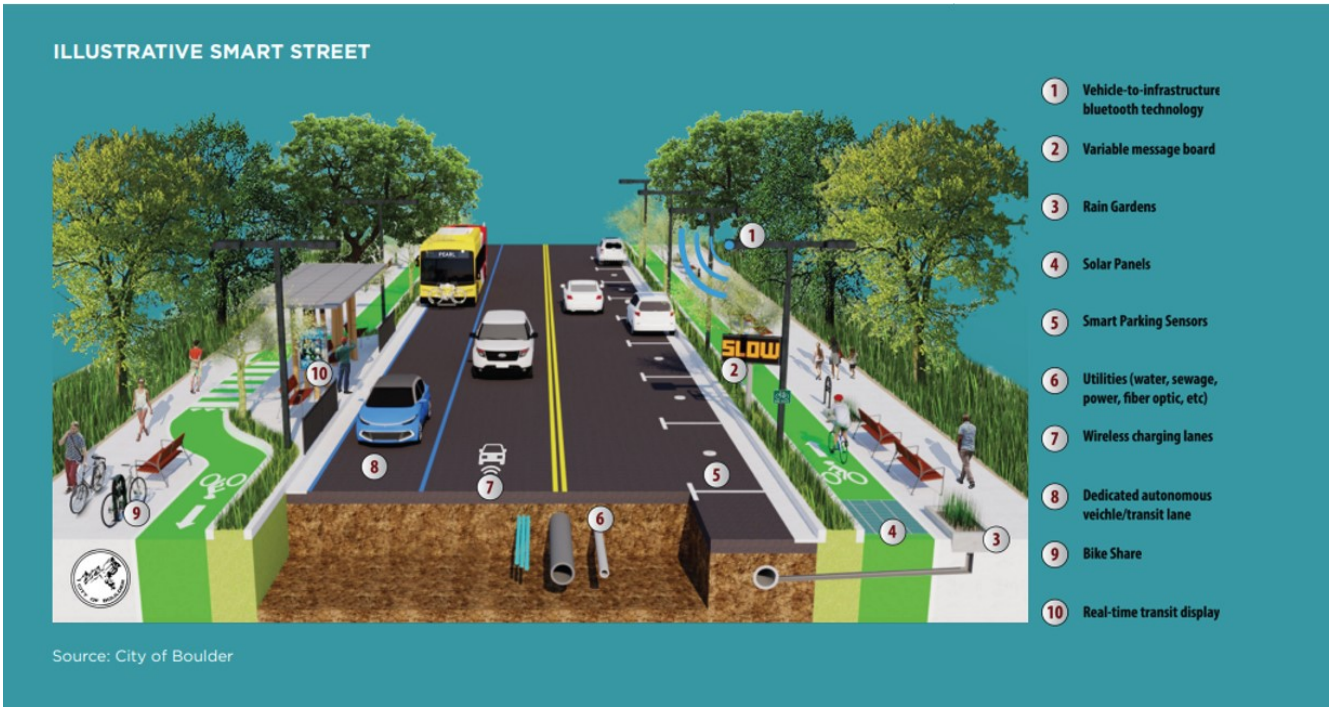
Simulation and Capacity Analysis Technical Committee
Committee Chair: **Sudheer Dhulipala -** SDhulipala@wsbeng.com
Recent Agenda Items: Presentation by Joe DeVore & Brian Kary on Iteris ClearGuide.
Future Agenda Items: TBD
Next Meeting: September virtual meeting TBD

Redefining Complete Streets

Tim Thoreen, PMP | HR Green

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **HR Green.**

The "Complete Streets" definition provided by the U.S. Department of Transportation is representative of the standard we have become used to: "Complete Streets are streets designed and operated to enable safe use and support mobility for all users. Those include people of all ages and abilities, regardless of whether they are traveling as drivers, pedestrians, bicyclists, or public transportation riders." In this view of complete streets, the focus is on maximizing modes of transportation carried through a corridor's constrained environment. However, this somewhat narrow view of a street's functionality is in need of a broader perspective today.



City of Boulder Illustrative Smart Street

Three key considerations that are leading to an evolving definition of complete streets:

1. Street Right-of-Way as an Asset

The City of Minneapolis recently updated its Transportation Action Plan. Recognizing that 22% of the City's landmass is dedicated to street rights of way, Minneapolis is committed to unlocking the potential of its streets as an asset for broader purposes. The new plan addresses a variety of inequities in how streets are used across the city. For example, a renewed emphasis on green space is identified as a measure to provide better stormwater management measures and reduce the heating effects of pavement.

FHWA is also supporting possibilities for "leveraging alternative uses" of right-of-way. FHWA has identified "pressing public needs relating to climate change, equitable communications access, and energy reliability" that will benefit from consistently applied, programmatic guidance to enable solutions to these needs.

(Continued on page 16)

Redefining Complete Streets (continued from page 15)

2. Multiple Functions, Limited Space
Our changing climate has impacted the infrastructure needed to function as a community. One of the areas this has become most noticeable is in precipitation patterns, where rainfall events are frequently more int

ense than ever before. Traditional street design is often overwhelmed by rainfall, and the result is more flooding. Greater emphasis is now placed on incorporating green features such as permeable pavement, rain gardens, vegetated curb areas, and sidewalk trees. These green streetscape design elements help efficiently capture and manage rainwater where it falls.

As we try to extract more functions from our streets, technology solutions offer new opportunities to maintain and improve the operational aspects of streets. With relatively minor space requirements, the incorporation of broadband, fiber, and "Internet of Things" into a corridor can open new doors for congestion management, parking systems, lighting, and asset management, among other benefits, while also providing a critical piece of infrastructure for the entire community.

3. Never forget safety!
Any vision for a Complete Streets must continue to embrace the "vision zero" approach for safety. Pedestrian safety concerns have risen over the last decade, with a 46% increase in fatalities from 2010 to 2019. Preliminary results from 2020 suggest pedestrian fatalities increased nearly 5% this past year despite an overall decrease in vehicle miles traveled (ghsa.org).

Smart Growth for America captures this intent with the following proclamation: "By adopting a Complete Streets policy, communities direct their transportation planners and engineers to routinely design and operate the entire right of way to prioritize safer, slower speeds for all people who use the road, over high speeds for motor vehicles. This means that every transportation project will make the street network better and safer for people walking, biking, driving, riding transit, and moving actively with assistive devices—making your town a better place to live." This shift was recently put on display during the pandemic when the City of Oakland employed a "Slow Streets" campaign that dedicated roadways exclusively to pedestrian uses.

(Continued on page 17)

Redefining Complete Streets (continued from page 16)

How will you redefine Complete Streets?
Whether it's "Smart", "Green", "Safe", or "Slow", the collective momentum for a redefinition of Complete Streets is clear. Technology, environment, and social attitudes are changing what it means to "use" a street. As transportation planners and engineers, our opportunity is clear: now is the time to make a long-term positive impact on our communities by creating streets that genuinely meet the needs of all users.

Saint Paul bicyclists are able to enjoy a clear lane

It's Time to Require a Daily Traffic Analysis

Joe Devore, PE, PTOE, RSP2(1) | KLJ Engineering

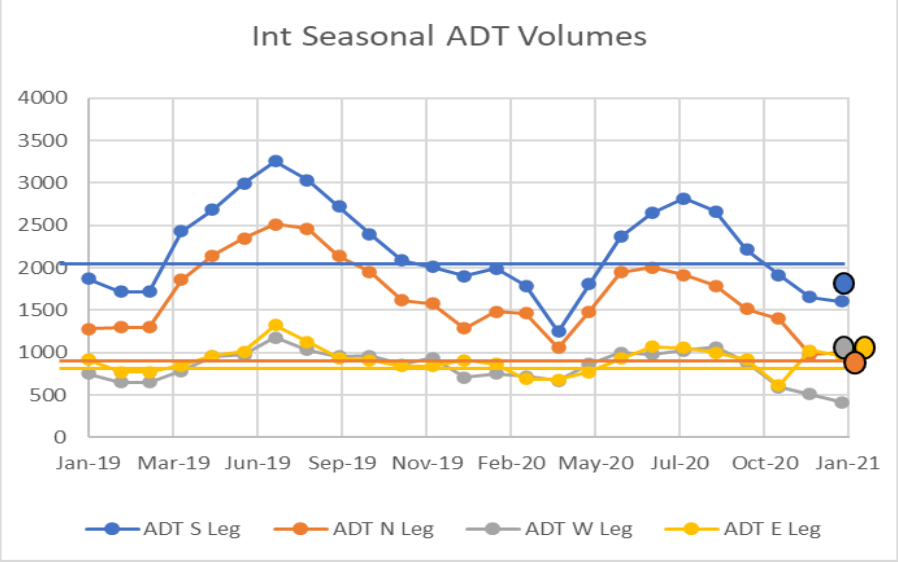
In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **KLJ.**

The Minnesota Department of Transportation (MnDOT) has made strategic investments over the last decade to maximize the amount of traffic data that is available for use on traffic and transportation related projects. These investments using big data sources such as StreetLight, Clearguide, HERE, Inrix, iPEMS, and MnDOT's statewide automatic traffic recorder (ATR) stations have allowed traffic engineers to consider daily trends, seasonal adjustments, and to make sense of traffic volumes during the Covid-19 pandemic. While this data provides a ton of benefit to a project on a high level allowing non-traffic engineers to understand origins and destinations of traffic, these advantages are lost when a traffic analysis is only completed for the peak hour periods during the day. This trend needs to change, and a 24-hour traffic analysis needs to be recommended to make sure intersection and corridor improvements address both the operations of a vehicle stuck in PM Peak hour congestion and the operations and safety of a vehicle during non-peak periods at a major intersection.

Collecting Daily Traffic and Safety Data

Collecting AM and PM Peak Hour data usually recognizes the highest congestion hour during a daily period. However, almost 80% of traffic volumes and 85% of crashes occur during non-peak periods. This means that a preferred alternative addressing the peak hour congestion at an intersection or along a corridor could recommend an option that limits operations and safety benefits for over 80% of daily traffic along a corridor. There are several statistical deficiencies in collecting only turning movement counts (TMCs) for a traffic project. By only utilizing TMCs from parts of one or two days, these counts could be outlier conditions compared to other seasonal variations, be captured during a non-recurring event, or be collected during a construction project that includes posted or unposted detouring traffic. Validating these TMCs using StreetLight 24-hour data for monthly intervals can better validate TMCs or show a different trend in traffic that needs to be captured for traffic analysis. This data can also be used to identify if any Friday or weekend peaks have larger hourly traffic volumes than weekday peak count data.

Using big data to identify daily volume changes on a corridor over the last 3 years, allows you to compare (right) the differences between seasonal variation (graph), published AADT (lines), effects of Covid-19, and how collected TMC counts (dots) are all related.



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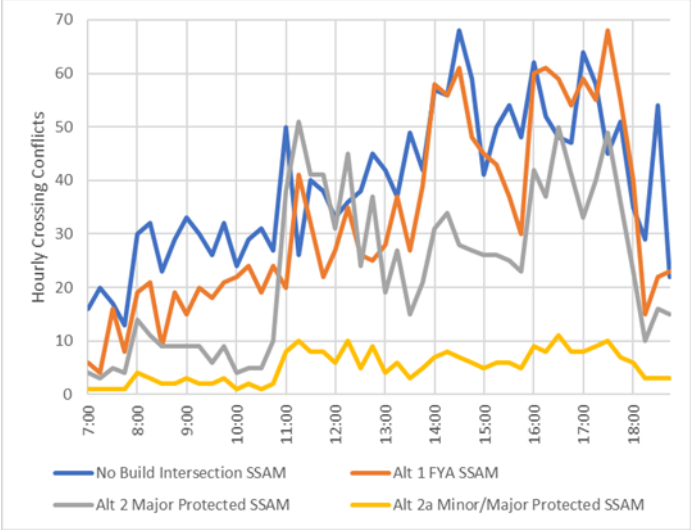
It's Time to Require a Daily Traffic Analysis (continued from page 18)

Advantages of 24-hour Modeling

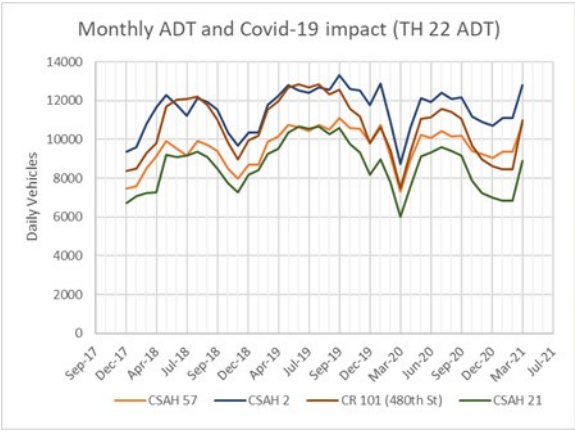
Using a 24-hour modeling approach allows results to consider the operations and safety benefits for the entire day and allows for better extrapolation into yearly benefit cost analysis. Programs like PTV VISSIM allow users to enter detailed peak hour factors while also allowing for 24-hour volumes and routing information to be added into each model. This allows Measures of Effectiveness (MOE) exports to identify peak issues, but also identify the average daily benefits for vehicle delay, travel times, emissions, and total travel time and distances. By comparing this between existing, no build, and alternatives, benefits can be clearly quantified and used to make difficult project decisions. Utilizing FHWA's Surrogate Safety Assessment Model (SSAM) provides even more benefit by incorporating daily safety benefits and can also be used for analyzing which time periods are most likely to produce safety conflicts that could lead to higher crash rates.

By looking at 15-minute crossing conflicts between alternatives, time of day plans for the safest flashing yellow arrow operations can be easily identified, compared, and implemented on a site-specific basis.



TH 22 Case Study

A great case study of this 24-hour volume and modeling analysis was a project completed for MnDOT District 7 between St Peter and Mankato that used StreetLight Data to identify that past TMC counts had been collected during a river flooding event. An upstream bridge was closed raising volumes in the study area and likely causing the need for a larger intersection improvement. Using StreetLight monthly analysis for the last 4 -years identified one other event increasing monthly volumes, so the analysis volumes were decreased to match the average yearly trends. Because of this 24-hour analysis using volumes that matched the true average conditions for the corridor, a Single Lane roundabout, Continuous T, and passing lanes are being designed for the corridor to maximize safety and provide the highest daily benefit to regional operations.



Northwest Metro Mississippi River Crossing Analysis - Using a New Approach to Evaluate Mobility Improvements During the COVID –19 Pandemic

Paul Morris, PE | SRF Consulting & Jennifer Wiltgen, AICP | MnDOT

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **SRF Consulting Group.**

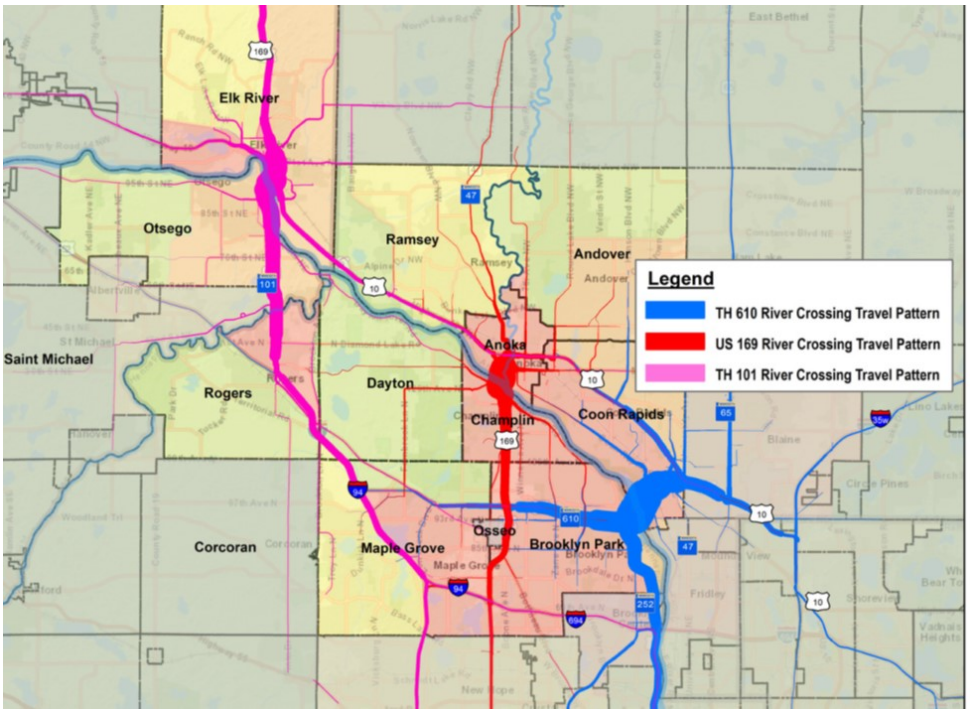
In 2019, the Minnesota Legislature allocated funds for MnDOT to conduct a review of Mississippi River crossings in the northwest portion of the Twin Cities metro area. MnDOT partnered with SRF Consulting Group, along with Bolton & Menk, Sambatek, and Haifeng Transportation Engineering, to complete a feasibility analysis of needs and opportunities. Historically there has been interest in pursuing a new Mississippi River crossing in this area, and while this analysis did consider this option, it also took a step back to systematically understand the existing issues, future needs, and overall capacity constraints related to river crossing mobility. In other words, the analysis started by asking "What's the need or problem we're trying to address?"

In addition, this effort was conducted almost entirely coincident with the COVID-19 pandemic. In addition to the logistical hurdles this presented – such as in-person meeting restrictions and working from home – it also raised some serious concerns about the assumptions for future travel in the area. For example, questions like *will high levels of telecommuting continue?*, *will congestion come back on these highways?*, and *are mobility improvements still cost effective?* began to dominate dialogue with stakeholders. It was clear that these questions needed to be addressed.

What are the issues?

The focus of this effort was a technical evaluation of the characteristics and performance of trunk highways serving regional travel in the study area. To establish the current operations, two evaluations were completed using readily available sources of travel data. The first was a congestion analysis. This utilized MnDOT's subscription to ClearGuide, an online interface providing access to GPS-based speeds on roadways across Minnesota. The results for 2019 conditions showed that virtually all the trunk highways in the study are experiencing recurring congestion, due to bottlenecks caused by traffic signals and merging traffic.

The other existing conditions analysis was a review of travel patterns using StreetLight Insights. This was used to visualize key origin and destination patterns of trips using the three river crossings at TH 101, TH 169, and TH 610. Important differences in length of travel and directional distribution by time of day were also explored.



(Continued on page 21)

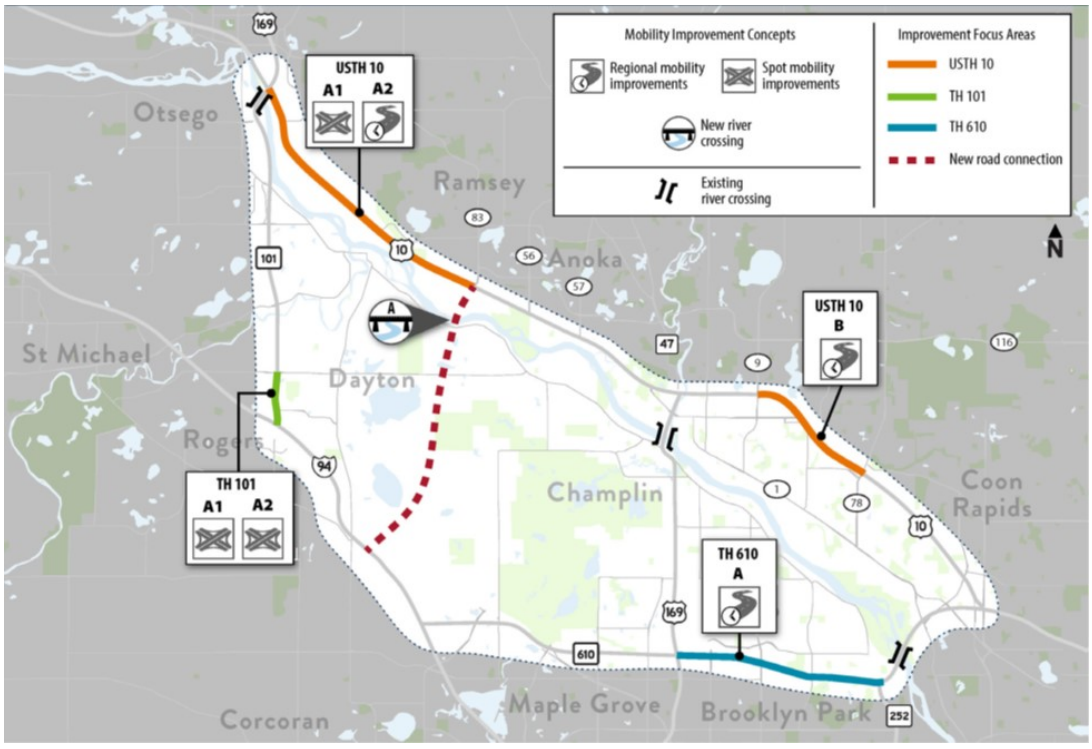
A New Approach to Evaluating Mobility During a Pandemic (continued from page 20)

One very enlightening finding was the enormous increase in regional trips on TH 101 on holiday weekends; indeed, the number of long-distance trips on the Friday before Memorial Day showed a four-fold increase compared to typical weekdays!

The study also reviewed plans for future land use and transportation development in the region. Plans highlighted that major residential and employment growth is anticipated and emphasized that any improvements address existing deficiencies and long term demands on the system; as most plans identified intensified land use along primary travel corridors and crossings.

What are the solutions?

To address the existing and future needs, a wide variety of improvements were developed and evaluated for the trunk highways in the study area. These ranged from low to higher cost, and included a mix of at-grade, grade separated, and expansion concepts. To evaluate the solutions, combinations of improvements were packaged together as concepts that could be implemented as a whole or individually over time. Traffic forecasting and analysis was performed to assess the impacts of the improvements on travel patterns, traffic volumes, and operational performance. Results were very promising, showing that nearly all the improvements would serve not only existing demands, but also future traffic growth as well.



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A New Approach to Evaluating Mobility During a Pandemic (continued from page 21)

Finally, benefit-cost analysis was performed on the concepts to evaluate r cost-effectiveness. This process uses a 20-year horizon to weigh the travel time, safety, and vehicle operating benefits against the life-cycle capital and maintenance costs of each concept. The results showed all concepts having benefit-cost ratios in the 1.0 to 1.5 range, indicating that benefits would be expected to outweigh costs over the next 20-plus years. It should be noted that this was a planning-level feasibility analysis with no recommendations or selection of alternatives; those steps are expected to occur later as part of an environmental review process and with additional public engagement.

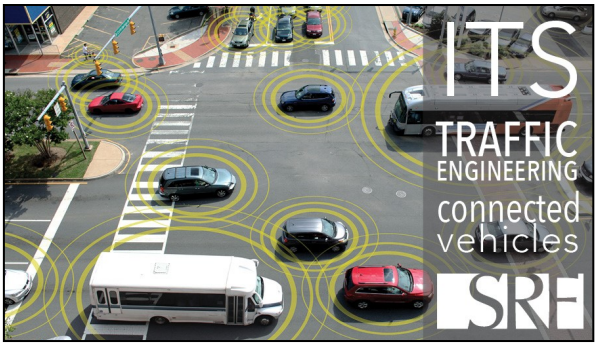
What about COVID?

Conducting this analysis during the pandemic introduced some serious challenges. As is well documented, traffic and congestion were dramatically reduced. However, changes were not uniform, with variations across geographic areas that have different land uses, industries, and local responses. These traffic changes highlighted the uncertainty regarding long term trends. Would high levels of telecommuting, e-commerce, and home delivery services change the mobility needs on these highways and across the Mississippi River? How would this impact cost-effectiveness of the proposed improvements?

Addressing these questions involved an in-depth sensitivity analysis future travel behavior. This process started by performing a comparison of congestion and travel patterns prior to and during the COVID-19 pandemic. This revealed that not all congestion disappeared, with traffic signal associated congestion still largely present on several trunk highways.

Next, the project team used the Metropolitan Council's Regional Travel Demand Model to develop special traffic forecasts. These forecasts assumed an additional 20 percent of workers would telecommute through 2040, by adjusting the work-related tours in the activity-based model. These sensitivity forecasts provided key inputs to reassess the post-pandemic operational needs and run the improvements through a more conservative cost-benefit analysis that assumes lower volumes. Remarkably, results of the evaluations were found to support many of the same conclusions as the original analysis, specifically that there are several feasible options to meet the mobility needs in the study area – including with a new river crossing – and that these would remain cost effective even with higher levels of telecommuting the future.

In summary, this effort was successful in evaluating the technical feasibility of future improvements to existing highways and potentially a new crossing to service communities in the northwest metro area. It leveraged several cutting-edge resources available to our industry including StreetLight, ClearGuide, and the Regional Travel Demand Model, and pushed the boundaries of what these tools can do. This is a wonderful example of how technical evaluation, analytical creativity, and collaborative partnerships can produce valuable insights for decision-makers to help guide the future of transportation in our region.



ITE LOL

Source: Dilbert

MEMBERSHIP UPDATE

New Members

Elizabeth Heyman, City of Minneapolis

Greg Stumpf, City of Minneapolis

Bryan Dodds, City of Minneapolis

Ethan Fawley, City of Minneapolis

Matthew Dyrdahl, City of Minneapolis

Jasna Hadzic-Stanek, City of Minneapolis

Nic Racek, City of Minneapolis

Ole Mersinger, City of Minneapolis

Meseret Wolana, City of Minneapolis

Jeff Handeland, City of Minneapolis

Adam Hayow, City of Minneapolis

Rick Kreuser, City of Minneapolis

Dillon Fried, City of Minneapolis

John Lundstrom, City of Minneapolis

Riley Mitts, Kimley-Horn

Krista May, Infrastructure Design Group Inc.

New Student Members

Cynthia Rosen, University of Minnesota

Satpal Singh Wadhwa, ND State University

Moves

Anna Potter, City of Saint Paul, formerly Kimley-Horn

Peter M. Lemke, Michael Baker International, formerly Bolton & Menk, Inc.

Michael Odell, Alliant Engineering, formerly University of Minnesota

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IN REMEMBRENCE

Robert (Bob) Sands

Bob passed away on March 8, 2021 at the age of 78. He was a long time active Life Member of NCITE right up to the last couple of years as Parkinson's heavily took over his body. He was our President in 1990 and was awarded NCITE's highest honor of Distinguished Member. He was the Treasurer of the District 4/ Mid-western District in 1991. Bob participated on Local Arrangements Committees when we hosted many of the District and International Annual Meetings. At the 1996 International ITE Annual Meeting he was affectively known as "Haberdashery Bob" since he was the chair of the committee that was assigned all of the miscellaneous jobs that didn't have any other clear committee responsibilities.

Bob grew up in Minneapolis and graduated from West High School. His undergraduate Degree in Civil Engineering was from the University of Minnesota and Master in Urban Planning was from NYU.

He started his profession with Edwards and Kelcey and continued with the Jacobs Engineering Group when they acquired E and K. He was very proud of being part of the design build of the Light Rail Transit in Minnesota.

Bob and his wife of 54 years, Beverly, enjoyed traveling the world, their home in Bloomington and winter home in Fort Myers Florida, U of M football, MN Wild Hockey, and golfing.

He definitely made an impact in NCITE. We extend our deepest sympathy to Bob's family — he will be greatly missed.

If you or a friend has changed jobs or moved, we would like to stay in touch. Members, please update your information by visiting http://www.ite.org/membership/index.asp. To access this area, you will need to know your membership number. Your "username" is your membership number, and your "password" is the first 6 letters of your last name (e.g. Johnson=Johnso). Non-members please contact Jack Olsson via phone (651.393.6158) or email (Jack.Olsson@kimley-horn.com) for assistance. Please provide you name, title, employer, complete street address (including mailstop, if applicable), telephone number, fax number, and email address.

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