

## CHAPTER 3: OUR TRANSPORTATION SYSTEM

- Motor Vehicles
- Bicycles
- Pedestrians
- Public Transit
- Travel Demand Management/Ridesharing
- Inter-Regional Travel
- Freight/Goods Movement



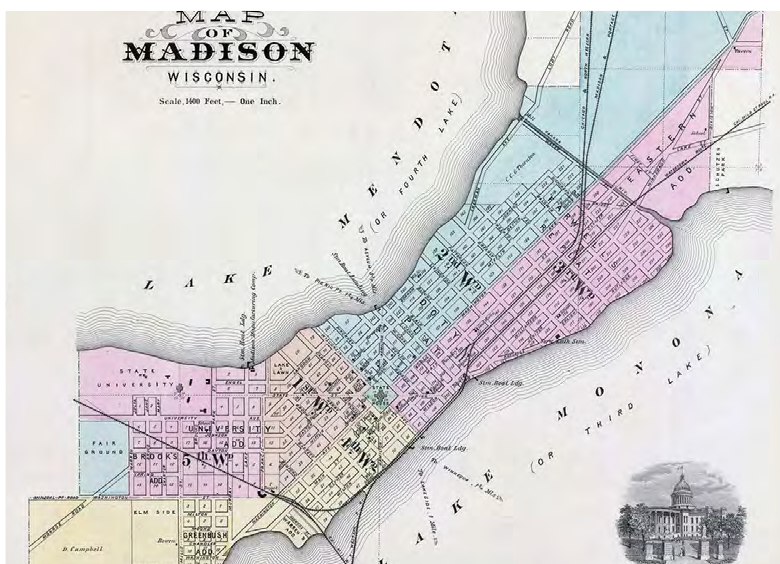
# MOTOR VEHICLES

## Introduction

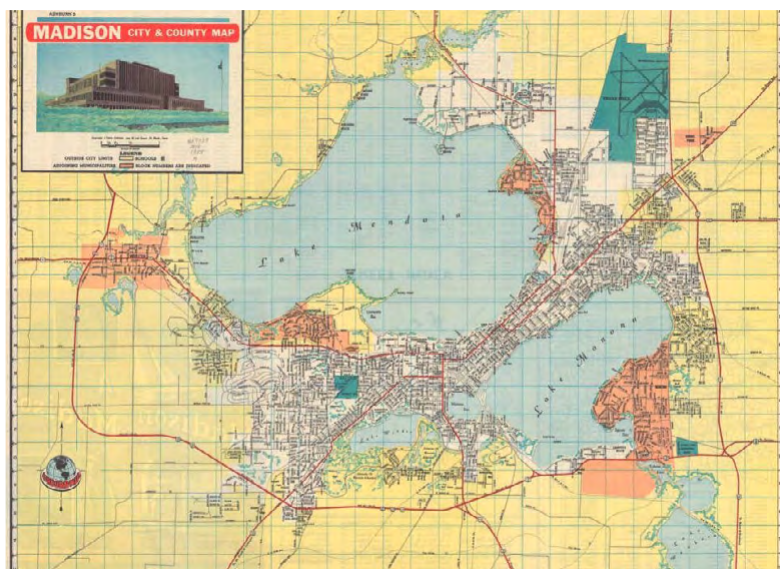
Streets and highways form the foundation of the transportation system. They are used by and must be designed to accommodate safe, convenient travel by buses, bicyclists, and pedestrians, as well as motorists. There are over 2,800 miles of public roadways in the Madison Metropolitan Area and close to 550 bridges. Roads are critical to virtually all freight moving to and from locations in Dane County. 98% of Dane County's freight tonnage and 92% of its freight value moves exclusively by truck. The remainder, which moves by other modes for part of its trip, needs to travel by truck on the first or last legs of its journey. Countywide, the roadway system carries an estimated 13.6 million vehicle miles of travel each day. Roadways also have both direct and indirect impacts on the natural environment that must be considered in planning efforts and facility design.

Streets and highways provide connectivity to jobs, homes, shops, parks, and other opportunities. The physical design characteristics of each roadway play a significant role in its safety, operational performance, and accommodation of different transportation modes. As an infrastructure asset, the roadway system requires maintenance to remain in acceptable condition.

The Madison area has a uniquely constrained roadway system due to the natural geography of the area, with the City of Madison's downtown sitting on an isthmus. The City of Madison, founded in 1848, is a master planned community built on a tight grid of streets around what we now know as the Capitol Square. High volume arterial streets radiate from the square and connect to a number of State and Interstate Highways including the Beltline (US Highways 12, 14, 18, and 151), Stoughton Road (US Highway 51), and I-39/90/94. Unlike many urban areas, downtown Madison is located off the freeway and expressway network. This has greatly contributed to the livability of the downtown, but also made traffic circulation more challenging, increasing the importance of travel demand management and operational strategies for mitigating congestion. Many suburban communities surrounding Madison were founded in the late 1800s, and contain a similarly dense street grid in their historic cores.



Madison, 1878 Credit [DaveRumsey.com](http://DaveRumsey.com).



Madison, 1950s after the construction of the Beltline. Credit University of Texas at Austin University of Texas Libraries

Roadway development patterns changed across the United States after World War II. America built most of its early highway and freeway infrastructure during this time, leading to the rise of suburbanization. Terms like roadway hierarchy became part of the planning lexicon, and curvilinear streets and cul-de-sacs became the norm for new neighborhood design. The Madison area was no exception to national trends. The construction of the Beltline Highway facilitated growth in areas further from the urban core, including the suburbs. Conceived and approved in 1944, the Beltline opened as a 2-lane highway in 1949.

In the 1950s, intersections with the Beltline were steadily converted into interchanges and portions of the road widened to four lanes. In the 1970s, portions of the roadway were expanded to six lanes. Currently, WisDOT is studying the roadway to determine ways to further improve the efficiency, reliability, and safety of this highly traveled freeway, which provides the only east-west connection south of the urban core between the Interstate and the west side.

The region is facing a number of challenges related to the roadway network. Limited options exist for increasing vehicular capacity through the isthmus, with no possibilities for adding general purpose travel lanes. There are also limited options for enhancing the connectivity of the street network in areas developed in the postwar period. One potential opportunity currently being studied is the addition of one or more non-interchange crossings of the Beltline. However, arterial roadway network congestion is still, with the exception of the Beltline, generally reliable and occurs over a short duration.

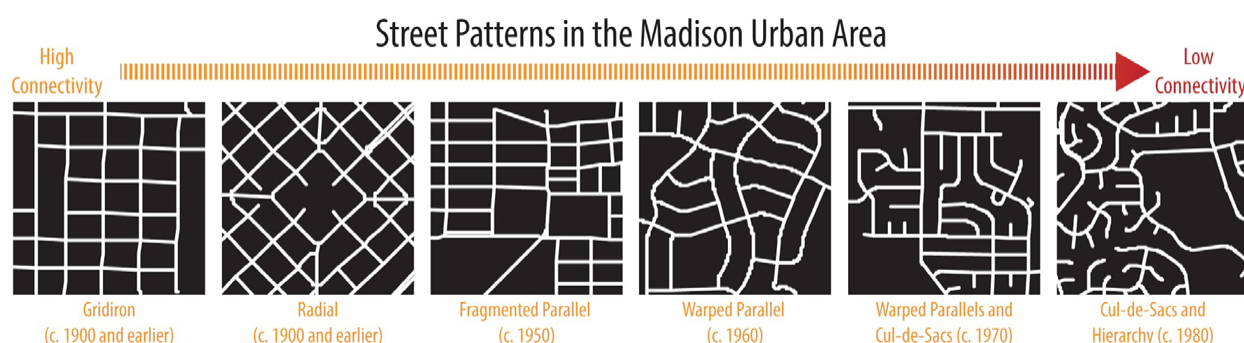


Figure 3-1: Street Patterns in the Madison Urban Area

## Roadway Functional Classification System

The Federal-Aid Highway Act of 1973 requires the use of functional highway classification to update and modify the Federal-aid highway system, which includes all regionally significant roadways eligible for federal funding. The functional classification system categorizes highways, roads and streets by the character of service they provide for transportation planning and funding purposes. It defines the role roadways play (mobility, connectivity, accessibility) in serving travel needs and carries expectations about roadway design, including speed, capacity, and relationship to existing and future land use. MATPB and other transportation agencies describe roadway system performance, benchmarks, and targets by functional classification.

The functional classification system divides roadways into two groups – urban and rural – based upon whether the roadway is located within an urban area. The urban area is defined by the U.S. Census Bureau, and is based upon total population, population density, and large impervious



Mineral Point Road is an example of an urban principal arterial.



areas where there is urban non-residential development. The roadway functional classification system makes a distinction between urban and rural roadways because of their differing road network densities and travel patterns.

MATPB coordinates with WisDOT to assign functional classifications to roadways in the urban area, while WisDOT assigns functional classes to roadways in the rural area. Roadways in rural areas must meet certain criteria to be entered into the functional classification system. They must adequately serve the needs of the area population and land uses, be a minimum distance from other classified parallel routes, and must meet several supplemental criteria as well. Roadways within urban areas must meet criteria from these same categories. In addition, the functional classification of roads that cross the urban-rural boundary is generally maintained, to ensure route connectivity.

Figure 3-2, shows the functionally classified roadway system in Dane County as approved in 2015. The map is updated every ten years.



Figure 3-2: Roadway Functional Classification System



Figure 3-3

### The Relationship between Functional Classification, Land Uses Served, and Traffic Volumes

Functional Class	Function	Land Use	Volume	Facility Type
Principal Arterials --Interstate	Link major urban areas of the United States. Move inter- and intra regional traffic, particularly long trips in the high traffic volume corridors.	Abutting land uses not directly served. Access and egress points are served by on-and off-ramps.	35,000 to 130,000+	High speed, divided highway with full control of access and grade separated interchanges.
Principal Arterials -Other Freeways	Move inter- and intra regional traffic, particularly long trips in the high traffic volume corridors.	Abutting land uses not directly served. Access and egress points are served by on-and off-ramps.	20,000 to 75,000+	High speed, divided highway with full control of access and grade separated interchanges. May have a very limited number of at-grade intersections.
Principal Arterials - Others	Serve longest trip demands and highest traffic volume corridors, where not served by freeways.	Serve major economic activity centers.	15,000 to 50,000	Typically a divided road with limited or no driveways to specific parcels and at-grade intersections with other roadways.
Minor Arterials	Interconnect with and augment the principal arterial system and provide service for trips of moderate length.	Serve important economic activity centers. Distribute traffic to smaller geographic areas than those served by higher-level arterials, with more emphasis on service to abutting land uses.	6,000 to 20,000	Number of lanes and type of median directly related to traffic volumes and abutting land uses.
Collectors	Connect local streets to the arterial street system.	Serve both residential neighborhoods and commercial/industrial areas; provide access to abutting land uses.	3,000 to 9,000	Typically two-lane streets with more frequent intersections.
Locals	Serve the ends of most trips.	Provide direct access to adjacent land.	100 to 7,500	Typically two-lane streets.

The Federal Functional Classification System divides roadways into four major classes: principal arterials, minor arterials, collectors, and local roadways. Principal arterials are further subdivided into the Interstate system, other freeway, and other (including expressways and signalized local arterial streets), while collectors are subdivided into major and minor in rural areas.

#### Urban Roadway Functional Classifications<sup>1</sup>

- **Principal Arterial:** Principal arterials serve major economic activity centers of an urban area, the highest average daily traffic (ADT) corridors, and regional and longer intra-urban trips. In every urban area, the longest trips and highest ADT are characteristic of the main entrance and exit routes. Because these routes are generally extensions of the highest rural functional routes, they should be principal arterials. Principal arterial trip lengths are indicative of the rural-oriented traffic entering and exiting the urban area on the rural arterial system, as well as the longest trans-urban area travel demands.
- **Minor Arterial:** Urban minor arterials serve important economic activity centers, have moderate ADT, and serve intercommunity trips interconnecting and augmenting the principal arterial system. Trip lengths are characteristic of the

<sup>1</sup> Highway Functional Classification Concepts, Criteria, and Procedures (FHWA, 2013) and Functional Classification Criteria (WisDOT, April 2013).

rural-oriented traffic entering and exiting the urban area on the rural collector system. In conjunction with principal arterials, minor arterials provide an urban extension of the rural collector system to the primary central business district (CBD) and critical links to satellite community CBDs.

Although the predominant function of minor arterials is traffic mobility, minor arterials serve some local traffic while, providing greater land access than principal arterials. As such, minor arterials may end abruptly at major traffic generators.

- **Collector:** Collectors provide direct access to residential neighborhoods, commercial, and industrial areas, and serve inter-neighborhood trips. As the name implies, these routes collect and distribute traffic between local streets and arterials. In the CBD and similar areas, the collector system may be a part of the street grid.

Collectors may end abruptly where they penetrate residential neighborhoods and serve isolated traffic generators, but should generally be linked to other collectors and arterials for traffic circulation. The travel mobility and land access functions of collectors are similar, as shown in Figure 3-4.

- **Local:** Local streets predominantly serve to provide access adjacent land uses. They serve the ends of most trips. All streets not classified as arterials or collectors are local streets.

## Proportion of Service

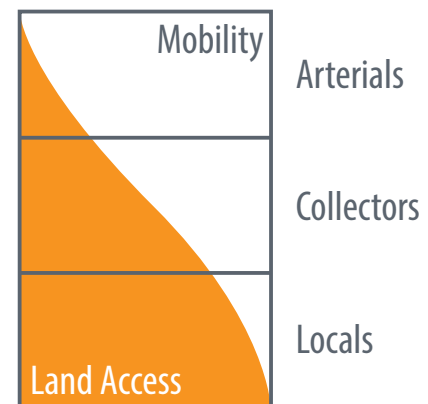


Figure 3-4: Proportion of Service Provided by Roadway Facilities. Mobility and land accessibility vary according to the three primary functional classes. Arterial roadways provide mostly mobility; locals provide mostly land access; and collectors generally provide an equal amount of travel mobility and land access. (FHWA)

Figure 3-5

## Characteristics of Roadway Functional Classes

Functional Class	Distance Served and Route Length	Access Points	Speed Limit	Distance Between Routes	Usage	Significance	Number of Lanes
Arterial	Longest	Few	Highest	Longest	Highest	Statewide	More
Collector	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Local	Shortest	Many	Lowest	Shortest	Lowest	Local	Fewer

As state departments of transportation and MPOs continue to move towards a more performance-based management approach, functional classification will be an increasingly important consideration in setting expectations and measuring outcomes for preservation, mobility and safety.

## Pavement Condition

Pavement condition management extends the useful life of a roadway and saves money by ensuring roadway preservation work occurs during the most efficient time in the pavement's lifecycle. Extreme pavement degradation can be minimized by performing preservation treatments early in the life-cycle of a roadway mentioned on the next page.

The Pavement Surface Evaluation and Rating (PASER) system is used to assist local communities in evaluating the condition of municipal roadways. The PASER rating system was developed by researchers at the University of Wisconsin-Madison to be a



quick, comparable way to evaluate surface conditions of pavement. The system rates pavements along a scale from 1-10 and prescribes treatment options accordingly, as is described in Figure 3-6.

Figure 3-6

### PASER Ratings and Corresponding Treatments

Quality	Rating	Treatment for Pavement	Treatment for Concrete
Excellent	9-10	No maintenance required	No maintenance required
Good	7-8	Crack sealing and minor patching	Routine maintenance
Fair	5-6	Preservation treatments (non-structural)	Surface repairs, partial-depth patching
Poor	3-4	Structural renewal (overlay)	Extensive slab or joint rehabilitation
Very Poor	1-2	Reconstruction	Reconstruction

For state roadways, WisDOT uses the more sophisticated Pavement Condition Index (PCI) to evaluate pavement condition. PCI was developed by the United States Army Corps of Engineers, and uses a visual survey to measure the distress of pavement. This widely utilized method of pavement condition measurement factors in a number of pavement distress types:

- ride quality
- alligator cracking
- bleeding
- block cracking
- bumps and sags
- corrugation
- depression
- edge cracking
- joint reflection cracking
- lane/shoulder drop-off
- longitudinal and transverse cracking
- patching and utility cut patching
- polished aggregate
- potholes
- railroad crossing
- rutting
- shoving
- slippage cracking
- swell
- weathering and raveling

In addition to these pavement distress types, PCI rates distress in jointed concrete pavements. The system rates pavements along a scale of 0-100 in which 0 is the worst possible roadway condition and 100 is a new roadway. For simplicity, this scale has been converted to the PASER scale where used in the RTP.

In general, roadways with a pavement condition of “fair” or worse are nearing the end of their repairable life. Lower volume roads routinely fall into this category, while high-volume, regional mobility corridors rarely do. In 2015, the Madison metropolitan area pavement condition varied by facility type:

- 96% of the interstate highway system is in good condition
- 89% of the US highway system is in fair or better condition
- Roughly 16% of the state highway system is in poor or worse condition
- About 60% of local facilities (arterials, collectors, and local roads) are in good condition and roughly 30% are in fair condition.

Some of the regional roadways in the poorest condition in 2015 include:

- WIS 113 from Kennedy Road to the WIS 19 (fair)
- WIS 113 north of Waunakee to CTH V (very poor to fair)
- WIS 19 from US 12 to Waunakee (very poor to poor)
- US 14 from the Beltline to Cross Plains (very poor to poor)
- The Beltline from the Broadway ramp to the Yahara River Bridge (very poor)
- Park Street from the Beltline north to West Washington Avenue (poor to fair) - *scheduled for concrete and joint repairs in*

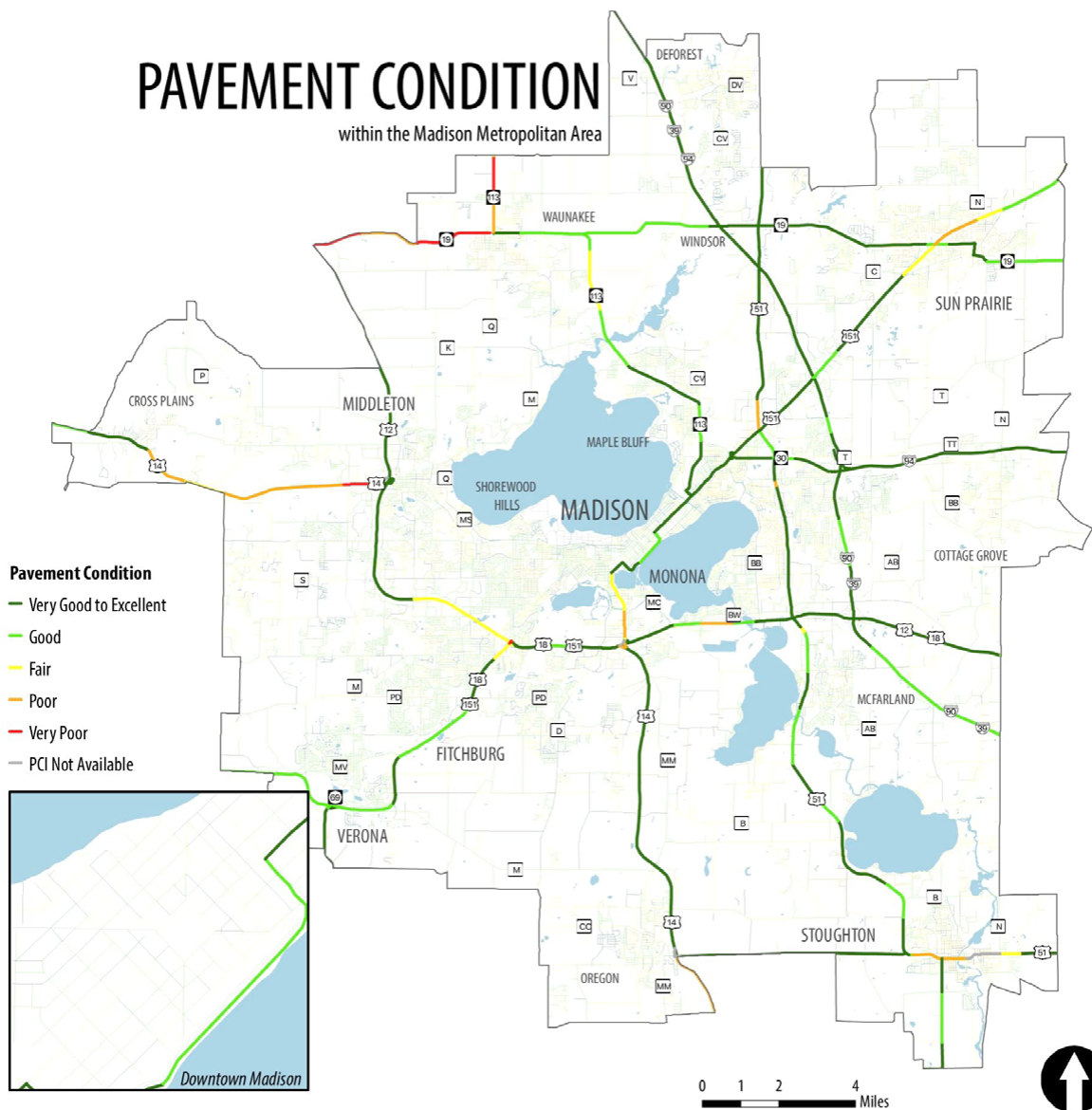


Figure 3-7: Pavement Condition

2019-2020

- US 51 from East Washington Avenue to Pierstorff Street (very poor)
- US 151 in Sun Prairie from the Main Street ramp to the Columbus Street bridge (very poor to poor) - *scheduled for resurfacing in 2018*
- US 14 from WIS 138 to County Highway A (very poor)
- US 51 in Stoughton from WIS 138 to Fourth Street (very poor) - *portion scheduled for resurfacing in 2018*

Some of these regional facilities, such as US 151 and Park Street, are programmed for improvements. Recent trends in roadway condition demonstrate a reduction in the pavement quality of local facilities and an improvement in overall quality of state facilities. Much of this change can be attributed to changes in state-level priorities and funding levels. In recent years, reductions in local roadway funding have led to reductions in local pavement ratings statewide.



## Bridge Condition

The Federal Highway Administration (FHWA) compiles the National Bridge Inventory (NBI), a database with information about every bridge and tunnel in the US. As part of this inventory, bridges are given a “sufficiency rating” based on over twenty categories that surmise a bridge’s structural condition, obsolescence of its design, and essentialness to the public. A low rating can be earned not only for poor structural conditions, but also for a design that is not adequate for current traffic conditions. Approximately 55% of the rating is derived from the structural evaluation of the bridge, 30% from the obsolescence of its design, and 15% the essentialness to the public.

Bridge sufficiency ratings are a key factor for funding. A sufficiency rating of 80 or less qualifies a bridge for federal repair funding, while a score of 50 or less qualifies a bridge for federal replacement funding. Federally funded bridge projects require a 20% local funding match.

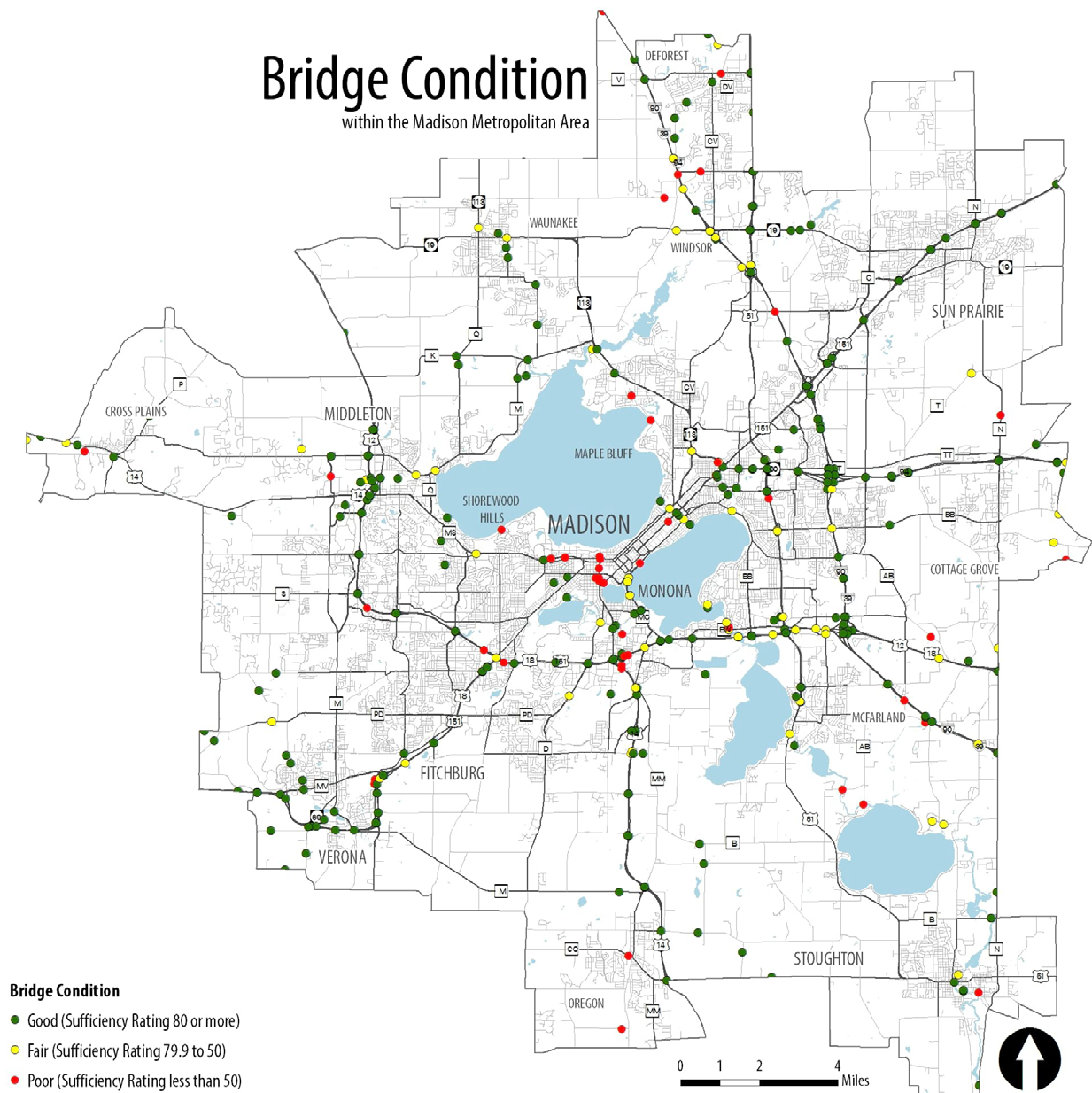


Figure 3-8: Bridge Condition

In the Madison area, 95% of all bridges are in fair or better condition. In fact, 75% of all bridges are in good condition. There are 17 bridges in the region in poor condition including:

- County Highway PB (Badger Mill Creek) - *Scheduled for replacement in 2017*
- County Highway AB (Yahara River) - *Scheduled for replacement in 2019*
- County Highway MN (Door Creek)
- County Highway PD (Badger Mill Creek)
- Windsor Road (Yahara River)
- County Highway N (Koshkonong Creek)
- River Road (I-90/94) - *Scheduled for replacement in 2017*
- WIS 30 westbound (Fair Oaks Avenue)
- Femrite Drive (Door Creek)
- High Point Road (Beltline Highway) - *bridge replacement underway*
- County Highway AB (I-90)
- County Highway KP (Black Earth Creek)



*Replacement of the County Road V bridge in DeForest.*



## Motor Vehicle Safety and Crash Data

The Wisconsin Traffic Operations and Safety (TOPS) lab maintains a database of all reported crashes in the state. Between 2010 and 2014, Dane County experienced an average of 6,817 crashes per year, resulting in a 5-year average crash rate of 140 crashes per 100 million vehicle miles traveled (VMT). During this period there were 154 total crash fatalities (0.63 fatal crashes per 100 million VMT) and 699 crashes resulting in serious injury (3.54 serious injury crashes per 100 million VMT). The number of fatalities remained relatively stable from year to year during the period, while the number of serious injury crashes declined from 195 in 2010 to 145 in 2014. The remaining 96% of crashes resulted in property damage only. In early 2016, the FHWA released rules establishing how to measure the number and rate of fatal and serious injury crashes on the transportation network. MATPB now tracks these measures annually in its Performance Measures Report ([Appendix I](#)).

[Figure 3-9](#) shows the location of intersections with high severe crash frequencies. As expected, the highest volume arterials including the Beltline, East Washington Avenue, Stoughton Road (US Highway 51), Mineral Point Road, Verona Road, and Gammon Road have the highest crash frequencies. The 10 intersections with the highest number of severe crashes include:

- Verona Road (US 18/151) and CTH PD
- East Washington Avenue and Thierer Road
- Stoughton Road (US 51) and North Broadway
- East Washington Avenue and 1st Street
- Park Street and Badger Road
- US 12/18 and Millpond Road
- John Nolen Drive and North Shore Drive
- Beltline and the north Whitney Way ramps
- Fish Hatchery Road and Greenway Cross
- University Avenue and Midvale Boulevard

WisDOT identifies road segments on the state system with crash rates that exceed the statewide average for similar roadway types, shown in [Figure 3-10](#). Further analysis is warranted for these segments to determine if there are any potential short-term and/or long-term engineering or traffic control solutions to enhance safety. The West Beltline expansion and Verona Road Interchange reconstruction is expected to improve the safety issues in that area. WisDOT completed a Safety and Operations Study for WIS 19 in 2016, and will be reconstructing the WIS 19/WIS 113 intersection in 2018, and will add two lanes on WIS 19 between River Road and Interstate 39/90/94 in 2020. The Beltline corridor and US 51 are the subject of ongoing major corridor studies which include safety issues as project needs.

The City of Madison Traffic Engineering Division prepares an annual crash report with statistics, maps, charts, and tables summarizing common factors for crashes, high crash locations, historical trends, and other information. This information,



including detailed crash diagrams, is used to assist engineers in planning strategies to reduce crashes and identify possible engineering solutions.

The Dane County Traffic Safety Commission; comprised of staff from the Dane County Highway and Transportation Department, the Dane County Sheriff Department, WisDOT Central and Region Offices, and the State Patrol; meet quarterly to review crash data – particularly fatalities, and to discuss safety issues such as planned projects, research, grant programs, and proposed legislation.

[WisDOT's 2014-2016 Strategic Highway Safety Plan](#) is a statewide comprehensive plan that provides a unified framework to reduce traffic fatalities, injuries and crashes over a three year period. The plan examines various highway safety issues in Wisconsin. Additionally, each year WisDOT prepares a report on the programs, grants and activities planned for the next federal fiscal year, which also serves as the state's application for federal safety funds, and submits the plan to the National Highway Transportation Safety Administration. WisDOT administers the federal Highway Safety Improvement Program (HSIP) funds, which can be used for projects that reduce the number and severity of crashes on public roads. This program focuses on infrastructure improvements selected through a data-driven approach, with an emphasis on low-cost treatments that can be implemented quickly.

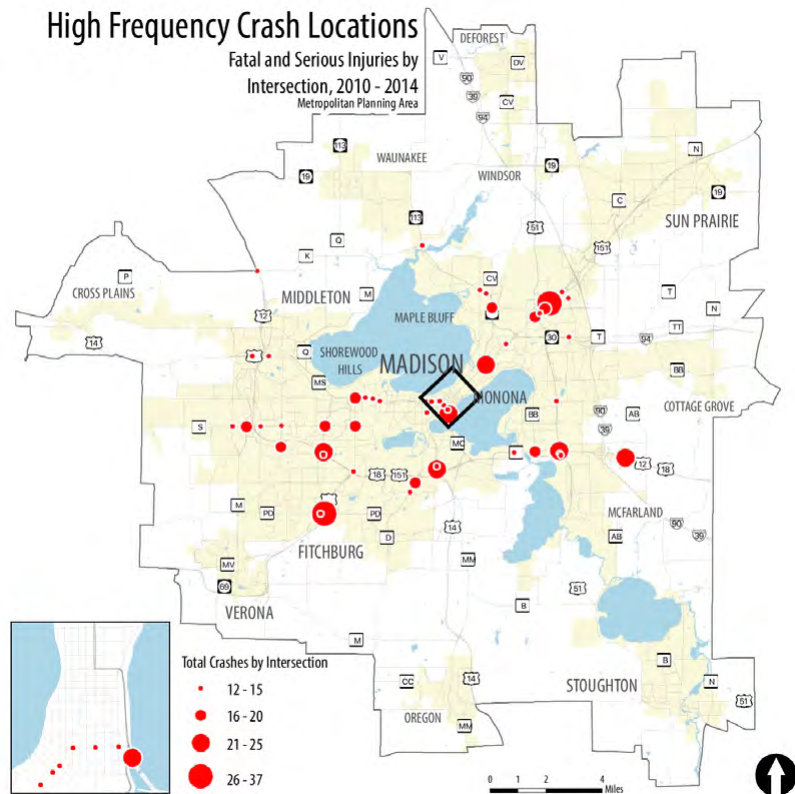


Figure 3-9: High Frequency Crash Locations

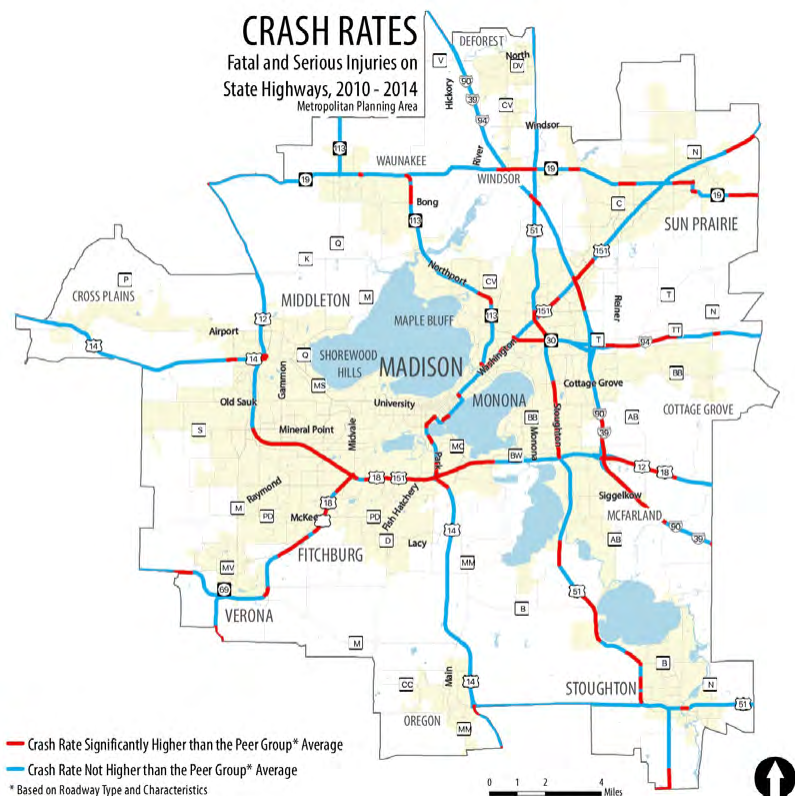


Figure 3-10: Crash Rates on State Highways



## Traffic Growth and Congestion

The growth in population and employment in the metro area, combined with an increasing number of commuters from outside the area has led to increasing traffic volumes on the regional roadway system. Following a dip in VMT during the Great Recession starting in 2008, VMT has begun to increase again the past three years. Figure 3-11 provides daily VMT estimates for Dane County from 2000 to 2015. VMT increased on average 0.6% per year during

Figure 3-11

### Estimated Daily VMT for Dane County

Year	VMT	Change from Previous Year
2000	12,497,100	-
2001	12,636,700	1.1%
2002	13,202,000	4.5%
2003	13,256,000	0.4%
2004	13,450,000	1.5%
2005	13,346,300	-0.8%
2006	13,621,900	2.1%
2007	13,561,000	-0.4%
2008	12,993,400	-4.2%
2009	13,214,200	1.7%
2010	13,258,300	0.3%
2011	13,116,500	-1.1%
2012	13,724,431	4.6%
2013	13,291,000	-3.2%
2014	13,481,513	1.4%
2015	13,637,621	1.2%

this time period. Average daily car travel per person declined by about 10 percent during this period, falling from 29 to 26 VMT per day. National data shows per capita VMT beginning to rise again since 2014 with miles traveled among those 16 and older about where it was in 1998.

Figure 3-12 shows average weekday traffic (AWT) volume on the arterial roadway network in 2013, while Figure 3-13 shows the AWT volume change from 1992 to 2013.

The most significant traffic growth over this time period occurred on the Beltline between

Verona Road and I-39/90 and on I-39/90 between the Beltline and US 151. AWT volumes on these roadways increased more than 30,000 per day. The Beltline is the only centrally-located roadway that directly connects the west and east sides of the metropolitan area. According to data collected for WisDOT's Beltline study, over one-half of all vehicles that use the Beltline, exit after passing four interchanges or less.

Traffic volumes also grew significantly on radial arterials outside of the Beltline and Interstate system. This includes US 18/151 (Verona Road), US 14, CTH S (Mineral Point Road), and CTH M (S.





Pleasant View Road). CTH K and WIS 19, circumferential routes on the north side, also saw significant traffic growth. Recently completed and programmed projects have or will be addressing capacity issues on US 18/151, including its interchange with the Beltline, CTH S (Mineral Point Road), and CTH M (S. Pleasant View Road). An existing bottleneck at the US 12/CTH K intersection was addressed in 2015. The intersection of CTH M and CTH K also experiences significant peak hour traffic congestion and needs improvement.

Traffic growth has also occurred on some of the radial arterials inside the Beltline, including WIS 30, East Washington Avenue, University Avenue, and Park Street. Volumes on other radial arterials in the central area, such as Monroe Street, Regent Street, and Johnson/Gorham have remained fairly consistent over the 1992 to 2013 time period, but can fluctuate from year-to-year. Traffic has remained steady in part because the downtown/ isthmus area has not seen much growth in employment compared to peripheral employment centers. Additionally, these arterial roadways through the downtown/ isthmus area are near capacity during peak commute times. Therefore, drivers are choosing alternative routes either south or north around the lakes for cross town trips.

According to travel data collected for the Beltline Study, during the weekday a.m. peak period only 10-20% of traffic traveling in the downtown/isthmus does not have an origin or destination there.

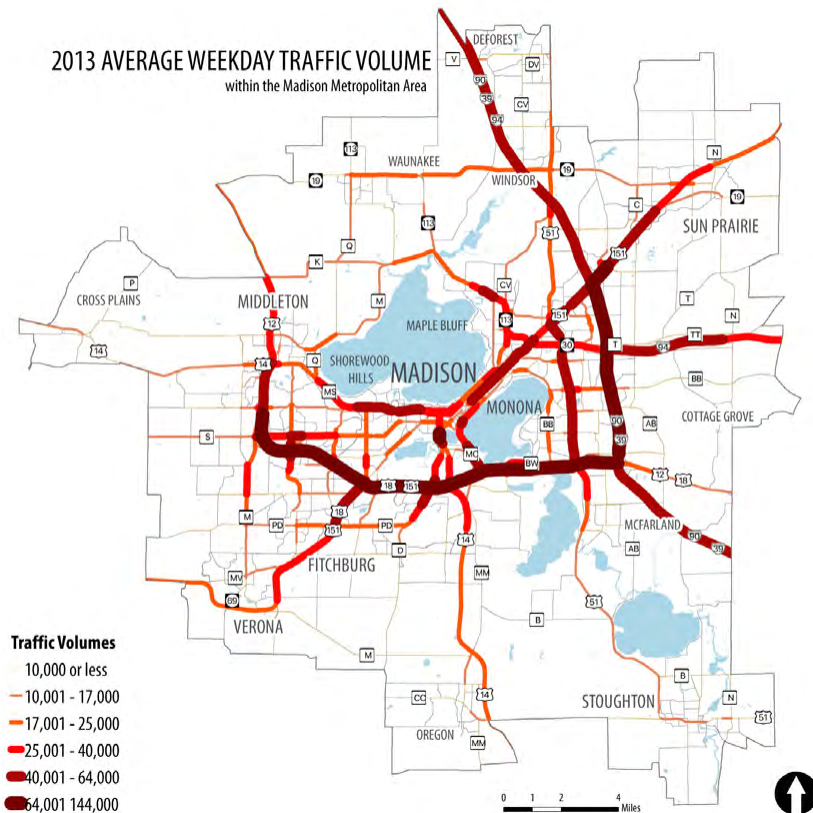


Figure 3-12: 2013 Average Weekday Traffic Volume

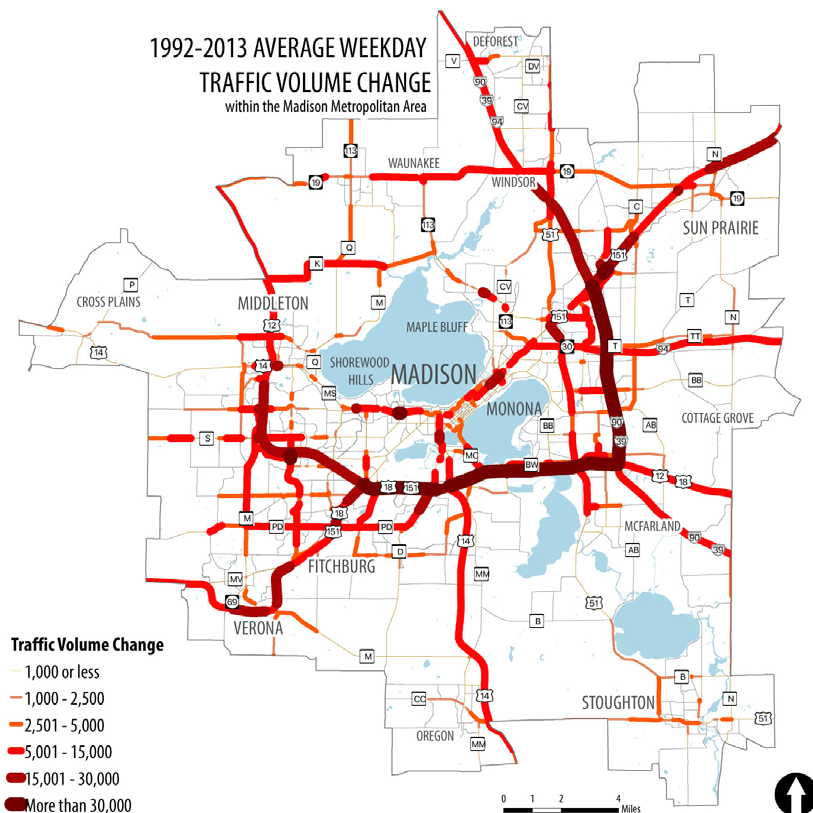


Figure 3-13: 1992-2013 Average Weekday Traffic Volume Change

## Congestion Mitigation Strategies

Dane County's roads are busier than ever before. In fact, according to WisDOT's estimate average daily vehicle miles of traveled, or VMT, in the county reached a new high in 2015 of 13.6 million miles. This extra traffic means that the potential for congestion, unreliable commute times, and unsafe roadway conditions is higher than ever.

Roadway congestion is common during the morning and afternoon rush hour periods on heavily traveled regional roadways. Related to congestion is travel time reliability – the variability in travel times that can occur from one day to the next. For most commuters, recurring peak period congestion is understood, anticipated, and planned for.

Drivers generally budget extra time to allow for routine delays, whereas unanticipated variability or delays can be a source of frustration as it can make commuters late for work, cause buses to run late, make business travelers late for appointments or meetings, cause truckers to be charged for late deliveries, and can disrupt the just-in-time delivery process. In many cases, rush hour congestion is difficult or impossible to solve due to physical constraints, costs, and the negative impacts of roadway expansion; however, reliability can be improved through a variety of operational enhancements and incident response management techniques.



The following are the seven commonly accepted sources of congestion that can lead to travel time reliability issues. Capacity limitations of roadways, or physical bottlenecks, only account for, on average, about 40% of the delay.<sup>2</sup>

1. Physical Bottlenecks (40%) – Capacity limitations due to design of motorway
2. Traffic Incidents (25%) – Crashes and accidents that impeding travel lanes
3. Work Zones (10%) – Construction activities that result in physical changes to motorway
4. Weather (15%) - Snow, rain, or other events that change driver behavior and impact flow
5. Traffic Control Devices (5%) – Poorly timed signals, rail crossings, etc.
6. Special Events (5%) – Sporting events, concerts, etc. that cause surges in traffic demand
7. Fluctuations in Normal Traffic – Day-to-day variations that lead to high-demand days

Complicating things, many of these sources of congestion can trigger another source to occur (a weather event causing a crash, a special event making a work zone bottleneck worse, etc.). This means that significant payoffs can be expected by implementing a comprehensive congestion management process (CMP) that includes travel demand management (TDM) and transportation system management (TSM) and operations strategies such as transit and ride-sharing incentives, traffic signal coordination, traveler information, and enhanced incident response, along with physical bottleneck relief through targeted capacity expansion.

<sup>2</sup> [https://ops.fhwa.dot.gov/congestion\\_report/executive\\_summary.htm](https://ops.fhwa.dot.gov/congestion_report/executive_summary.htm)



## Congestion Management Process for the Madison Area

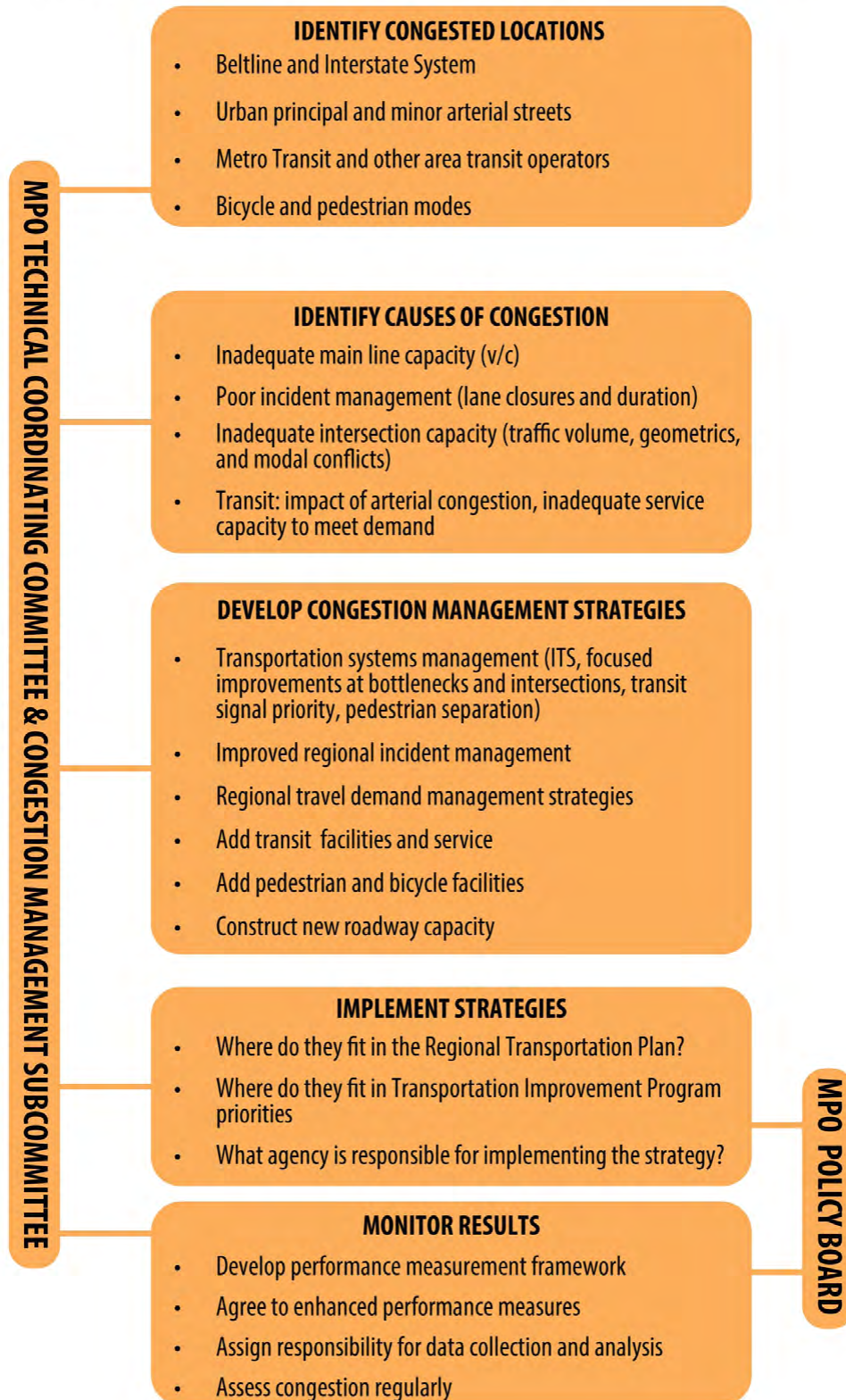


Figure 3-9: Congestion Management Process for the Madison Area



### Congestion Management Process

A Congestion Management Process, or CMP, is a systematic process that provides information on transportation system performance and provides alternative strategies to alleviate congestion and enhance the mobility of people and goods. In short, it is a way to get the most out of the existing transportation system. Metropolitan planning organizations are required to maintain a CMP if planning for an area with a population of over 200,000.

MATPB adopted its most recent CMP in November 2011.

FHWA says that CMPs must include:

- Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring congestion, and identify and evaluate alternative strategies
- Objectives and performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods that have been deemed acceptable by local transportation officials, the MPO, State DOT
- Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions
- Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures
- Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation
- Implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures



Depending upon the need, recommendations for congested corridors can range from implementing better incident management to strategic capacity enhancement. Recommendations will fall into one of three categories: TSM, TDM, or capacity enhancement. The type of recommendation will depend on need, available right of way, land use context, cost, and other considerations. Per MATPB policy, roadway capacity enhancements are generally considered only after implementing both TDM and TSM strategies and not achieving anticipated or desired congestion reduction. A Level of Service (LOS) of D is generally considered acceptable, and service levels lower than that must sometimes be tolerated in certain areas such as downtowns due to right of way constraints and the negative impacts of expanded roadway capacity such as impacts to other roadway users and removal of parking.



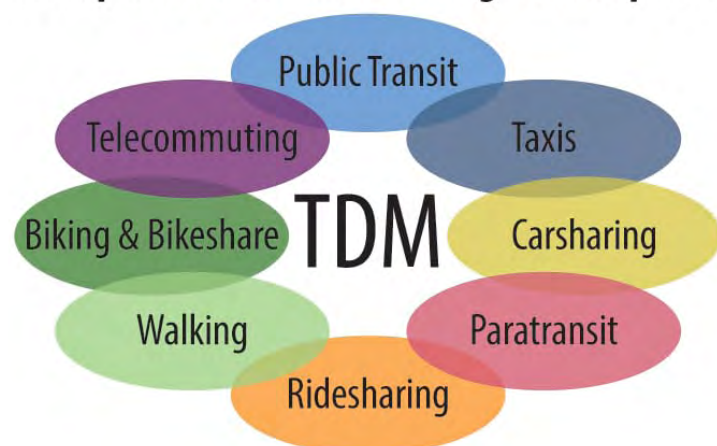
### Transportation System Management (TSM)

TSM is a planning tool that focuses on increasing the efficiency of the transportation system by active management of facility operations using technology to minimize the effects of incidents or recurring vehicle congestion. This strategic approach places emphasis on improving existing system efficiency by utilizing intelligent transportation system (ITS) technology to ensure that drivers are aware of incidents, that incidents are attended to rapidly, and that the network responds to sudden fluctuations in driving conditions. This approach also examines and implements future technologies that can improve system efficiency such as connected vehicle technology, coordinated, staged, or adaptive traffic signals, and dynamic message signs. ITS is increasingly becoming a key component of TSM.

### Transportation Demand Management (TDM)

TDM is a planning tool that focuses on increasing the number of options for people utilizing the transportation system and incentivizing the use of those options. TDM strategies include increasing awareness and utilization of public transportation, taxis (including app-based services), car sharing, paratransit, ridesharing, vanpooling, carpooling, walking, bike sharing, and telecommuting. Additionally, transportation demand can be managed by adopting land use policies that encourage more compact development with mixed uses and well-connected street networks that can reduce trip length and frequency while providing an environment that is supportive of non-auto modes of travel. More information about TDM, including strategies being implemented by MATPB, can be found on page 3-31.

### **Transportation Demand Management Options**





# BICYCLES

## Existing Bikeway System

The Madison metropolitan area is served by an interconnected bikeway network, consisting of off-street shared-use paths, on-street bike lanes, and local streets. Bikeway construction began in earnest in the 1990s and most major roadway projects now feature provisions for bicyclists as well as pedestrians. Several rail and other corridors have been utilized to build high quality shared-use paths.

The 2015 Bicycle Transportation Plan organized components of the bikeway system into a regional network of primary and secondary bicycle routes consisting on-street and off-street segments (see Figure 3-14). This network helps planners visualize the bikeway network as it is used by cyclists, identify gaps, and prioritize improvements. The Bicycle Transportation Plan identifies regional bicycle infrastructure needs and outlines recommended regional priority path segments to improve the connectivity of the system and build a truly regional network.

Most communities in Dane County also engage in bikeway planning. The City of Madison has worked cooperatively with MATPB staff to develop and adopt the regional bicycle plan. The Cities of Fitchburg (2017) and Middleton (2009) regularly update their local plans. Other communities including Sun Prairie, Stoughton, McFarland, and Verona have undertaken updated bicycle route mapping and studies to identify and prioritize planned facilities. Local comprehensive and/or recreation and open space plans typically include a bicycle transportation component. The City of Madison also plans for bicycle infrastructure as part of preparation of neighborhood development plans.

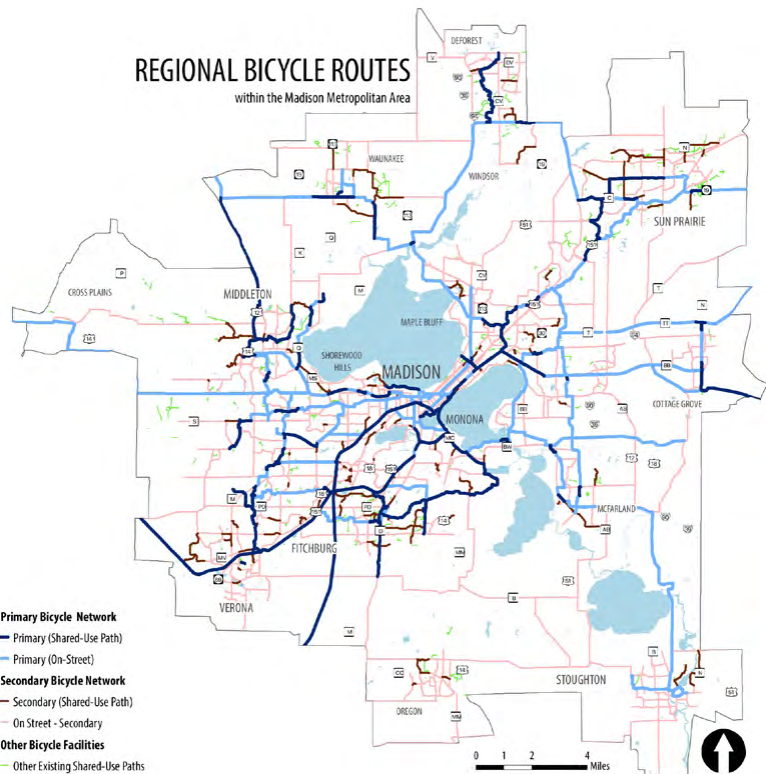


Figure 3-14: Regional Bicycle Routes

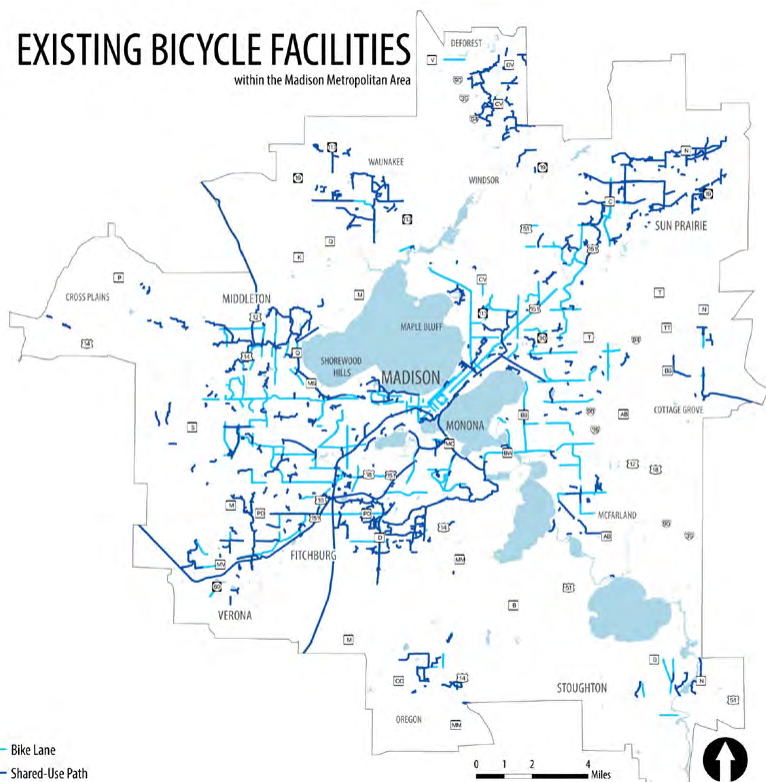


Figure 3-15: Existing Bicycle Facilities



## Bicycle Facilities

Bicycle facilities consist of a combination of shared-use paths and on-street facilities such as bike lanes and paved shoulders (in rural areas) and bike boxes and other intersection improvements. Appropriate bicycle facilities are generally included on street corridors as they are reconstructed, if possible. Newer innovative features are now beginning to be added such as separated bicycle lanes and bike signals. Still, gaps in the network persist that make it difficult for cyclists to operate safely and comfortably and access destinations. The 2015 Bicycle Transportation Plan identified several types of bicycle facilities used in the Madison area and around the U.S. Bicycle facilities are chosen based on many factors, including the projected usage, safety design, cost, and available space. Figure 3-15 on page 3-19 shows existing bicycle facilities.

Well-connected street networks are important for bicyclists to navigate within neighborhoods. Most of these streets have no specific bicycle treatments – they are unnecessary because of the low traffic speeds and volumes. In some cases, where continuous low-volume streets are used by high volumes of bicyclists and for longer journeys, they may have bicycle priority features like traffic calming, wayfinding signage, and sharrows.

Dedicated bike lanes are used on arterial and collector streets to separate bicyclists from traffic. They may be separated from traffic with a buffer space or vertical element like a curb or row of parked cars. Counter-flow bike lanes are used on one-way streets to allow two-way bicycle traffic.

Shared-use paths are the most comfortable bicycle facilities because they eliminate the need for a bicyclist to interact with traffic outside of street crossings. Shared-use paths are typically built along existing transportation corridors, through parks, and in other locations where land can be secured. However, they often do not provide direct access to homes and businesses.

Paved shoulders wide enough for bicycle use are used in rural areas where bicycle traffic is relatively low. They operate similarly to bike lanes but also serve as emergency stopping lanes for drivers.

Madison is served by a popular and successful bike-share system operated by BCycle. The system currently operates 350 bikes and 40 docking stations (see Figure 3-16). Stations are centered around central Madison but extend out to University Row (University Avenue at Midvale Boulevard), Monroe Street, the Alliant Energy Center, Olbrich Botanical Gardens, and Madison College's Truax Campus. The service attracted about 101,000 bike trips in 2016.

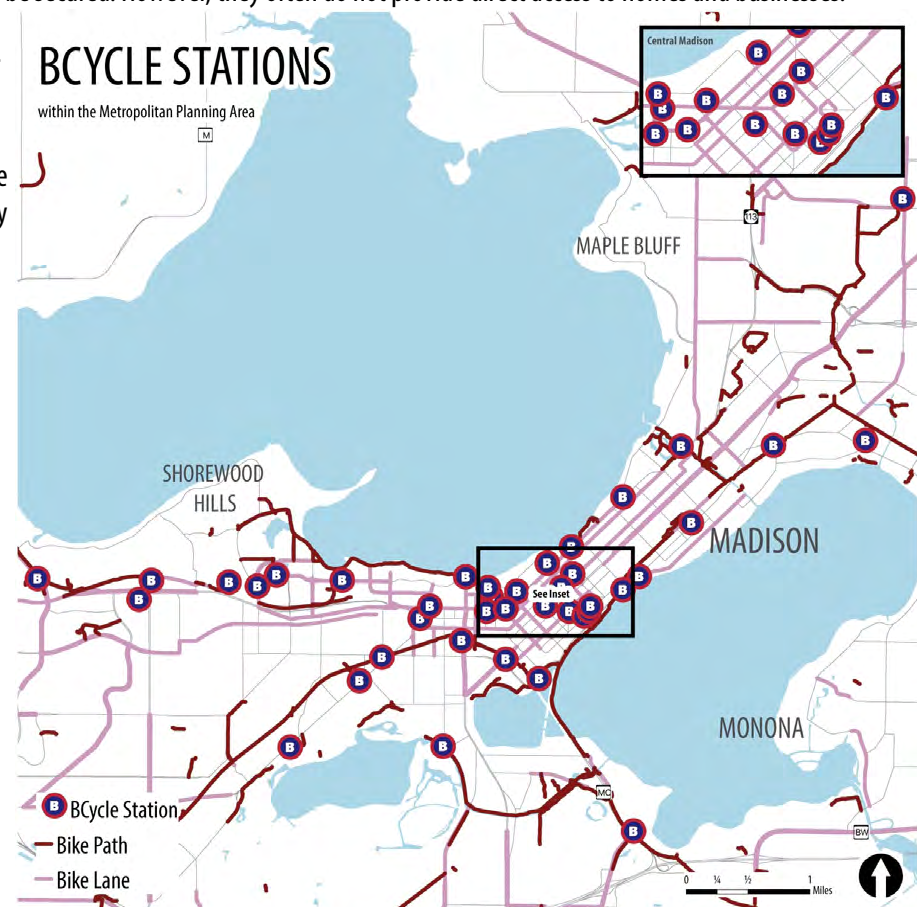


Figure 3-16: BCycle Stations

## Education and Encouragement Programs

Education and encouragement programs help people of all ages, backgrounds, and abilities make use of bicycling infrastructure. These programs help people learn to use the roads and paths safely, and help those who are new to bicycling start riding. Other programs help educate motorists about how to safely interact with bicyclists.



## Maps and Wayfinding

The Cities of Madison, Fitchburg, Middleton, and other communities publish local bike maps. MATPB, in partnership with Dane County, publishes the Dane County Bicycle Map, which shows the level of bicycle suitability on rural roadways and highlights suitable through routes connecting communities and major destinations in the county. The Wisconsin Department of Transportation provides bike maps for all counties in Wisconsin.

Historically, shared-use paths and bike routes were named and signed by their controlling jurisdictions. The Dane County Bicycle Wayfinding project established standards for marking bicycle routes to provide consistency across jurisdictions, making it easier and more convenient for cyclists to navigate the system.



## Bicycle Usage

Bicycle usage has increased dramatically in the last 15 years or so. The U.S. Census provides reliable commute-to-work bicycle counts that show that about 3.6% of commuters in the Madison Urban Area bike to work. The number rises to 5.5% for commuters residing in the City of Madison and exceeds 10% in some central Madison Census Tracts as shown in Figure 3-17. The increases are largely associated with improved bicycle infrastructure, changing attitudes about transportation and the environment, and the cost and availability of parking in central Madison.

Estimating bicycle usage for non-commute trips is extremely difficult. The City of Madison has several bicycle-counting devices at various locations spread throughout the city that show high usage particularly near the UW-Madison campus and on the Southwest and Capital City Paths. A household travel survey is being conducted in 2016-'17, which will provide data on travel by bicycle and other modes for all trip purposes. The survey will also provide information on factors that prevent people from choosing to make more of their trips by bike, foot, and transit.

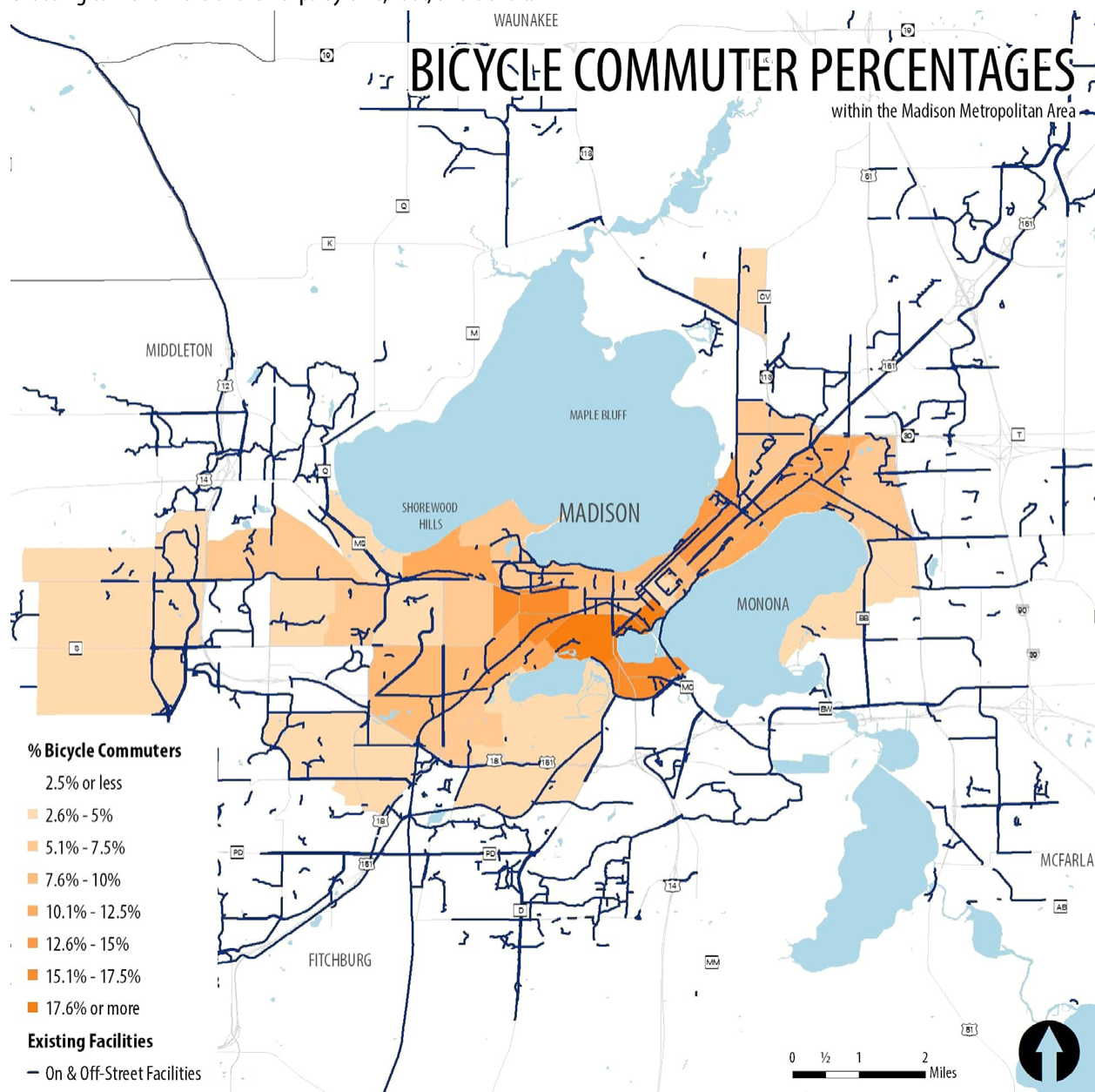


Figure 3-17: Percentage of Commuters Traveling by Bicycle



# PEDESTRIANS

## Existing Pedestrian System

Pedestrian facilities are important for a safe transportation system that accommodates all users. Sidewalks make walking safer and more pleasant for pedestrians, including the disabled, and provide access to public transit, increasing transportation options for those who may not be able to drive. Having sidewalks on both sides of the street makes walking easier and safer by reducing the number of times pedestrians must cross the street and be exposed to traffic. The City of Madison and other communities have programs that routinely retrofit sidewalks and crosswalks with curb ramps on streets that do not have them and repair sidewalks that are damaged or do not meet modern standards.

All streets benefit from sidewalks. They create a healthier community, as research has shown people will walk more often for recreational purposes if one is provided. Sidewalks, however, are most crucial on urban arterial and collector streets which have higher traffic speeds and volumes and serve more destinations. Sidewalks on these streets provide the most safety benefits and increase the number of transportation trips made by walking. In addition, shared-use paths are also used by pedestrians as an alternative to walking along streets or because they provide shorter routes to destinations.

Intersections represent a special barrier for pedestrians because of the dangers pedestrians face navigating across streets where turning traffic may be passing through the crosswalk and drivers may be focusing on several things at once. Motor vehicle traffic is required to yield to pedestrians at most unsignalized intersections, but compliance is limited.

## Sidewalk Coverage

MATPB maintains a county-wide sidewalk database in order to track sidewalk coverage. The database contains information on whether each public street has a sidewalk or shared-use path on both sides, one side, or no sidewalk at all (Figure 3-18). It further tracks whether streets are primarily urban or rural (sidewalks are not normally installed on rural roads) and whether or not a sidewalk is expected, due to existing development and other circumstances. Sidewalks are not normally built on frontage roads, freeways and ramps, and in similar locations.

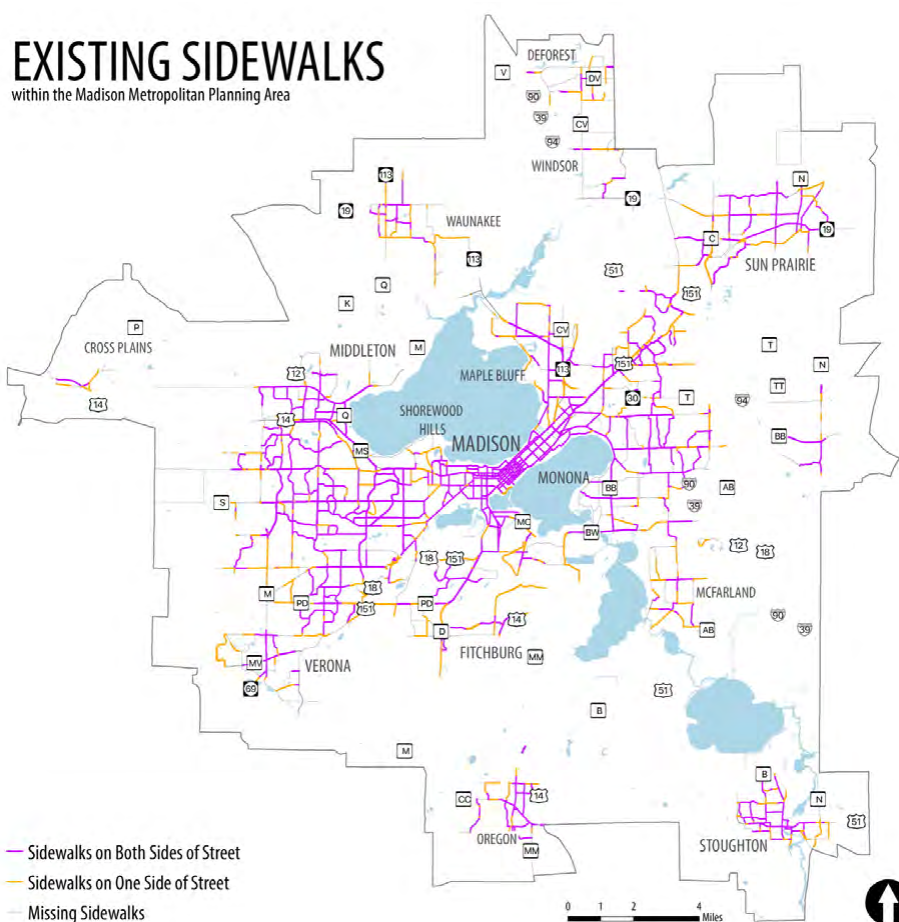


Figure 3-18: Existing Sidewalks

The sidewalk analysis and recommendations in this regional transportation plan focus on collector and arterial streets. In the planning area, about 55% of urban collector and arterial streets by length are estimated to have sidewalks on both sides where they are expected; about 21% have sidewalk on one side, and the remaining 24% have no sidewalk. Many of the urban streets that are missing sidewalk are in peripheral neighborhoods – in some cases sidewalk will be added systematically as the neighborhoods develop.

## The Challenges and Trade-Offs with Sidewalks

Although sidewalks are normally included in new construction in most jurisdictions, installing sidewalks along streets in established neighborhoods is sometimes met with local opposition. Residents may be concerned about several issues, including being assessed for the cost of sidewalk installation, the need to clear snow and ice in the winter, and the perceived loss of yard area.

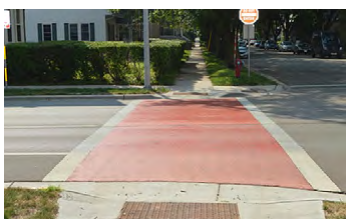


City of Madison residents are charged a special assessment for sidewalk installation and repair. A pilot program was used in 2015 in order to reduce this burden for low-income residents. While it is common for residents or developers to pay a special assessment for the construction of new sidewalks, some municipalities, such as the City of Sun Prairie, do not.

## Intersection Treatments

A variety of intersection treatments are used in the Madison area to make intersections safer for pedestrians. Some examples are shown below (see [Appendix F](#) for more information on pedestrian facilities and safety treatments).

**Marked Crosswalks**



Legal crosswalks can be either marked or unmarked. But well marked crosswalks are easier for drivers and pedestrians to see.

**Pedestrian hybrid beacons**



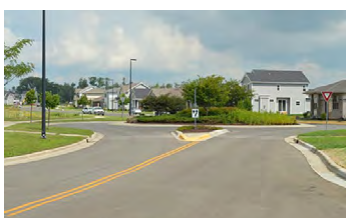
Special traffic signals at an intersection that does not warrant full signalization. The signals are only activated when a pedestrian is present and presses the button.

**Rectangular Rapid flashing beacons**



Yellow LED lights can, in some cases, be associated with signs at crosswalks to alert drivers at a crosswalk. The lights are activated by a pedestrian.

**Median refuge islands**



Refuges can shorten distance needed to cross an intersection and allow a pedestrian to make a multi-stage crossing. Refuges should be wide enough to safely accommodate several pedestrians.

**Curb extensions**



Intersection treatments designed to shorten the effective crossing distance for pedestrians.

**Wayfinding signage**



In dense commercial areas like downtowns and campuses, wayfinding tools like maps can be valuable for people who are unfamiliar with the area.



## Pedestrian Walk Access Analysis

High quality pedestrian facilities are most needed in areas with high population density and a mix of pedestrian-generating land uses like stores, schools, parks, and employment. The pedestrian walk access analysis estimates pedestrian demand using these principles. The analysis counts the number of destinations within walking distance of each Census Block, using a distance-decay function, and assigns each block a destination accessibility score. It then weights the score by Census Block population density, to estimate potential pedestrian demand. Neighborhoods with a high population density and dense mix of walking destinations receive higher scores. The analysis tool has some limitations as it does not directly account for the attractiveness of the pedestrian environment, such as building orientation, proximity to the street, and other factors. However, it is a useful aid in prioritizing gaps and deficiencies in the pedestrian network. Destinations included in the walk access analysis include:

- Coffee shops, banks, and retail outlets
- Child care centers, schools, and colleges and universities
- Grocery stores
- Restaurants
- Community centers, libraries, and places of worship
- Medical facilities
- Parks

## Walk Access Scores

within the Metropolitan Planning Area

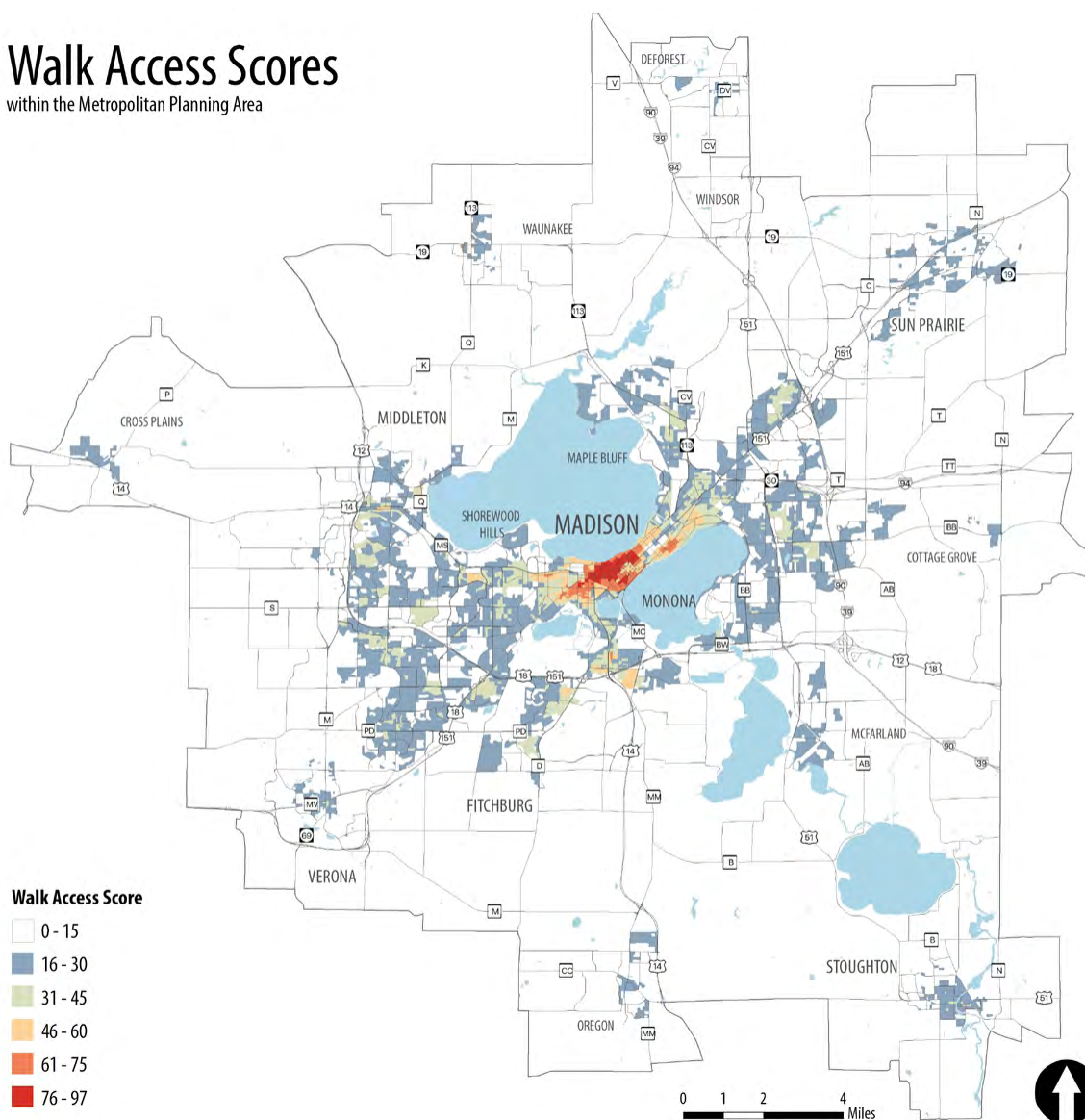


Figure 3-19: Walk Access Scores

Not surprisingly, the central Madison area, including the UW-Madison campus, generates the highest walk access scores. Other mixed-use neighborhoods like Schenk-Atwood, Dudgeon-Monroe, Regent, South Park Street, and suburban downtowns also receive fairly high scores. Many urban neighborhoods have moderate walk access scores, and these areas have regular pedestrian traffic and may have missing connections or substandard facilities.

## Street Network Connectivity

Besides high quality pedestrian facilities, pedestrians need a dense network of streets. Since people only walk at a speed of a few miles per hour, any out-of-direction travel is an impediment to walking. Downtown and older neighborhood grid systems with short blocks and dense street networks are ideal for walking.

Intersection density is a key indicator of pedestrian network connectivity. Generally, a higher number of intersections is correlated with shorter blocks and easier navigation. Linear barriers, such as water features, freeways, and railroads also present impediments to walking. Intersection density and linear barriers are shown in Figure 3-20.

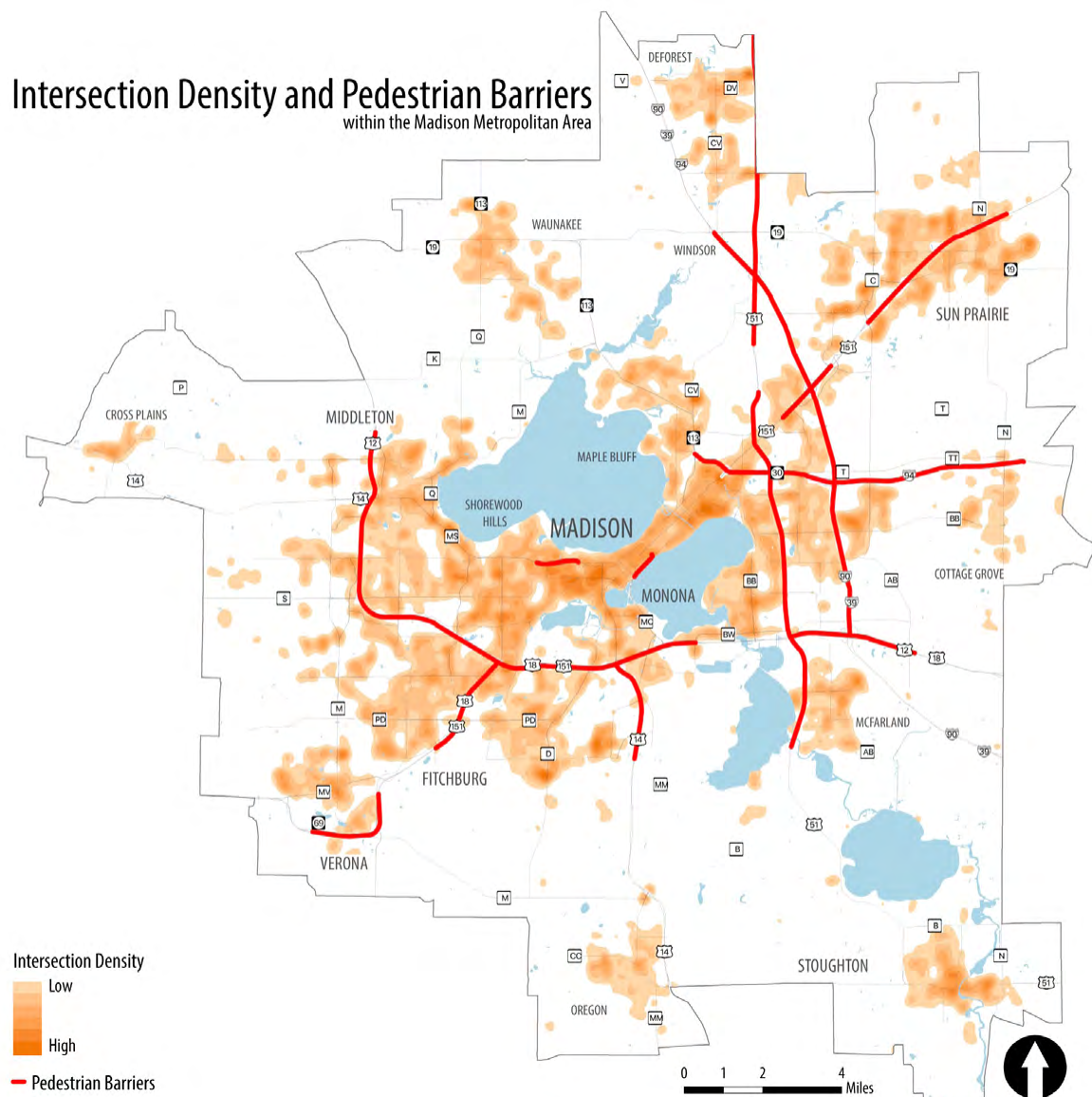


Figure 3-20: Intersection Density and Pedestrian Barriers



The Beltline Highway and Interstate 39/90/94 present significant challenges for connecting neighborhoods. New pedestrian connections across these regional roadways, like new non-interchange crossings, are needed and existing connections may be improved by adding or widening sidewalks and improving intersection crossings at ramp terminals.

All rail lines in the urban area are low volume, low speed lines with relatively frequent crossings. Several rivers and creeks cross the urban area but numerous bridges help to reduce their impact on pedestrian connectivity. For example, the Yahara River contains nine pedestrian crossings in its one-mile stretch between Lakes Mendota and Monona. The City of Madison has identified the need to connect the Capitol Square with Lake Monona with a better crossing of John Nolen Drive and the railroad.

## PUBLIC TRANSIT

### Service Providers

Metro Transit is operated by the City of Madison and provides the majority of public transportation service in the Madison metropolitan area. Metro operates a fleet of about 215 fixed-route buses as well as point-to-point paratransit service for qualifying people with disabilities. Metro partners with the Cities of Middleton and Fitchburg as well as the University of Wisconsin and other municipalities and entities to provide service outside the City of Madison.

Metro Transit has had an overall trend of increasing ridership since the City of Madison acquired the Madison Bus Company in 1970 as shown in Figure 3-22. The US Oil Crisis of the 1970s caused transit ridership to spike across the nation. Throughout the 1980s ridership declined before reaching a period of moderate growth in the 1990s and fast growth in 2000s. Annual ridership first exceeded 14 million in 2011 and increased further in 2014. Ridership declined in 2015 and 2016. The causes of this recent decline are not entirely clear but may be linked to declining gasoline prices.

In addition to Metro Transit, the City of Monona provides fixed-route commuter service during the morning and afternoon peak periods, called Monona Express, and specialized transportation for seniors and people with disabilities in the mid-day called Monona Lift. Monona Express operates in a counter-clockwise loop around Lake Monona in the morning and a clockwise loop in the evening. Service is only provided to passengers travelling within Monona or between Monona and Madison. Publicly subsidized shared-ride taxi service is available in Sun Prairie and Stoughton.

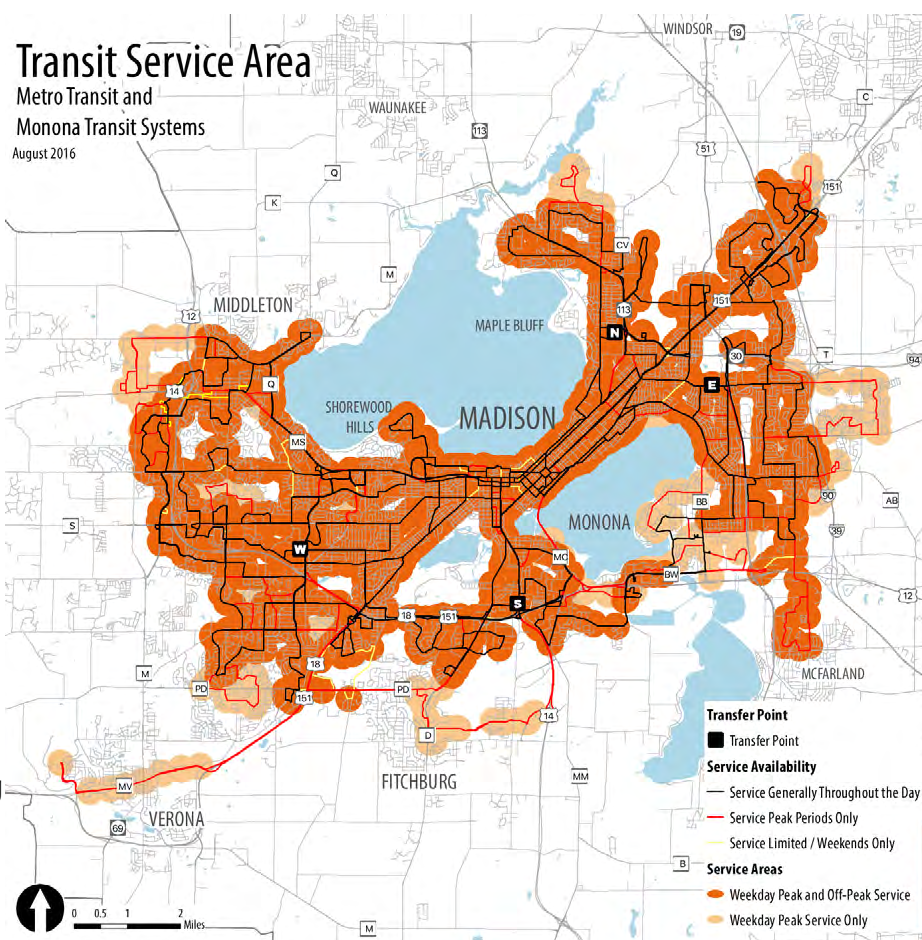


Figure 3-21: Transit Service Areas

## Metro Transit Ridership 1970-2015

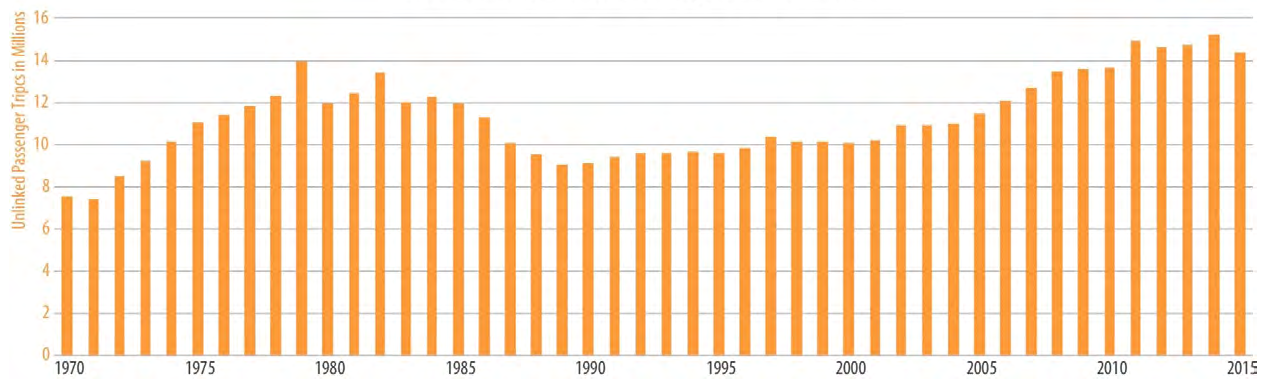


Figure 3-22: Transit Ridership 1970 - 2015

### Service Levels

Metro Transit operates 62 mainline fixed routes and several supplemental school day routes based out of Madison's four public high schools. Service is designed around four transfer points with most routes operating every 30 minutes during weekday peak periods and every 30 to 60 minutes off peak if service is offered during those times. Timed transfers at the transfer points allow for efficient connections throughout Metro's service area. Many routes overlap in central Madison to provide service every 15 minutes or better.

Metro Transit's service is concentrated in the morning and afternoon peak periods with about 180 buses in operation during those times. Fleet utilization drops to about 60 buses during the weekday mid day and 35 on weekends. The added service during peak periods consists of increased frequency on all-day routes, commuter routes that provide faster, more direct service and supplemental school day routes targeting middle school and high school students.

### Bus Operations

Metro Transit dispatches its fleet of about 215 buses and 17 paratransit vans from a single bus storage and operations facility on East Washington Avenue at Ingersoll Street. The facility was renovated in 1981 with the intent of housing a fleet of about 160 buses and is currently operating beyond capacity. Buses are parked in drive aisles and maintenance bays overnight and Metro leases a small lot in Middleton. Service expansion during peak periods is currently not possible because of the lack of available buses during peak periods.

Metro Transit applied unsuccessfully for a Federal TIGER grant in 2015 and 2016 for funding assistance for a new satellite bus storage and maintenance facility in northeast Madison on Nakoosa Trail. The

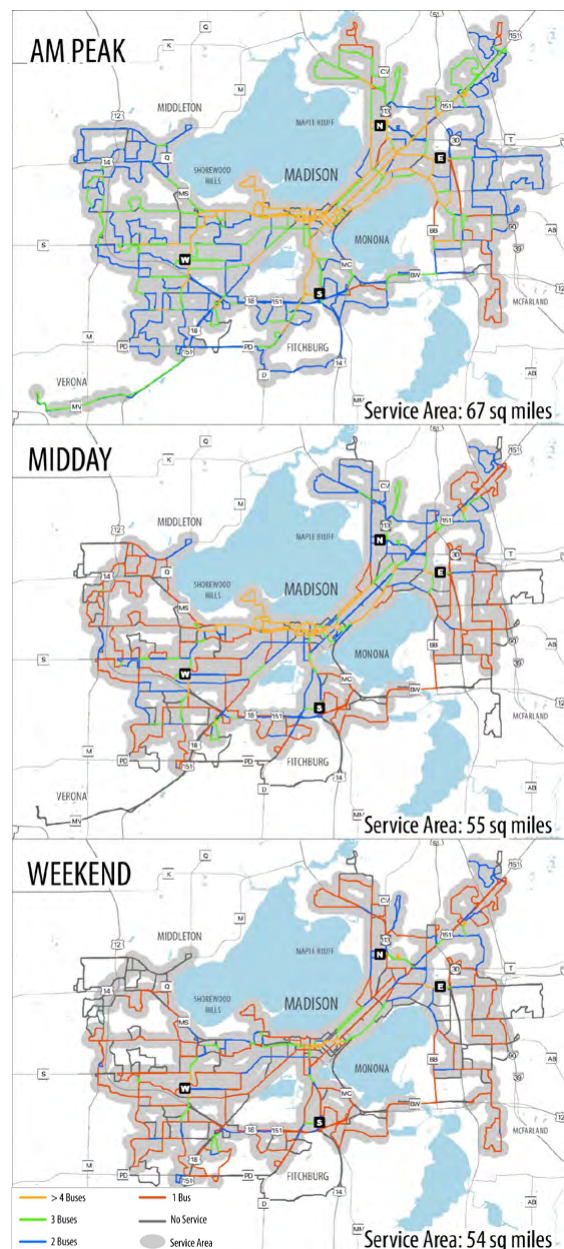


Figure 3-23: Transit Service Areas



new facility would reduce bus crowding at the existing facility and provide space for expansion, allowing Metro to provide new service including bus rapid transit. The Nakoosa Trail facility is planned to be LEED-certified and include a fitness room intended to reduce healthcare costs for bus operators and other employees.

Metro Transit's fixed-route fleet consists entirely of standard-length 40-foot diesel transit buses, about 10% of which are hybrid diesel-electric. Metro Transit, in coordination with MATPB, conducted a [Bus Size Study](#) in 2014, reviewing the fleet make-up. The study concluded that although the uniform fleet cost-effectively serves the area, the overcrowding problems encountered on several routes could be solved with larger 60-foot long articulated buses. Further, a few buses could be replaced with shorter 30-foot buses, although the small number of 30-foot buses combined with similar operating costs would not result in large cost savings.



## Funding

Funding for public transportation in the Madison area is derived primarily from four sources – fares, property taxes, federal grants, and state operating grants. As Metro Transit is a City of Madison utility, some service, particularly service provided outside the city limits, is funded through partner agreements where other municipalities or institutions cover the local share of the service.

Metro Transit's funding and governance structure as a city-owned utility is fairly uncommon. A Regional Transit Authority which would raise revenue in the transit service area has been explored but is not currently allowed by state law. Enabling legislation was granted in 2009 and rescinded in 2010.

For more information on transit service in the Madison area, see the [2013-2017 Transit Development Plan for the Madison Urban Area](#) prepared by MATPB in cooperation with Metro Transit and other transit providers.

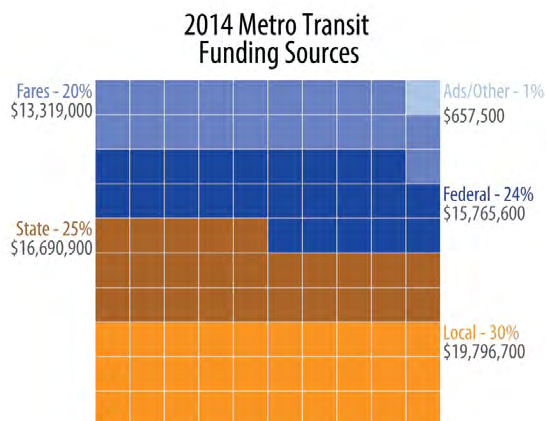


Figure 3-24: 2014 Metro Transit Funding Sources

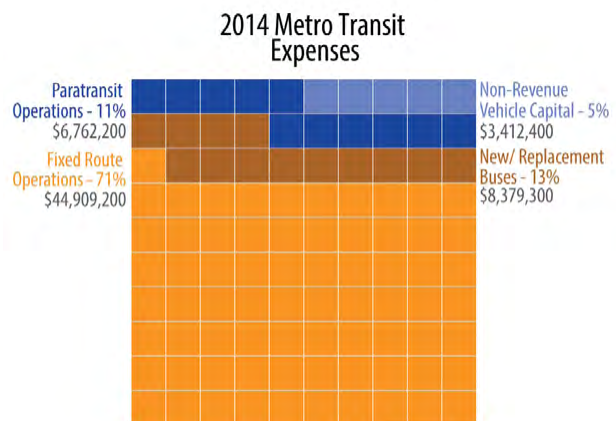


Figure 3-25: 2014 Metro Transit Expenses

## Specialized Transit Service Providers

The majority of specialized transit open to the public is supported by Metro Transit and Dane County. A variety of private organizations and service providers help bring the service to the public.

Metro Transit provides its paratransit service, Metro+Plus, in accordance with the Americans with Disabilities Act (ADA). The paratransit network shadows the all-day fixed-route bus system, excluding peak-period commute-oriented service. Paratransit service is provided on a demand-responsive, advance-reservation basis for people who are unable to use Metro's regular fixed-route service.



Metro operates its own paratransit service on weekdays. Late-night and weekend service, as well as weekday service beyond the limitations of the directly operated service, is contracted to private providers. Metro coordinated about 274,000 paratransit trips in 2015 (52,000 directly operated and 222,000 contracted).

The Adult Community Services Division of the Dane County Department of Human Services (DCDHS) administers wheelchair-accessible fixed-route group ride and demand-responsive services for seniors and people with physical or developmental disabilities. The services are provided entirely through contracts with private service providers. DCDHS operates an on-call center to help coordinate these services as well as external resources and to help riders easily connect with the correct service.

The group ride services are divided into Group Access Service, in urban neighborhoods, and the Rural Senior Group Transportation Program, which operates outside of the Madison contiguous area. The services provide regularly scheduled weekday routed group trips for seniors (age 60 and older) and people with disabilities who live at home in Dane County. The service is neighborhood-based, connecting residential areas to nearby nutrition sites, grocery/general shopping areas, and other destinations.

The public shared-ride taxi systems in Sun Prairie and Stoughton offer accessible service that is generally door-to-door. Several private taxi companies operate in the contiguous Madison area; however, only Union Cab offers wheelchair-accessible service.

Other specialized transportation services fill various needs. The Retired Senior Volunteer Driver Escort Program (RSVP) provides individual door-through-door rides primarily to medical appointments for adults aged 60 and over, and for people with disabilities, with volunteer drivers in their own vehicles. The Veterans Helping Veterans program provides veterans and their family members with rides to appointments and services.

For more information on specialized transit services and service needs and coordination issues, see the [Dane County Coordinated Public Transit – Human Services Transportation Plan \(2013\)](#), prepared by MATPB in cooperation with Metro Transit, DCDHS, and other service providers.



# TRAVEL DEMAND MANAGEMENT AND RIDESHARING

## Travel Demand Management

Travel Demand Management (TDM) is generally defined as a set of strategies designed to reduce roadway congestion and demand for single-occupancy vehicle (SOV) travel by redistributing travel demand to alternative travel modes, times, and routes. TDM programs have typically focused on commuter-based programs such as carpooling, van-pooling, transit, telework, and employer-focused incentive and marketing efforts aimed at reducing SOV trips. TDM programs are now also focusing on active transportation and trips beyond work commutes.

In the Madison metro area, a number of programs and strategies are employed to offer options to commuters. These include the Rideshare, Etc. program, the state-run vanpool program, park and ride lots, public transportation services such as buses, vans and shared-ride taxis, shared vehicles, bicycling, and walking. In addition, strategies to encourage the use of these programs such as the Guaranteed Ride Home program, employer transit pass programs, and promotion programs are also in place.

## Rideshare, Etc Program

MATPB administers the Rideshare, Etc program in partnership with WisDOT. The program serves commuters in all of Wisconsin along with the counties in neighboring states. The goal of the program is to reduce congestion and pollution, to provide commuters with more travel options, and to improve quality of life in the communities served. The program includes a website ([www.rideshareetc.org](http://www.rideshareetc.org)) where commuters set up a profile and then can tailor a search to their needs, including a search of potential carpool partners, vanpools, transit routes, and biking partners.

As shown in Figure 3-22 in 2016, 676 new commuters registered with Rideshare, Etc for the Dane County area. The number fluctuates each year and the number of registrations

Year	New Commuters Registered
2012	907
2013	919
2014	792
2015	703
2016	676

Figure 3-22: Rideshare Etc. Registrations



is often impacted by the addition of new incentives as well as by rising or decreasing gas prices. However, the total number of commuters in the Madison Metro Area active in the Rideshare, Etc. program is much larger, as many people remain in the system after their initial registration. In 2016 there were 1,866 active participants. In addition, ridesharing arrangements are often formed outside the formal Rideshare, Etc. program and are not captured in these statistics. According to recent Census data, around 8.4% of Dane County residents carpool to work.

## State Vanpool Program

Madison is served by a number of vanpools operated by the Wisconsin Department of Administration. The State Vanpool Program serves both state and non-state employees commuting to Madison from outside communities, although each vanpool must have at least one state employee. The vanpools are groups of 7 to 15 commuters traveling together in a passenger van owned and insured by the State Vanpool Program. Passengers share the cost of the trip and pay a fare based on the costs to operate the van. The fare covers gas, insurance and van maintenance. Currently the state operates 70 vanpools commuting to Madison with 920 passengers.



## Park and Ride Lots

Currently there are twelve formal park and ride lots in Dane County. Nine are operated by WisDOT, one is jointly operated by WisDOT, Wisconsin Department of Natural Resources and Dane County and two are operated by Metro Transit. Of the park and ride lots, five have transit service:

- North Transfer Point at 1213 Huxley Street
- Dutch Mill Park and Ride on US Highway 51 at US Highway 12/18
- Northside Town Center at Sherman Avenue and Northport Drive
- Verona at 2565 Old County Highway PB
- American Center on East Park Boulevard

### Existing Park and Ride Lots

within Dane County and the Madison Metropolitan Planning Area

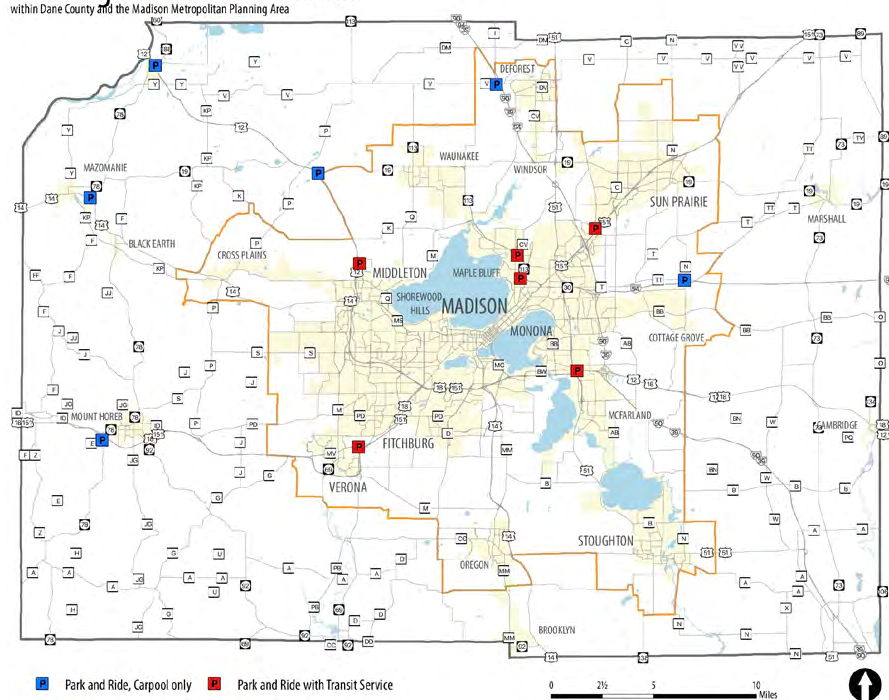


Figure 3-26: Park and Rides

## YW Transit & Job Ride Program

YW Transit is a transportation program run by the YWCA that serves Dane County. The three primary goals of the service are as follows:

- Provide rides for low-income people going to/from work
- Provide a safe ride at night for potential victims of sexual assault
- Provide rides to community agency programs for individuals isolated by poverty, age, disability, and language barriers who have no viable transportation options



Source: YWCA

## Car Share

Car sharing allows people to access a car for short periods of time, often by the hour. Car sharing makes it easier for people to get by with fewer cars or go car-free, helping members save money while still having access to a car when they need one. Car sharing also provides members with flexibility, since they can access different types of vehicles depending on need. In Madison, car sharing is currently provided by Zip Car. Currently there are 22 Zip Car locations with 32 vehicles which are located on the UW-Madison campus and in the central part of Madison. In the last 12 months the UW-Madison averaged 3,084 members and members used the vehicles for 24,172 hours.





## Bike Share

Users of bike share are able to check out a bike at any station, ride to where they need to go, and park the bicycle at the closest station to their destination. People use the bikes to run errands, grab lunch, travel from the bus stop to their office, or just explore the city. The goal is to make it easier for people to make short trips by bicycle.

The City of Madison partners with Trek Bicycles to operate bicycle-sharing through the BCycle program. Currently BCycle operates 40 stations throughout the city with more than 350 bikes. BCycle started with stations primarily on the UW campus and downtown but has been expanding to new areas including stations at Hilldale Shopping Center and Madison College. Many local businesses also partner with BCycle to offer free or low-cost memberships for employees and customers. In 2016 riders took around 101,000 trips covering nearly 308,000 miles and the system averaged just under 300 bike checkouts per day of operation between March 17 and December 31.



## Incentive Programs

The Madison area has programs to incentivize commuters to travel by non-SOV modes that are available to all employees. In addition, some businesses have their own incentive systems.

The Guaranteed Ride Home Program supports commuters that do not drive alone to work by providing them with a taxi voucher so they are not stranded at work if an emergency arises. Participants receive up to six vouchers per year good for up to \$75 per ride. The program is administered by MATPB and funded by Dane County Highway and Transportation Department. Currently 1,027 people are registered for the Guaranteed Ride Home program.

Metro Transit offers a Commute Card program that is open to employers of any size and offers a reduced price per ride to encourage commuting by bus. The employer can choose to pay the entire cost, share the cost, or have each employee pay for their own rides. Currently 121 employers participate in the program. Large employers such as UW-Madison, City of Madison, Dane County, Edgewood College UW Hospital, Meriter Hospital and St. Mary's Hospital subsidize all or most of the expenses of the Commute Card program for their employees. In addition, a few smaller employers such as Filament Game and the Edgewater Hotel cover the cost of their employees' passes.

## Encouragement Programs

To ensure that people are aware of their transportation options and to increase the use of new walking and cycling infrastructure, transit and other services, TDM programs rely on encouragement and education campaigns.

Each year MATPB collaborates with Metro Transit, UW-Madison Transportation Services, and Dane County to run an advertising campaign aimed at raising awareness of commuter options. The campaign usually includes a mix of bus tail ads, online ads, print ads and occasional radio ads.

In addition, Rideshare, Etc. partners with businesses to do outreach through participation in resource fairs and other workplace events as well as providing maps, brochures and other information for businesses to share. Rideshare, Etc. also works with

Sustain Dane to support businesses enrolled in the MPower sustainability program to include TDM projects as a part of their sustainability efforts.

A number of efforts in the Madison area are also focused specifically on promoting bicycling. Many communities participate in the Wisconsin Bicycle Federation-sponsored Bike Week which is held annually in June, and is an expansion of the traditional Bike to Work Day.

One of the newest bicycle promotion programs is the Love to Ride Madison bicycle challenge. This month-long challenge provides messaging tailored to a person's riding experience and encourages experienced bicyclists to get their co-workers and friends out on rides. The ultimate goal of the month-long challenge is to get more people to bike to work and school. The behavior change model recognizes that people are not likely to go straight from never riding a bike to riding one to work. Instead, they are likely to begin with a recreational trip on the weekend and then, once they get comfortable on a bike, move on to cycling on an easy errand before they try commuting to work.

In addition, the Safe Routes to School movement focuses on getting parents and children to walk and bike to school, as children being driven to school creates congestion and safety concerns. Safe Routes to School programs exist in schools throughout Dane County to promote walking and bicycling to and from school. Starting in 2017 a coordinated county-wide program will begin with Federal Transportation Alternatives Program funding provided by MATPB.



## UW-Madison Commuter Solutions Program

UW-Madison has a comprehensive TDM program, with a staff that includes a Program Manager, a Ped/Bike Coordinator, and a Flex Parking/Transit Coordinator. The UW Commuter Solutions program UW-Madison TDM activities include:

- Promoting Transit: UW-Madison provides free campus bus service and contracts with Metro Transit to provide a Commute Card for both faculty/staff and students.
- Supporting Carpooling: The UW offers 6 daily parking passes at no cost for registered carpool members as an added incentive.
- Park and Ride: The UW offers park and ride lots for faculty and staff including one at Wingra Dr. and one at University Crossing that have a shuttle to campus. The UW also has a park and ride lot at University Research Park that is served by Metro Transit.
- Occasional Parking for non-SOV commuters: The Flex Parking program provides occasional parking to people who normally commute by alternate modes.
- Supporting Bicycling: The UW provides bicycle parking throughout campus, with bike lockers and cages for more secure parking. The UW also runs a Bicycle Resource Center that offers free use of tools and classes on maintenance and repair for students and employees.



## INTER-REGIONAL TRAVEL

### Inter-City Bus Service

A handful of private inter-city bus companies provide regularly-scheduled bus service between Madison and Milwaukee, Chicago, and other cities, as well as points in between. Badger Bus provides eight round trips per day to Milwaukee with stops in Johnson Creek and Waukesha, and Van Galder provides more than 12 round trips daily to Chicago with stops in Janesville, Beloit, and Rockford. Megabus and Greyhound provide several daily express trips to Chicago and the Twin Cities.

Lower-volume routes connect Madison to smaller cities. Lamers Bus Lines runs three daily routes between Madison and Dubuque, Green Bay, and Wisconsin Rapids. Jefferson Lines also links Madison to La Crosse on its Milwaukee to Minneapolis route. This service is partially supported by Wisconsin state intercity bus grants. In addition, seasonal limited service between Madison and Whitewater, Eau Claire, and La Crosse/Minneapolis operated by Badger Bus supports college and university student weekend travel.

### Passenger Rail Service

The nearest passenger rail station with regular public service is in Columbus, Wisconsin, about 26 miles northeast of downtown Madison. This station serves Amtrak's daily Empire Builder route serving Chicago, Milwaukee, Minneapolis/St Paul, Seattle, Portland, and other cities.

Amtrak also coordinates with inter-regional bus companies to sell integrated tickets on their thruway bus service. Thruway bus service allows passengers to buy a single ticket that includes travel on Amtrak's rail service and connecting bus routes. Amtrak's national network includes a central hub in Chicago which, along

#### Intercity Bus Stops within the Madison Metro Area

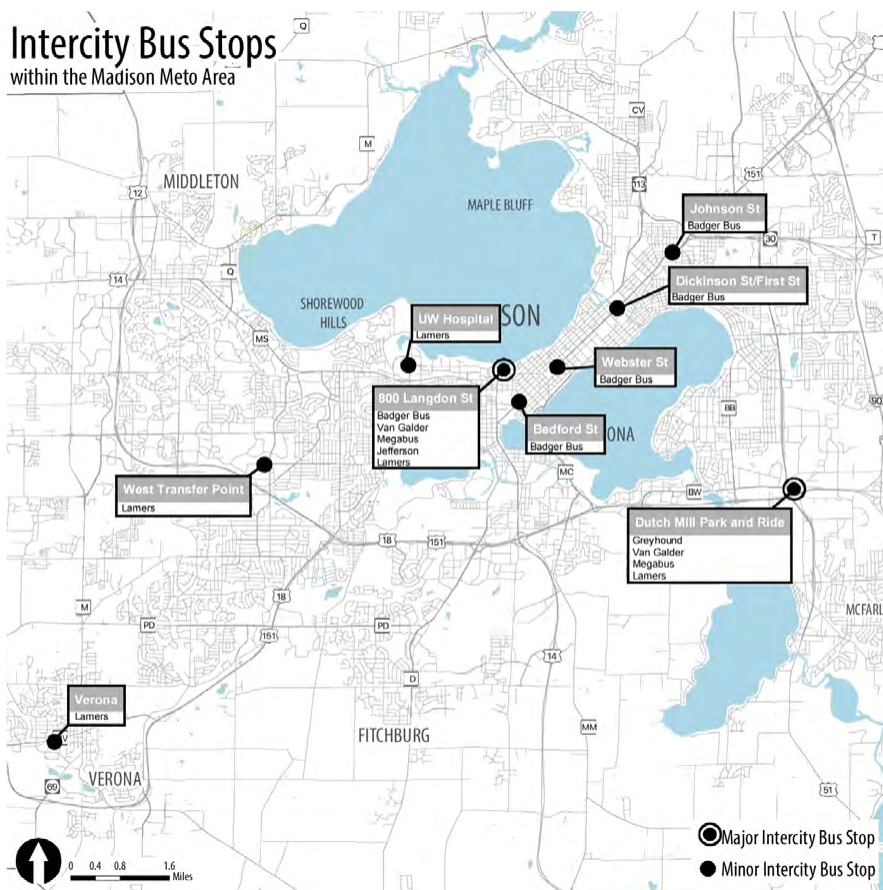


Figure 3-27: Intercity Bus Stops



with Van Galder's Madison-to-Chicago bus service, allows convenient rail travel between Madison and many major destinations around the U.S.

Besides its long-distance service, with trains generally running daily on routes longer than 750 miles, Amtrak offers more frequent service on shorter state-supported lines. The Hiawatha Service between Chicago and Milwaukee is one of Amtrak's more successful state-supported routes with about seven daily round trips and about 800,000 passenger boardings per year. Planned improvements to the Hiawatha Service include improving frequency to ten round trips per day and increasing train speeds to 90 miles per hour. In the 2000s, the Wisconsin Department of Transportation led an effort to extend the Hiawatha Service line to Madison with improved tracks and a station near the Monona Terrace. The project was canceled in 2010.

## Inter-City Bus Terminal

Inter-city buses stop in a variety of places in Madison but most serve a stop on Langdon Street on the UW campus ([See Figure 3-27](#)). Greyhound is an exception, only serving the Dutch Mill park-and-ride on Madison's southeast side. No terminal serves inter-city bus passengers – leaving them without access to bathrooms, information, or shelter. The lack of an inter-city transit terminal is inconsistent with the level of inter-city bus service in Madison. The need for a new terminal has been felt at least since Badger Bus closed their terminal on Bedford Street in 2009, and was exacerbated when inter-regional buses could no longer stop on Langdon Street due to a renovation of the Memorial Union. The stop has since moved back to Langdon Street; however, the stop is now near Lake Street, rather than in front of the UW Memorial Union.



Various sites for an inter-city terminal have been investigated, including a rail terminal near the Monona Terrace, a parcel on Bedford Street, and a terminal integrated into the Lake Street parking garage when it is reconstructed. There is general agreement on the need to provide a high quality facility that serves all the inter-city bus lines with information, ticket sales, and other amenities in a location with convenient pedestrian access to the UW, Capitol Square, and Metro Transit bus service.

## Airport Access

Metro Transit provides public transit service to the Dane County airport, with Route 20 operating every 30-60 minutes between the North Transfer Point and East Towne Mall. Transfers at either location allow passengers to travel to central Madison, the UW, and other destinations in the Metro Transit service area. A trip between the Capitol Square and the airport, a five-mile trip, is scheduled to take about 31 minutes, including a five- to ten-minute wait at the North Transfer Point.

Direct limited-stop service between central Madison and the Dane County Airport has been investigated intermittently. The region's hesitancy to introduce the service is due to several factors. First, transit ridership from the airport is currently estimated at only 15 to 20 passengers per day. Although it is unclear what the demand potential would be with faster, simpler service, it is unlikely that a fixed-route service designed specifically to serve the airport could be operated with sufficient frequency to draw enough ridership and be a cost-effective use of funds. Second, the service would be duplicative of parallel service in the corridor, particularly routes 20 and 2 and/or 4.

The planned Bus Rapid Transit system includes a line along Sherman Avenue serving the North Transfer Point and Northside Town Center with some trips continuing east to the airport. This service would provide a fast trip between the airport and central Madison without a transfer.



# FREIGHT

## Freight Movement

The region's economic prosperity depends on the efficient movement of goods. Freight plays an important role in business efficiency, productivity, and profitability. In fact, reports show there is a strong correlation between an increase in the movement of freight and growth in gross domestic product.

In recent years, a shift towards online shopping from traditional brick-and-mortar stores has had a major impact on the amount and types of freight shipments entering the community and fundamentally changed the "last mile" of freight movements. In the past, the "last mile" movement of a freight delivery was to a retail store, whereas now a number of these movements terminate at an individual address in a residential neighborhood.

Over the last few years in Dane County, freight volumes have been increasing, with trucks carrying more of these shipments. In 2007, Dane County received over 8 million tons of freight, about 1 million tons of which was carried by rail, with nearly all of the remainder carried by truck. Air and other modes (such as pipelines) carried only a very small portion of total inbound freight. At the same time over 8 million tons of freight left the region, with virtually all of it leaving via trucks. By 2014, inbound shipments had increased by over 45 percent and outbound shipments by about 9 percent. Of the nearly 12 million tons of inbound freight, nearly 11.5 million tons arrived by truck, while only 400,000 arrived by rail.

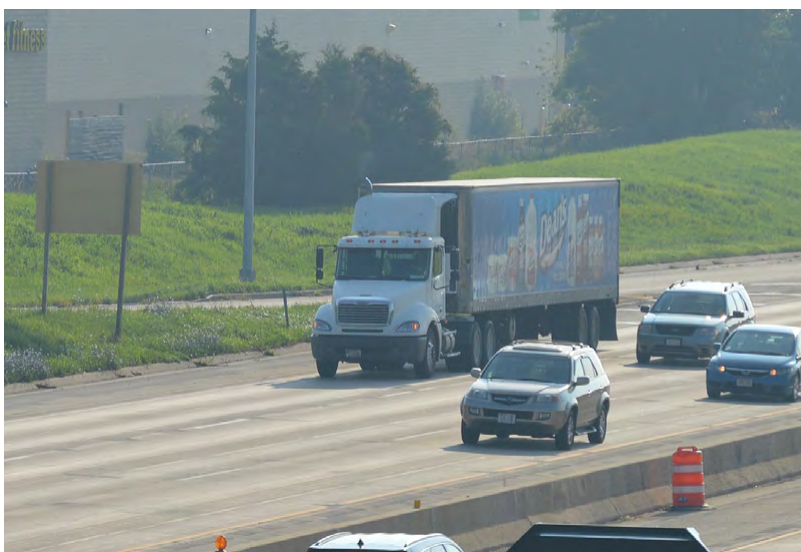


Figure 3-28

### Dane County Freight Flows (2014)

	Rail Tons	Truck Tons	Air Tons	Other Tons	Total Tons	Rail Value	Truck Value	Air Value	Other Value	Total Value
Outbound	93,808	8,950,409	12,953	78	9,057,248	\$57,318,279	\$8,598,129,851	\$844,223,852	\$3,284,361	\$9,502,956,343
Inbound	402,772	11,494,628	13,013	83	11,910,497	\$240,770,009	\$11,828,391,105	\$804,907,825	\$1,314,921	\$12,875,383,860
Internal	3,600	2,689,808	0	0	2,693,408	\$2,067,151	\$1,712,152,252	\$0	\$0	\$1,714,219,403
Totals	500,180	23,134,845	25,966	161	23,661,153	\$300,155,438	\$22,138,673,208	\$1,649,131,677	\$4,599,282	\$24,092,559,606

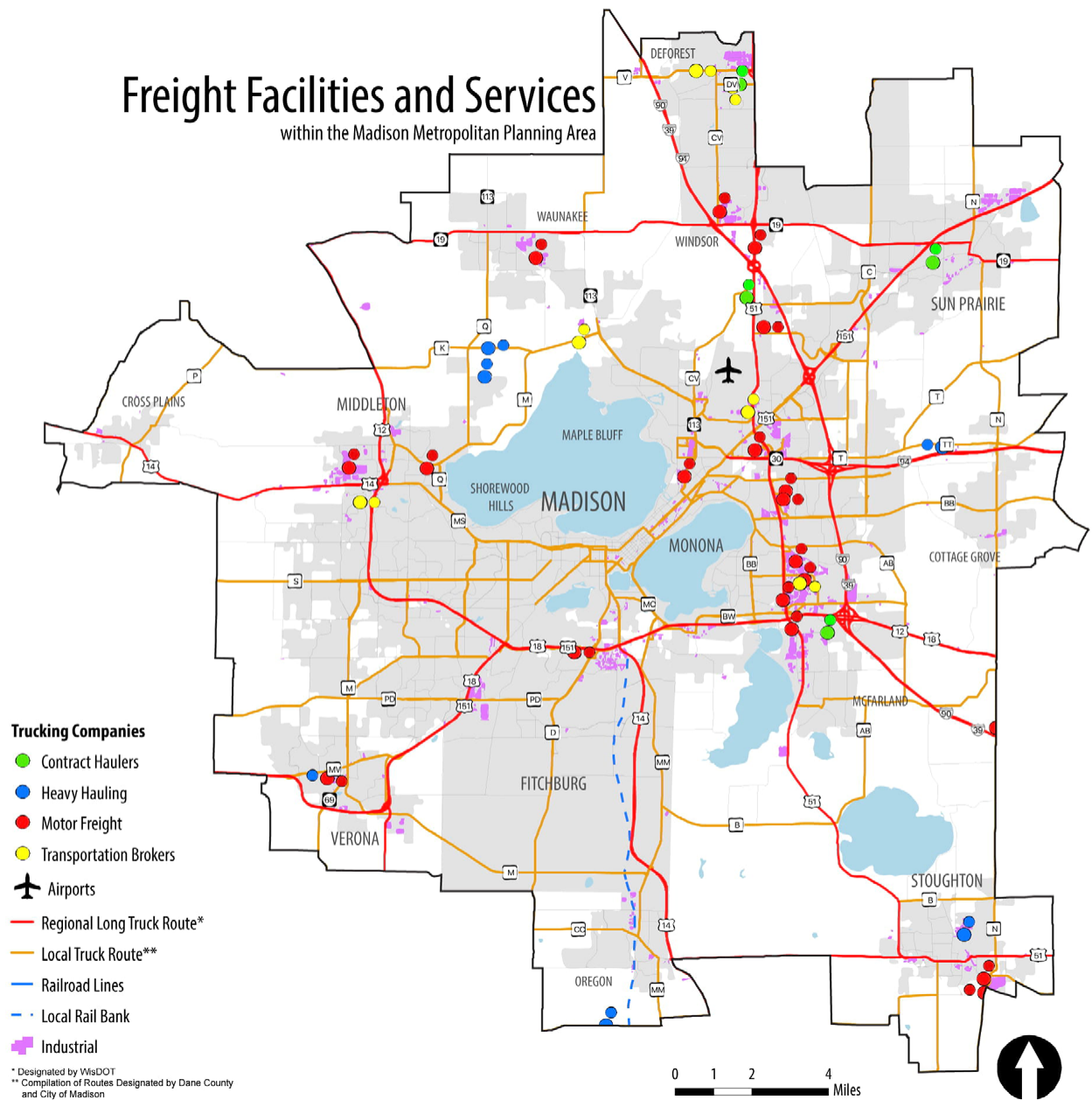


Figure 3-29: Freight Facilities and Services

Between 2007 and 2014 there was a marked increase in the amount of freight arriving by air. This is significant because air freight is dominated by high-value materials, as shown by the very high value of these shipments relative to their weight (Figure 3-28).

The total value of freight shipments, both inbound and outbound, was over \$24 billion dollars in 2014. Inbound shipments had a total value of nearly \$13 billion, outbound \$9.5 billion, and the remainder were internal shipments. Over 90% of the total value of freight shipments was transported by truck.

Figure 3-30

### Weight and Value by Mode (2014)

Mode	Tons	% of Total	Value	% of Total
Truck	23,134,845	97.8%	\$22,138,673,208	91.9%
Rail	500,180	2.1%	\$300,155,438	1.2%
Air	25,966	0.1%	\$1,649,131,677	6.8%
Unknown	161	0.0%	\$4,599,282	0.0%
Total	23,661,153	100.0%	\$24,092,559,606	100.0%



Figure 3-31

### Dane County Freight Tonnage by Mode (2014)

Mode	Outbound Freight					Inbound Freight					Internal Freight	
	Within WI	Outside WI	Total	% Within WI	% Outside WI	Within WI	Outside WI	Total	% Within WI	% Outside WI	Total	% of Total
Truck	5,362,444	3,542,398	8,904,841	60.2%	40%	5,888,514	5,606,114	11,494,628	51.2%	48.8%	2,689,808	99.9%
Rail	16,072	77,736	93,808	17.1%	83%	91,320	311,452	402,772	22.7%	77.3%	3,600	0.1%
Air	3,961	8,993	12,953	30.6%	69%	3,924	9,090	13,013	30.2%	69.8%	0	0.0%
Unknown	0	78	77	0.0%	100%	0	83	83	0.0%	100.0%	0	0.0%
Total	5,382,476	3,629,204	9,011,680	59.7%	40%	5,983,758	5,926,739	11,910,497	50.2%	49.8%	2,693,408	100.0%

A slight majority of the freight shipped into Dane County comes from within the state of Wisconsin. Unsurprisingly, most of the rail and air freight shipped into the county comes from outside of the state, while truck freight is evenly distributed between shipments that come from Wisconsin and those coming from outside of the state. Nearly 60 percent of the outbound freight is bound for a destination within the state. Interestingly, Dane County receives four times more inbound than outbound rail tonnage, while inbound and outbound air shipment tonnage is nearly identical. Intra-county freight shipments amount to 2.6 million tons, nearly all of which are carried by truck.

The county exports and receives a wide variety of commodities. The top inbound commodities by weight are broken stone or riprap (18%), gravel or sand (10%), and warehouse and distribution center goods (9%). The top outbound commodities by weight are gravel or sand (26%), grain (15%), and broken stone or riprap (10%). Internal freight largely consisted of the same commodities – broken stone or riprap (37%), gravel or sand (19%), and petroleum refining products (18%).

## Freight Facilities

### Trucking

As mentioned earlier, a majority of the freight bound for and coming from Dane County is carried by trucks. The Interstate and U.S. highways that pass through the county are statutorily designated as Long Truck Routes – routes that can accommodate vehicles up to 75 feet long. These routes connect the metropolitan area to surrounding cities including La Crosse, Eau Claire, Wausau, the Twin Cities, the Fox Valley Cities, Janesville, Dubuque, Rockford, Milwaukee, and Chicago.

Local truck routes include many major local arterials and business highways within the region such as East Washington Avenue, University Avenue, McKee Road (CTH PD), Milwaukee Street, Reiner/Sprecher Roads, and Monona Drive. These routes are integral for moving freight around the region as well as to and from their local destinations. Local routes are defined by local



Figure 3-32

## Dane County Inbound, Outbound, and Internal Commodities, by Tonnage (2014)

Commodity	Inbound		Outbound		Internal		Total	
	Tonnage	%	Tonnage	%	Tonnage	%	Tonnage	%
Gravel or Sand	1,232,524	10.3%	2,325,472	25.7%	521,242	19.4%	4,079,238	17.2%
Broken Stone or Riprap	2,142,057	18.0%	886,314	9.8%	1,004,541	37.3%	4,032,912	17.0%
Grain	587,880	4.9%	1,369,294	15.1%	20,704	0.8%	1,977,878	8.4%
Warehouse & Distribution Center	1,083,034	9.1%	562,369	6.2%	53,009	2.0%	1,698,411	7.2%
Petroleum Refining Products	395,170	3.3%	628,041	6.9%	490,869	18.2%	1,514,080	6.4%
Misc Waste or Scrap	527,726	4.4%	270,043	3.0%	120,199	4.5%	917,968	3.9%
Dairy Farm Products	121,181	1.0%	571,323	6.3%	10,753	0.4%	703,258	3.0%
Ready-mix Concrete, Wet	429,090	3.6%	91,843	1.0%	123,094	4.6%	644,027	2.7%
Misc. Field Crops	346,597	2.9%	120,828	1.3%	9,836	0.4%	477,260	2.0%
Asphalt Paving Blocks or Mix	379,740	3.2%	-	0.0%	-	0.0%	379,740	1.6%
Concrete Products	269,007	2.3%	33,091	0.4%	16,046	0.6%	318,145	1.3%
Prepared or Canned Feed	86,514	0.7%	204,642	2.3%	8,654	0.3%	299,811	1.3%
Liquefied Gases, Coal or Petroleum	139,806	1.2%	81,558	0.9%	19,362	0.7%	240,725	1.0%
Cut Stone or Stone Products	80,625	0.7%	106,459	1.2%	37,650	1.4%	224,734	0.9%
Bread or Other Bakery Prod	54,128	0.5%	119,521	1.3%	25,459	0.9%	199,108	0.8%
Livestock	147,116	1.2%	28,788	0.3%	1,212	0.0%	177,116	0.7%
Misc Plastic Products	64,879	0.5%	100,122	1.1%	5,192	0.2%	170,193	0.7%
Oil Kernels, Nuts or Seeds	42,059	0.4%	116,061	1.3%	2,057	0.1%	160,177	0.7%
Soft Drinks or Mineral Water	155,238	1.3%	-	0.0%	-	0.0%	155,238	0.7%
Misc Food Preparations, Nec	65,356	0.5%	63,593	0.7%	13,861	0.5%	142,810	0.6%
Primary Iron or Steel Products	139,034	1.2%	-	0.0%	-	0.0%	139,034	0.6%
Truck Trailers	18,855	0.2%	85,278	0.9%	21,978	0.8%	126,111	0.5%
Misc Industrial Organic Chemicals	120,172	1.0%	-	0.0%	-	0.0%	120,172	0.5%
Fertilizers	37,042	0.3%	62,630	0.7%	14,040	0.5%	113,711	0.5%
Misc Metal Work	44,187	0.4%	60,685	0.7%	7,434	0.3%	112,306	0.5%
Lumber or Dimension Stock	111,693	0.9%	-	0.0%	-	0.0%	111,693	0.5%
Portland Cement	86,772	0.7%	8,694	0.1%	15,850	0.6%	111,315	0.5%
Meat Products	17,408	0.1%	77,680	0.9%	8,586	0.3%	103,674	0.4%
Metal Scrap or Tailings	-	0.0%	102,528	1.1%	-	0.0%	102,528	0.4%
Paper Waste or Scrap	978	0.0%	97,512	1.1%	1,022	0.0%	99,512	0.4%
Flour or Other Grain Mill Products	98,680	0.8%	-	0.0%	-	0.0%	98,680	0.4%
OTHER	2,885,948	24.2%	882,881	9.7%	140,759	5.2%	3,909,588	16.5%
Total	11,910,497	100%	9,057,248	100%	2,693,408	100.0%	23,661,153	100%



municipalities and Dane County and are shown in orange on the map to the right.

The metropolitan area is home to numerous trucking companies including contract haulers, heavy hauling companies, motor freight companies, and transportation brokers. Most of these companies cluster in industrial areas and near long truck routes. Many truck companies are located along the US Highway 51 corridor due to the corridor's relatively easy access to the Interstate System.

### Rail

The Wisconsin and Southern Railroad Company (WSOR) is the principal or sole operator on all of the rail lines in the area except for a segment that runs between Madison and DeForest that is owned by Canadian Pacific. WSOR connects the region with over 21 counties in southern Wisconsin and northern Illinois on its more than 700 miles of track.

### Air

The Dane County Regional Airport (MSN) on the north side of Madison provides air cargo service to the region. The most recent major change in cargo operations at the airport occurred in 2010, when FedEx increased service to meet the demands

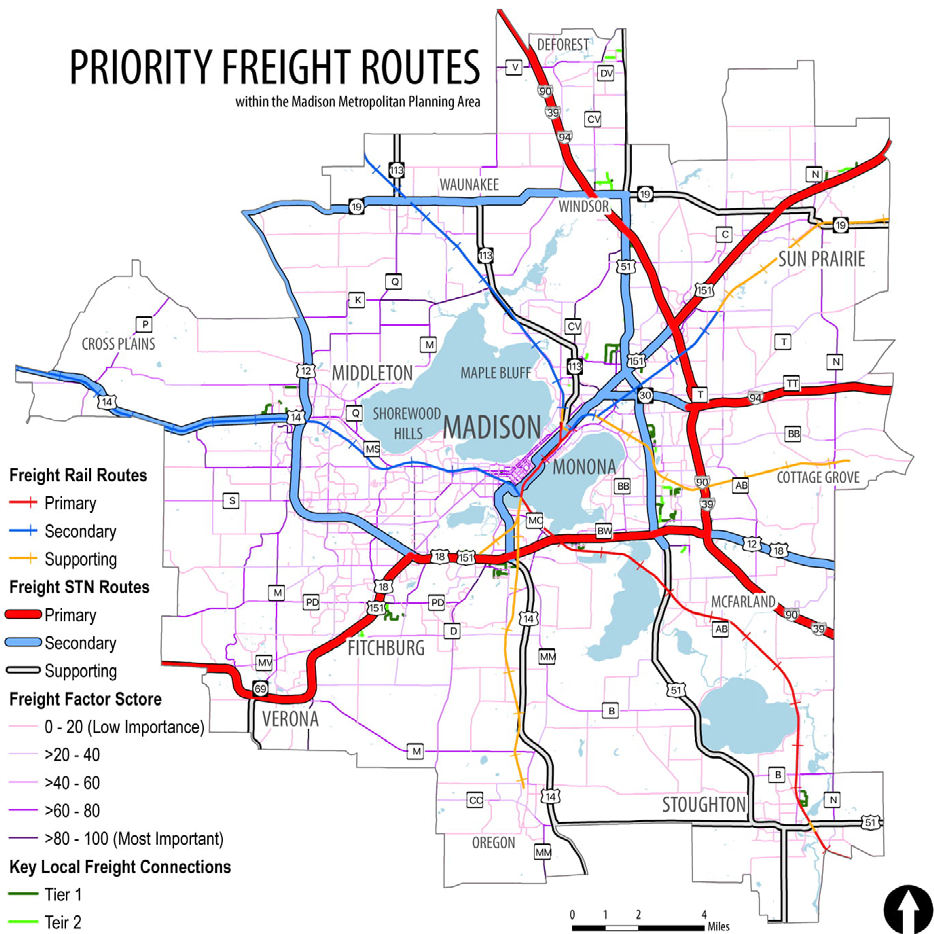


Figure 3-33: Priority Freight Routes







of the recovering economy, following the departure of a competing air cargo operator. Goods shipped by air tend to be high value, low weight, and perishable or otherwise time sensitive. Examples include medical equipment, farm and food products, and medical samples.

#### Intermodal

Intermodal facilities provide access and service to multiple modes of transportation without any handling of the freight itself while changing modes. There are no intermodal facilities in Dane County.

#### Priority Freight Routes

WisDOT is finishing up work on the first [State Freight Plan](#). As part of the planning effort, WisDOT examined all freight routes within the state and identified the most important regional routes, rail lines, and local routes. For local routes, state highways, railroads, ports, and airports WisDOT developed a “freight factor” based on the freight tonnage, value, and connection between modes that a particular route provides. The freight factor of a roadway signifies the importance of a route to the freight network.

The map on the previous page identifies primary, secondary, and supporting rail and state highway network routes. Additionally, it highlights the freight factor of local routes, and key local freight connections.



## National Highway Freight Program

Section 1116 of the FAST Act established a new National Highway Freight Program (NHFP) to increase the efficiency of freight movement on the National Highway Freight Network (NHFN), replacing the National Freight Network and Primary Freight Network created under MAP-21. The NHFN is composed of the following road systems:

- Primary Highway Freight System (PHFS)- The most critical highway portions of the US freight transportation system.
- Interstate routes not on the PHFS.
- Critical Urban Freight Corridors (CUFC)- Roads in urbanized areas which provide access and connect the PHFS and interstates with ports, public transportation facilities, or other intermodal transportation facilities. Each state, in consultation with MPOs, may designate up to 75 miles of highway as CUFCs.
- Critical Rural Freight Corridors (CRFC)- Roads not in an urbanized area which provide access and connect the PHFS and interstates with ports, public transportation facilities, or intermodal transportation facilities. Each state may designate up to 150 miles of highway as CRFCs.

The FAST Act requires FHWA to re-designate the PHFS every 5 years to reflect changes in freight flows; states can designate CUFCs and CRFCs on a rolling basis. National Highway Freight Program funds may only be used for projects on the NHFN.

As shown in Figure 3-34, in Dane County Interstates 39, 90, and 94 are included in the PHFS of the NHFN, in addition to approximately 12 miles of the Beltline from Gammon Road to I-39/90.

As part of the draft National Freight Strategic Plan, the U.S. DOT has proposed a draft National Multimodal Freight Network (NMFN) that includes railways, waterways, ports and harbors, pipelines, airports, and intermodal facilities, in addition to highway facilities, that is a more comprehensive collection of the facilities that are critical to the safe and efficient movement of freight throughout the country.



# National Highway Freight Network: Wisconsin

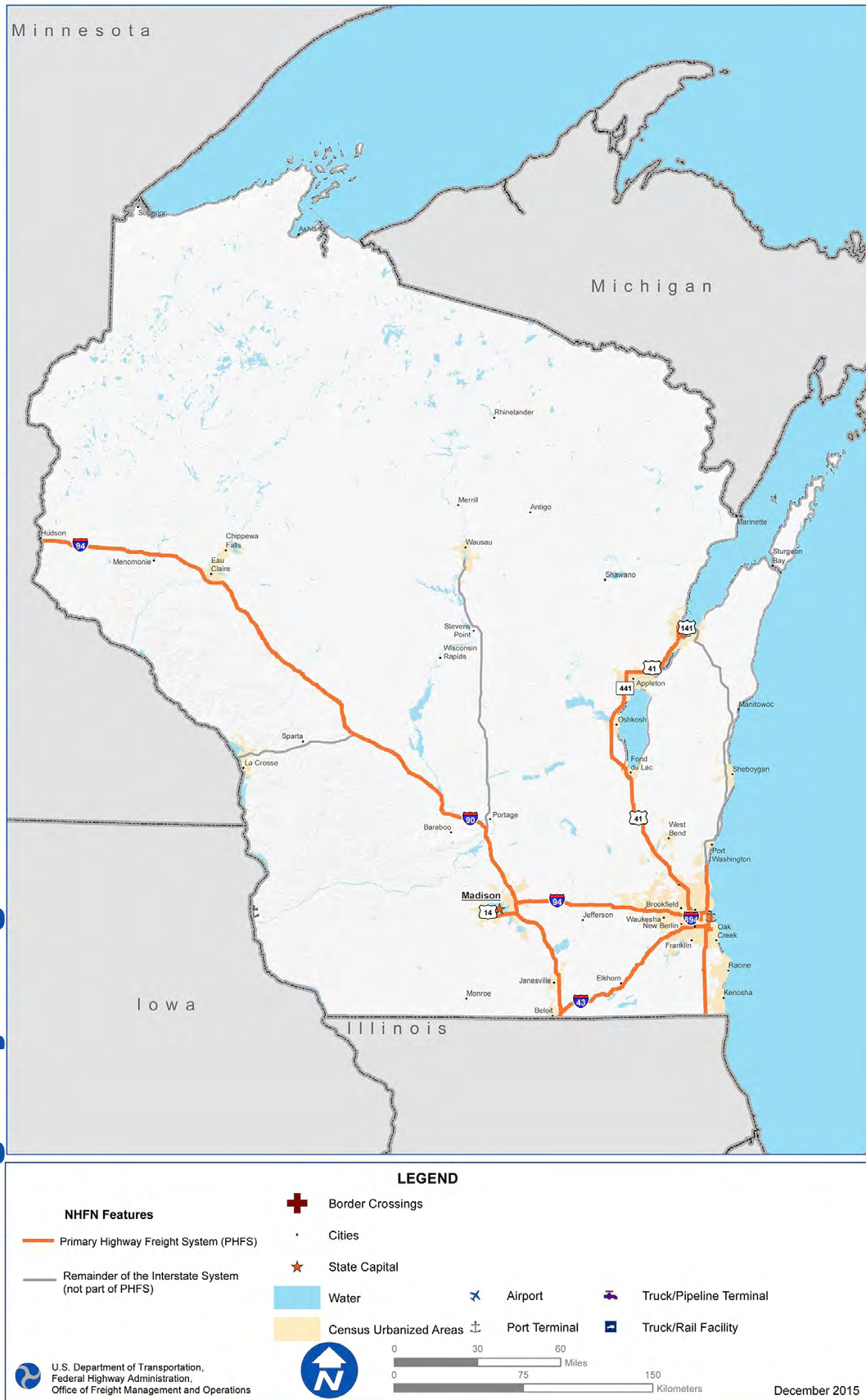


Figure 3-34: National Highway Freight Network in Wisconsin