

Access to Opportunity: counting both ends of the trip

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CTS Accessibility Observatory

MCEA 2023 Summer Meeting





Overview

- What is (this kind of) Accessibility?
- What is the Accessibility Observatory?
- How can you use Accessibility?



Accessibility

Or, Access to Opportunity

Accessibility definition

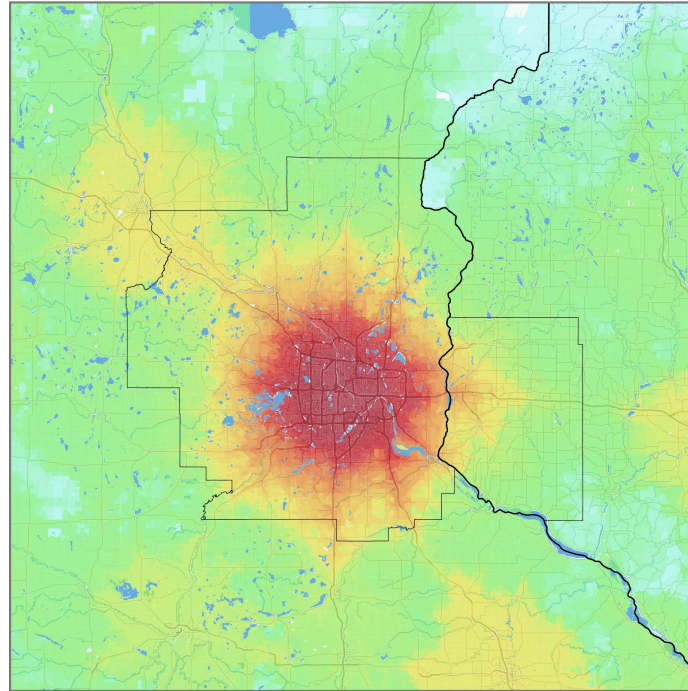
- The *ease* with which a traveler *could* reach valued destinations



How many jobs can one reach in 30 min driving at 8am?

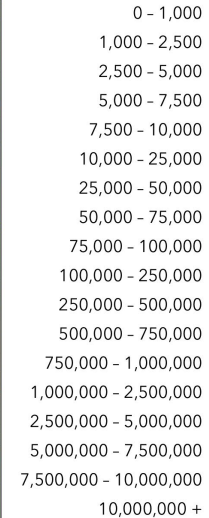
Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI



Jobs within 30 minutes

(Driving, AM peak)

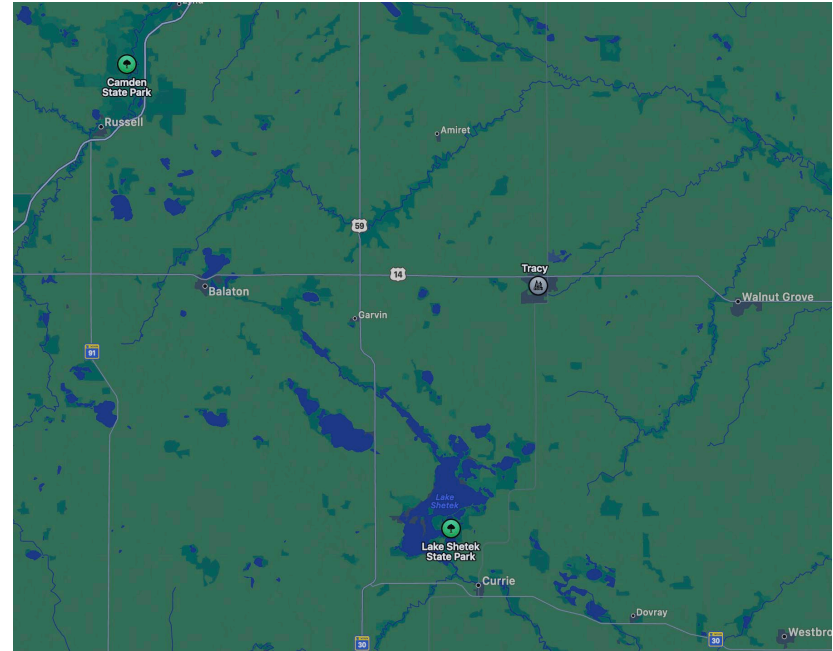


State border

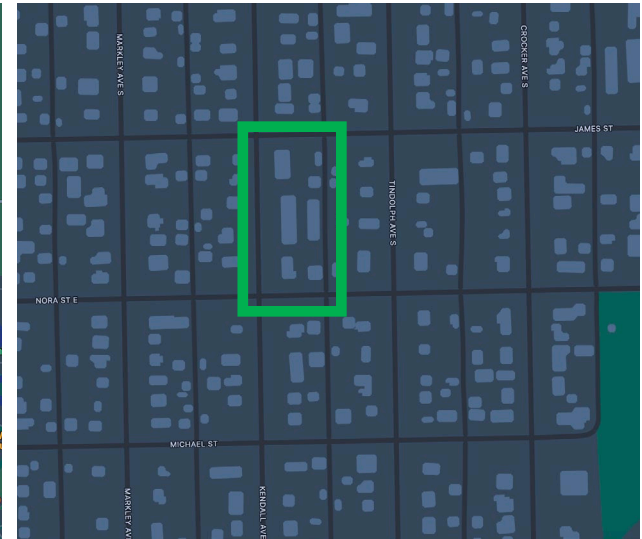
CBSA boundary

Components of Accessibility metric

- Starting place
- Opportunity type
- Travel network
- Time of departure
- ease = inverse of cost
 - usually: time



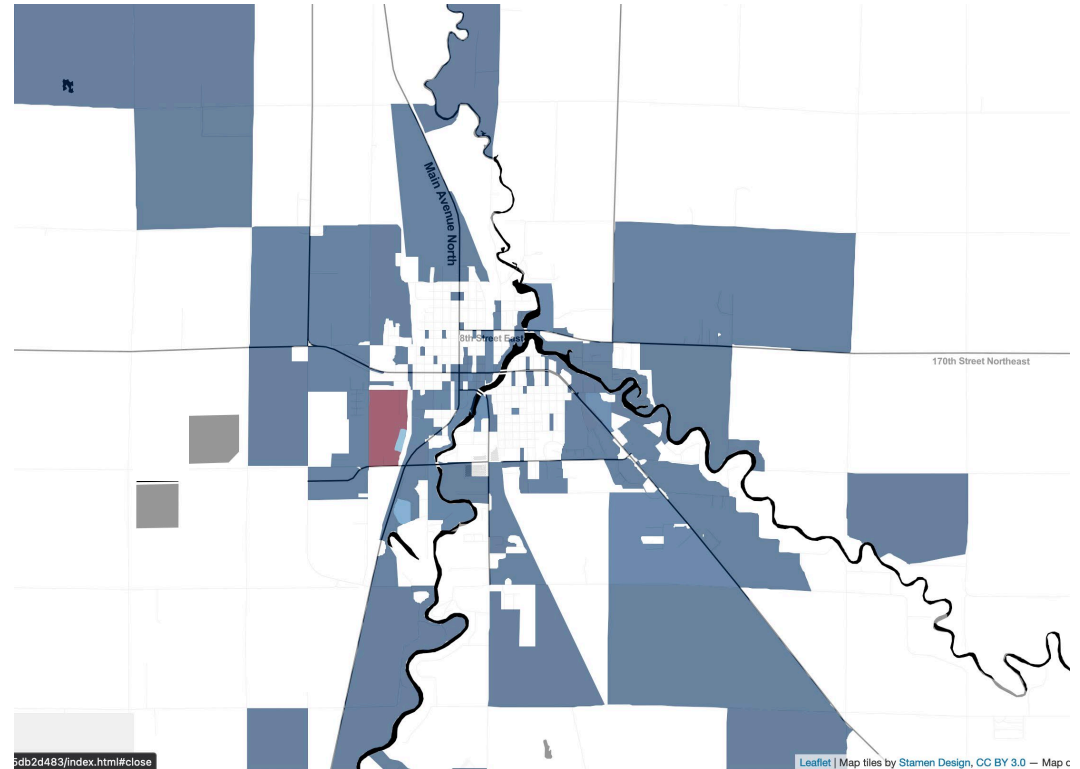
Accessibility: starting place



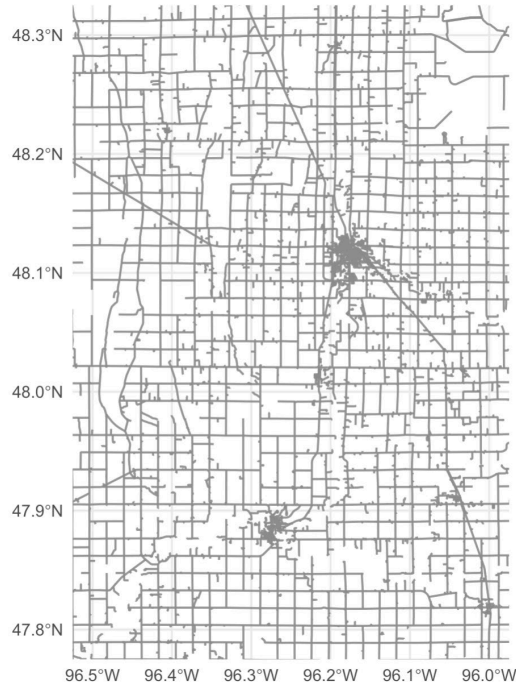
Kendall apartments
TRF, Pennington Co.

Accessibility: opportunity type

- US Census data on **jobs**
- Aggregated by type, wage, etc
- Census block level

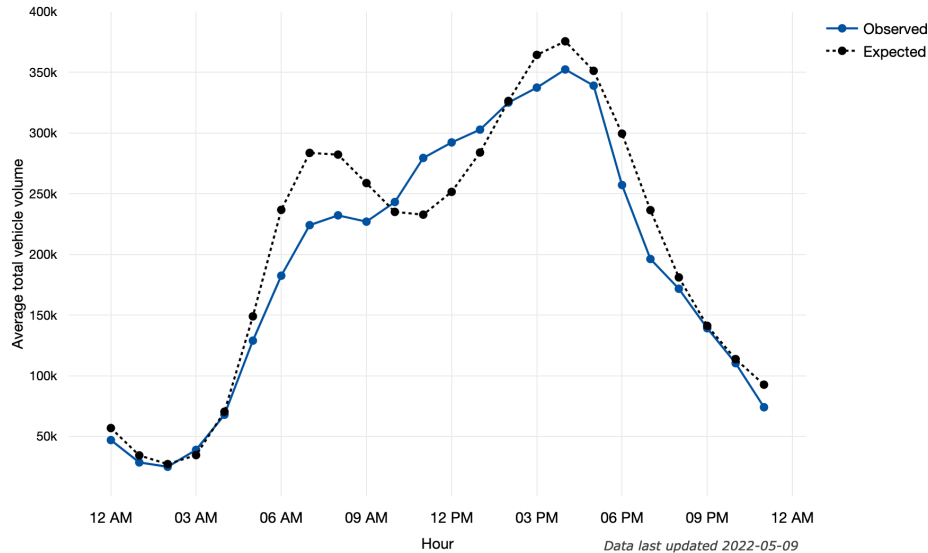


Accessibility: travel network



- **Auto:** road network including speeds
- **Bike:** road network classified by level of traffic stress
- **Transit:** walk network + transit schedule (GTFS)

Accessibility: time of departure

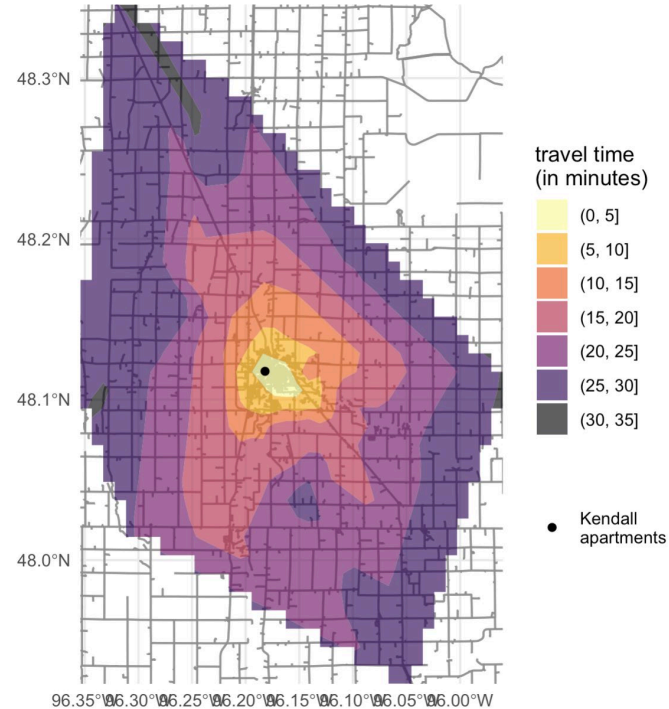


MnDOT / Met Council

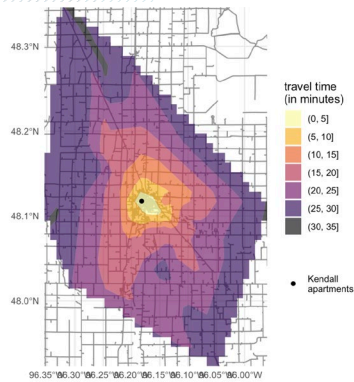
- **Auto:** impact of congestion on level of service (speed and delay)
- **Transit:** frequency and speed of transit service

Accessibility: cost (time)

- Isochrone: driving from Kendall apartments at 8AM
- 30 min max

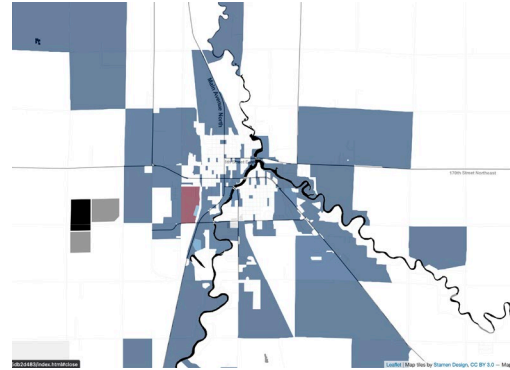


Accessibility: calculations



Where can
be reached

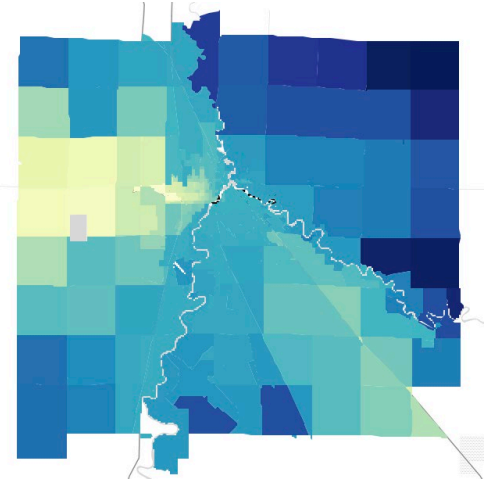
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X

What is
there

=



=

Access to Opportunity



Accessibility Observatory

Research unit at CTS

Accessibility Observatory



Saumya Jain



Andrew Owen



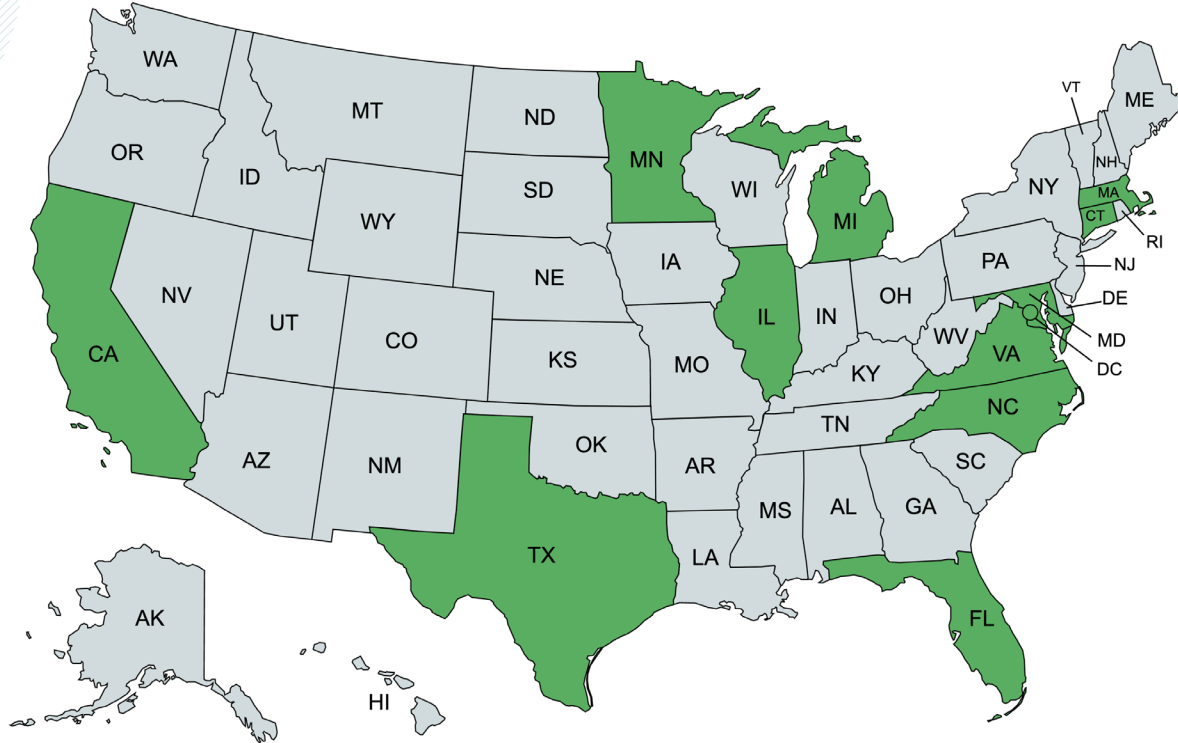
Shirley Shiqin Liu



Eric Lind

- Research unit in CTS
- grant-funded projects
 - FHWA pooled fund
 - MnDOT
 - Met Council
 - Other locales & partners

NAE pooled fund (MnDOT led)



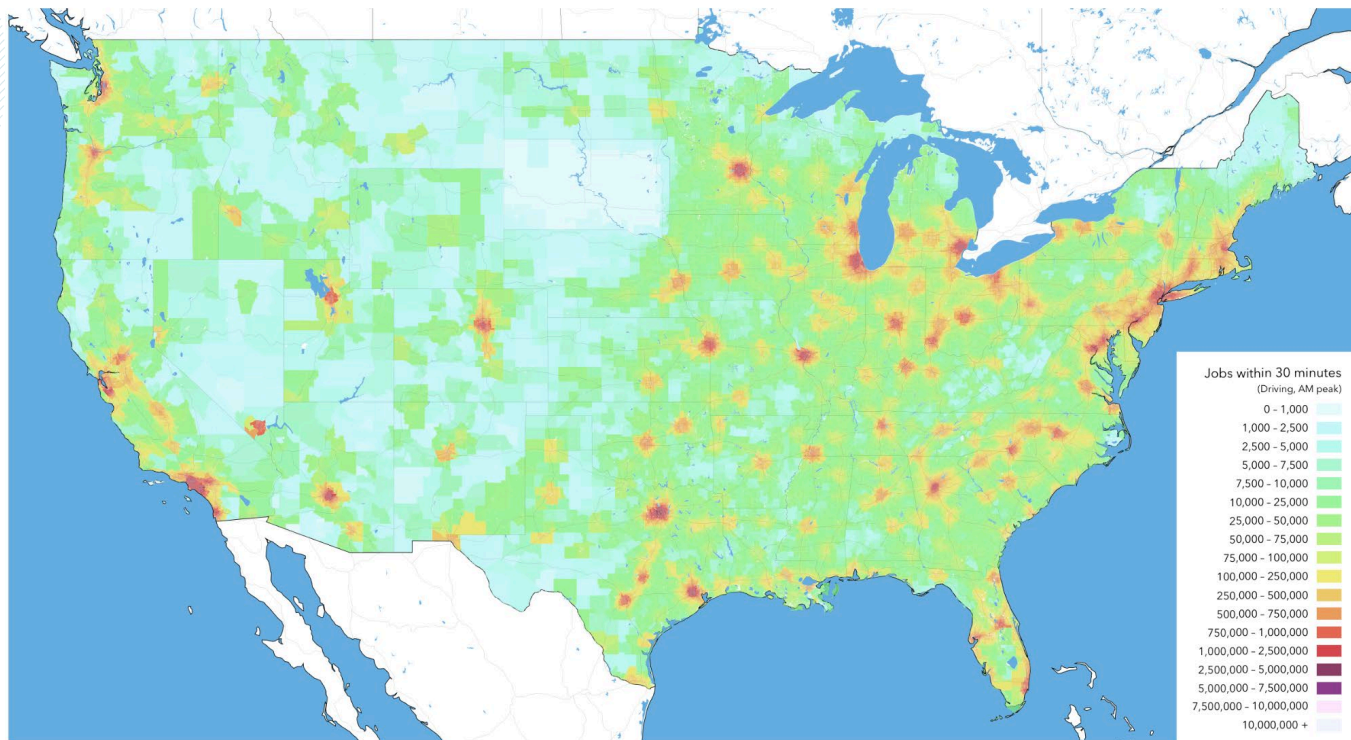


Figure 1: National U.S. map of accessibility to jobs by auto in 30 minutes.

Building National Accessibility Data

- Road network, speeds
- GTFS feeds
- Open street maps
- Census geography
- LEHD data

- Travel time x opportunities

- Reduce billion-row result datasets to MPO, County, State summaries

- ★ Dataset delivery
- ★ Report delivery

collect input data

build networks

run calculations

process results

aggregate datasets

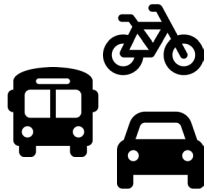
★ synthesize and report



- OpenTripPlanner
- R5 (open-source Conveyal engine)

- Comparing 8AM hour to Max (auto)
- Averaging for schedule variability (transit)
- Multiple networks based on level of traffic stress (bike)

- Highlighting trends and hotspots
- Adding context, perspective
- *New datasets and delivery methods*



Access Across America

Other Observatory
Research

National Accessibility
Evaluation

For Members

TAP meeting materials

Previous Studies

Access Across America: Auto 2020

Study finds widespread increased job access via auto in major U.S. metros

Access Across America: Auto 2020, which estimates the ability of people to connect to opportunity via the road network, shows that access to jobs by auto had increased in 43 — or 86% — of the top 50 U.S. metropolitan areas just before the COVID-19 pandemic began. Rankings of the top 10 metro areas for job accessibility by auto increased an average of about 6% from the previous year.



The study also shows the change in congestion impacts for each metro since the previous year. Access to jobs by auto decreased due to congestion delays in 92% of the 50 largest U.S. metros.

For example, job accessibility in the 6th-ranked Minneapolis–St. Paul metro area increased by 1.4% over the previous study with the average worker traveling by auto able to reach 900,491 jobs within 30 minutes. The Minneapolis metro also ranked 33rd for growth in congestion impact with 30 percent fewer jobs accessible within the same 30-minute commute during peak travel times.

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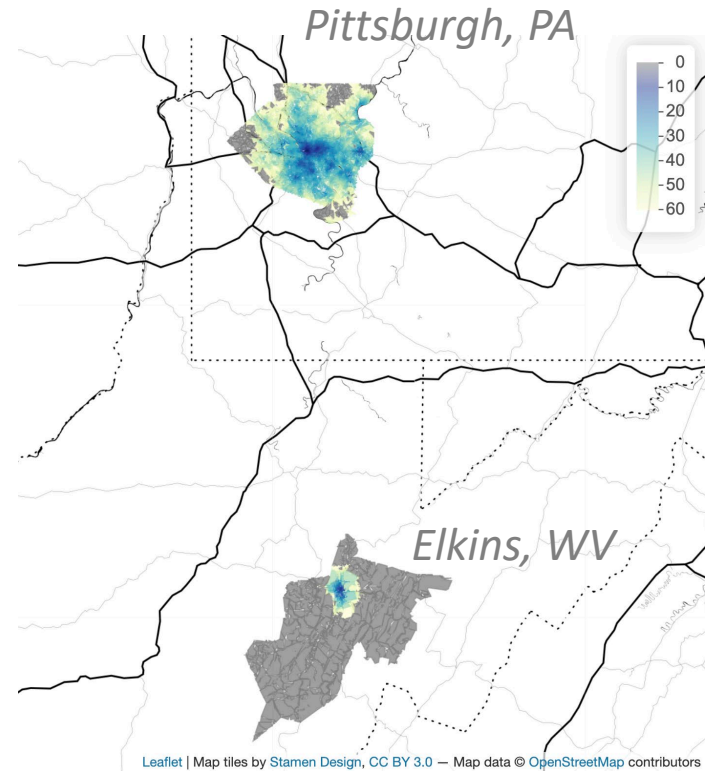
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Access in Appalachia

- Non-work destinations
- Travel time to choice
 - E.g., biking to 2nd High school
- Access to:
 - rural health care
 - freight infrastructure
 - education
 - entertainment





Accessibility in Practice

How can these metrics be used?

MnDOT Access report

2020 Auto Accessibility Report: Minnesota

Prepared for the state of Minnesota by the
Accessibility Observatory at the University of Minnesota

- Summaries by MPO, County
- Observed in year
- Change over time

2.3 Accessibility by County

Table 5 provides the average (worker-weighted) job accessibility by auto during the AM peak period for each county, and Table 6 gives the 1-year change in average job accessibility by auto. Table 7 indicates the accessibility congestion impact, and Table 8 gives the 1-year change in congestion impact.

Table 5: Average Job Accessibility by Travel Time Threshold for Counties (Driving, AM Peak)

County	10 min	20 min	30 min	40 min	50 min	60 min
Aitkin	659	2,149	5,098	14,447	25,712	47,381
Anoka	32,021	224,991	684,096	1,282,192	1,681,028	1,873,734
Becker	4,257	9,501	16,432	27,459	65,564	133,819
Beltrami	6,005	12,555	16,990	21,587	26,482	31,629
Benton	26,981	64,857	97,636	136,431	195,236	363,794
Big Stone	704	2,218	4,912	9,153	17,215	27,286
Blue Earth	23,041	42,173	57,976	80,376	118,675	184,850
Brown	5,716	9,762	22,051	54,250	82,180	110,562
Carlton	5,040	22,789	68,966	88,855	105,171	117,082
Carver	17,803	115,381	399,434	951,454	1,513,618	1,821,517
Cass	965	6,551	13,197	23,711	35,422	52,592
Chippewa	2,635	6,969	15,515	29,604	55,742	72,598
Chisago	3,499	17,913	78,319	332,377	888,531	1,457,174
Clay	33,199	100,784	119,264	135,543	158,500	177,017
Clearwater	660	2,298	8,609	16,267	24,470	33,682
Cook	461	853	1,225	1,646	1,910	2,488
Cottonwood	2,039	5,147	11,769	25,093	47,958	84,579
Crow Wing	7,225	15,851	26,602	38,150	48,792	82,118
Dakota	42,840	267,655	783,678	1,423,377	1,745,983	1,899,837
Dodge	2,947	23,078	94,188	143,513	181,517	278,145
Douglas	6,961	15,004	23,155	33,547	52,595	81,820
Faribault	1,070	2,942	11,117	32,383	70,681	116,798
Fillmore	810	3,370	24,179	64,202	123,436	187,593

Project of the year 2022: TRF

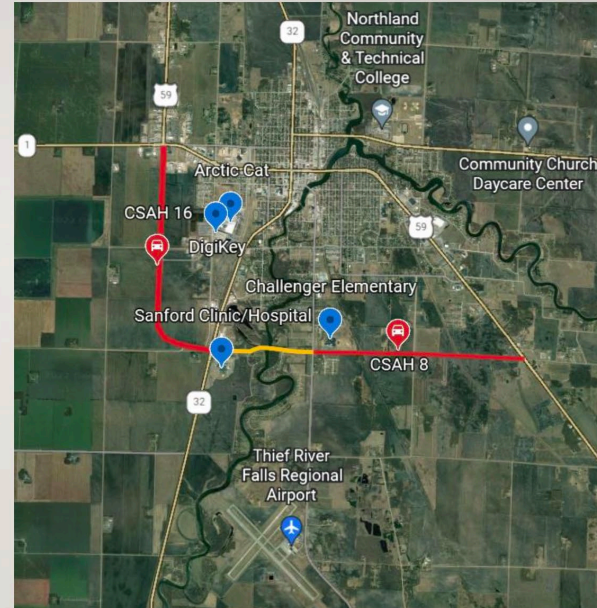
PRIOR TO CONSTRUCTION

How Did this all get Started?

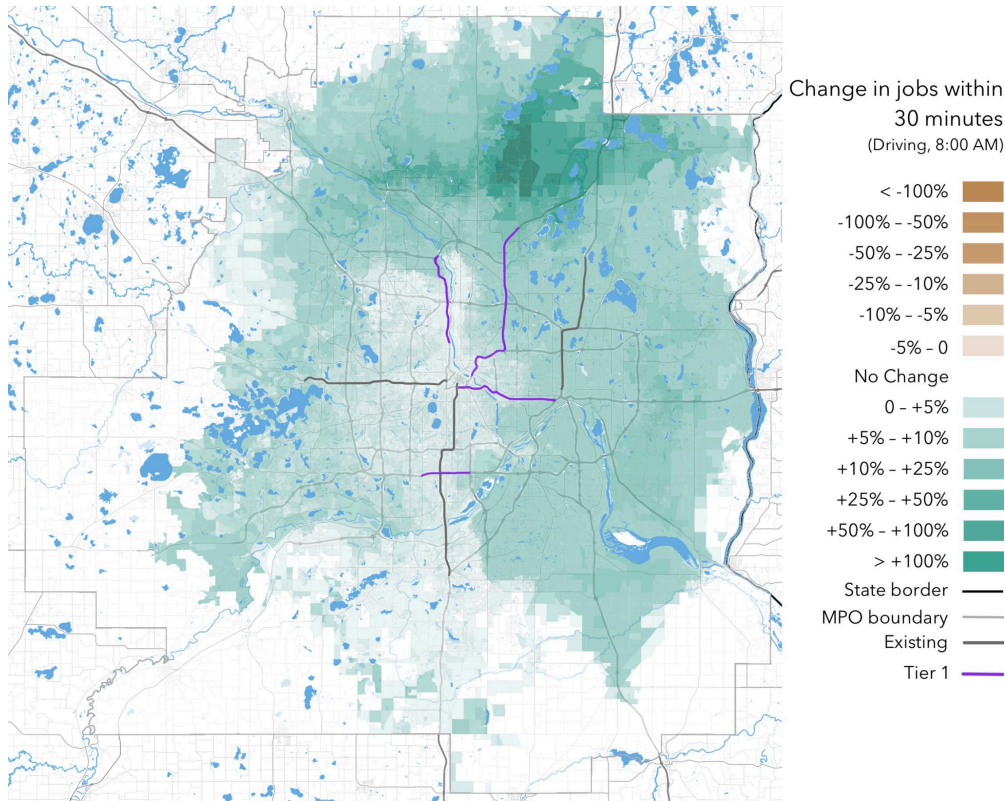
This has been a project that's been in the making for over 3 decades.

In 1997 Delton Schultz built CSAH 16

- At that time Delton had the idea to build a bridge across at the same location but the City and County Leaders were not in complete support of the project.
- This was prior to DigiKey explosion onto the scene and City leaders were concerned about losing customers.



Access combines land use & transportation



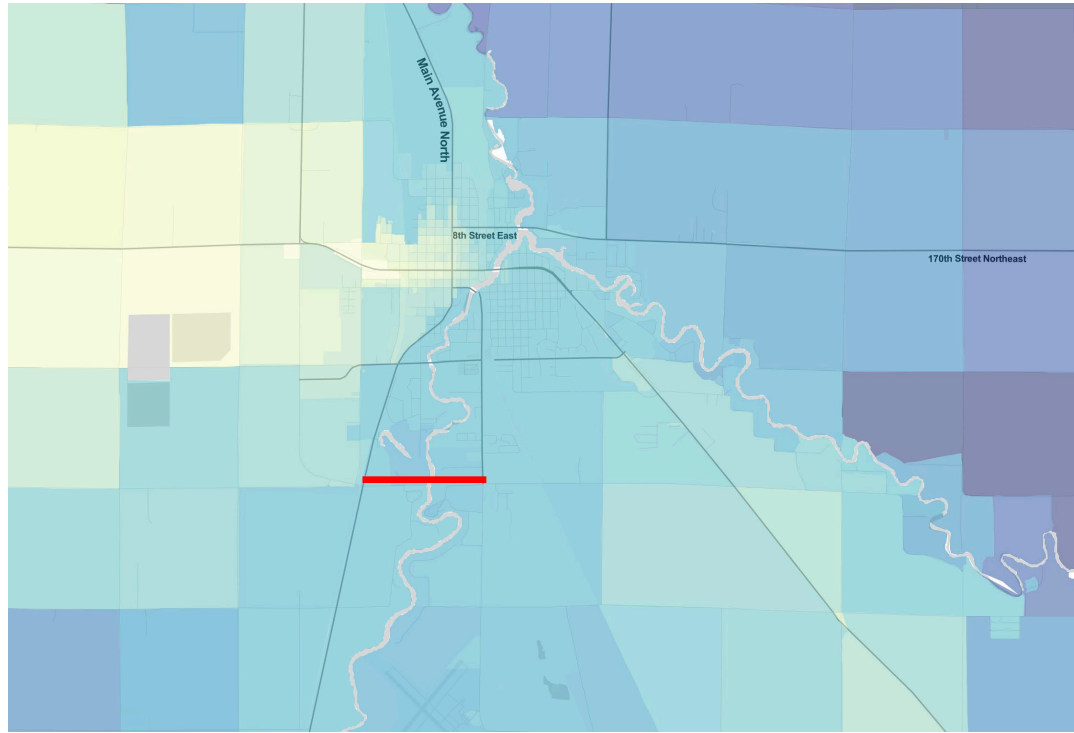
Implications:

Change in access shows *where* benefits and harms accrue

Further AO work:

- impact of land use change v transportation change
- residential demographics from 2020 census for equity analysis

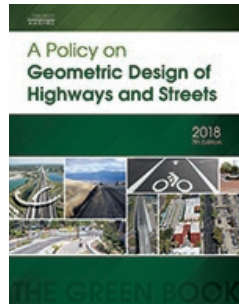
TRF Access to jobs: change after bridge?



Towards a Level of Access

- Level of Service
 - Mobility
 - Throughput
 - Delay focused
 - Grade A - F

- Level of Access
 - Accessibility
 - Origin to destination
 - Trip focused
 - % of threshold



Questions & Discussion

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